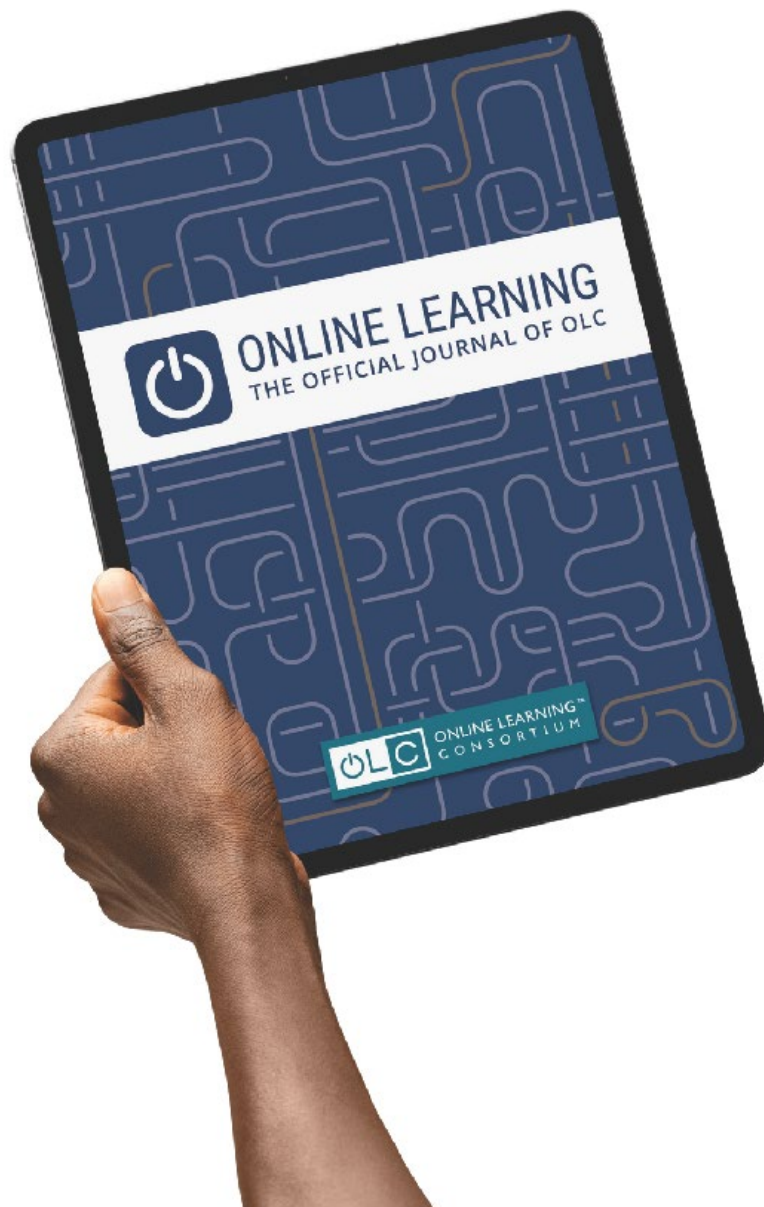




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# Introduction to the Special Issue: Highlighting AERA's Online Teaching and Learning SIG 2025

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Lowenthal, P. R., Rice, M. F., Moore, R. L., & Belt, E. S. (2025). Introduction to the Special Issue: Highlighting AERA's Online Teaching and Learning SIG 2025. *Online Learning*, 29(4), iii-vii. <https://doi.org/10.24059/olj.v29i4.5453>

The American Educational Research Association (AERA) is an international society that “strives to advance knowledge about education, to encourage scholarly inquiry related to education, and to promote the use of research to improve education and serve the public good” ([About AERA](#)). AERA members consist of researchers, practitioners, and policymakers who belong to one or more of the 12 divisions and more than 150 special interest groups (SIGs). They come together annually to share educational research results and discuss implications for practice. The Online Teaching and Learning (OTL) SIG is a group of over 200 members who discuss and disseminate challenges and possibilities relating to online teaching and learning. SIG OTL and the Online Learning Consortium (OLC) have maintained a long-standing collaboration to advance online, blended, and digital learning theory and practice. The AERA annual meeting in 2025 was held in Denver, Colorado. The theme of the meeting was “[Research, Remedy, and Repair: Toward Just Education Renewal](#).”

Since 2016, the *Online Learning Journal* (OLJ), the official journal of the OLC, has published an annual special issue showcasing research from SIG OTL members. This year's collection of eleven articles is grouped around four dimensions of online education: measuring online learning, examining the social dimensions of online learning, addressing challenges of engagement and completion, and developing online teaching capacity.

Collectively, the articles in this special issue illustrate a diversity of contemporary scholarship in online education and its engagement with foundational questions about how we measure, design, and support meaningful learning experiences. From psychometric validation of assessment instruments to innovative approaches for developing teacher capacity and student engagement, these studies represent an ongoing effort to link research on design, context, and evidence in meaningful ways. The research articles are organized here to move from how we measure online learning, to how we relate within it, to how we engage and persist, and finally to how we teach and transform practice. The narrative cadence reflects a progression from epistemological questions of evidence and validity to the

relational, operational, and developmental dimensions that define contemporary research on online teaching and learning.

The first three articles focus on the development and validation of measurement instruments to assess various dimensions of the online learning environment. These studies demonstrate the importance of rigorous psychometric evaluation across diverse contexts—from assessing learner characteristics and self-regulatory behaviors to evaluating instructional practices and pedagogical tools. By establishing valid and reliable measures, researchers and practitioners may consider using these instruments to understand and improve online learning experiences across different populations and educational settings.

Na, Jeong, Clarke-Midura, and van Dijk (2025) examine the cross-cultural validity of the Online Self-Regulated Learning Questionnaire (OSLQ) with 571 Korean college students. Using both confirmatory factor analysis and item factor analysis, they found support for a seven-factor model. They found that the OSLQ instrument demonstrates strong psychometric properties for assessing students with lower self-regulated learning abilities, and that students with moderate to low ability levels tended to overestimate their skills.

Byrne, Mondrey, Folami, Moeyaert, and Licata-Hoang (2025) expand upon trauma-informed pedagogy in online teaching by developing and validating a student-facing survey instrument. Drawing on data from 129 undergraduate students at a Historically Black University, they present a valid and reliable measure that faculty and instructional designers can use to understand and implement trauma-informed practices in asynchronous online courses.

Agrati, Perla, Vinci, and Beri (2025) investigate pre-service teachers' attitudes toward and use of online assessment tools, examining how prior teaching experience influences their engagement with digital assessment technologies. Their study of 3,780 Italian pre-service teachers revealed that while experience has little correlation with frequency of use of digital technologies, it significantly enhances critical evaluation of tool selection and assessment utility, suggesting that teacher education programs should differentiate training based on experience levels.

The next three articles examine the multifaceted nature of social interaction and social presence in online learning environments. Taken together, these studies reinforce that social presence is not a monolithic construct but rather manifests differently depending on learner characteristics, stakeholder perspectives, and instructional modalities. By investigating social dynamics from the perspectives of parents, non-traditional graduate students, and language learners, these researchers' work highlights the complex interplay among social connection, learning outcomes, and course design.

Song, Koehler, Richardson, and Cheng (2025) employed a mixed-methods approach to investigate Chinese parents' perceptions of social presence in their young children's online learning experiences. Their study of 53 parents revealed significant positive relationships between perceived social presence and both perceived learning and satisfaction with instructors, with social presence accounting for 26.7% of the variance in perceived learning. Their qualitative findings further support the importance of considering culture in the interplay between social and teaching presence.

Mercado and Shin (2025) examine social presence through a case study of 15 non-traditional graduate students participating in collaborative activities within a practice-oriented



online course. Their analysis revealed that while self-regulation and team leadership enhanced group dynamics and accountability, students faced challenges with task complexity and time management. Their study reinforces the importance of instructor support in addressing knowledge gaps and of team leadership in fostering purposeful interactions.

Jiang, Xie, and Stein (2025) investigated how basic psychological need satisfaction (e.g., autonomy, competence, and relatedness) related to students' willingness to communicate in online language learning across synchronous and asynchronous modes. Using experience sampling methodology with 104 students, they found that while competence and relatedness needs were associated with willingness to communicate in both modes, autonomy need satisfaction mattered only in asynchronous settings, and the relationship between willingness to communicate and communication quality varied by instructional format. Their findings suggest that online instructors might consider emphasizing choice, self-pacing, and independent reflection when designing asynchronous online learning activities.

Then the next two articles investigate persistent challenges in online education: sustaining learner engagement and promoting course completion. Both studies move beyond documenting noncompletion rates to testing interventions and examining behavioral patterns that influence persistence across diverse learner populations. These researchers reveal how accountability structures, self-regulated learning, cultural contexts, and course design features interact to shape engagement and completion outcomes in large-scale online learning environments.

Li, Kizilcec, Cho, and Krasny (2025) systematically investigated accountability interventions in a MOOC, randomly assigning participants to discuss their progress with someone within the course, outside the course, or in a control condition. While none of the interventions significantly affected overall discussion participation or completion rates, culturally contingent patterns emerged. For instance, U.S. participants in the accountability-outside condition demonstrated higher engagement and completion rates compared to those in the accountability-inside condition. Their results reveal important theoretical questions about how accountability mechanisms operate across different cultural contexts.

Hsiao, Chang, Chen, and Tung (2025) employed a mixed-methods approach to examine how 115 Taiwanese high school students engaged with bilingual scaffolded MOOCs over eight weeks and to investigate the relationships among attitudes toward English, self-regulated learning motivation, online behaviors, and course completion. Their results revealed that students who perceived English as having practical value demonstrated higher self-regulated learning motivation and satisfaction, and that discussion participation significantly predicted course completion. These findings suggest that MOOC designers should prioritize accessible materials, interactive activities, and explicit instructor guidance to support diverse learners.

The last three articles center around the need to support and develop educators' capacity for effective online instruction by examining motivation, professional development, and pedagogical innovation across K-12 and higher education contexts. These studies reemphasize that successful online teaching requires more than technical proficiency; it demands attention to teachers' motivational profiles, confidence levels, as well as the creation of supportive, culturally responsive spaces for both educators and learners. By exploring differentiated support systems, evidence-based professional development outcomes, and

transformative methodologies rooted in cultural practices, these researchers offer practical and theoretical insights for building sustainable online teaching capacity.

Morrison, Smart, Wiles, and Bennett (2025) investigated K-12 teachers' motivation for online teaching using data from 62 teachers in the Southeastern United States. Their analysis revealed significant differences in motivation and self-efficacy across content areas (STEM versus non-STEM), grade bands (elementary, middle, and secondary), and gender, with teachers reporting a moderate overall motivation level of 2.66 on a 4-point scale. These findings reaffirm the importance of tailoring professional development and support for online teaching to teachers' disciplinary contexts, grade levels, and identities rather than assuming a one-size-fits-all approach.

Hill, Hart, Baker, Xiu, and colleagues (2025) examined the perceived effects of structured professional development programs on 82 community college faculty members' online teaching practices and confidence. Following participation in programs focused on core learning theories and practical engagement strategies, the majority of faculty members reported adopting new techniques such as creating welcoming environments and increasing student-student interaction, while also demonstrating increased confidence in both technical skills (e.g., building courses, creating materials) and soft skills (e.g., developing equitable online environments). Their results reinforce the idea that praxis-based professional development can directly translate into more inclusive, engaging, and confident online teaching.

Dathe, Brassington, and Rice (2025) employed a self-study to explore *plática*—a Chicana feminist conversational practice—as a means of creating counterspaces for healing and relational engagement in online teacher education. Through their reflections on teaching during and beyond the pandemic, they illustrated how *plática* methodology can intentionally cultivate intimate spaces that address emotional labor, institutional hierarchies, and pedagogical connections. Their findings offer a transformative framework applicable across various fields, including online teaching and beyond.

Taken together, the eleven studies featured in this issue reaffirm that culturally responsive design, multidimensional engagement, intentional support, and methodological rigor remain essential to advancing both the scholarship and practice of online education. As online and blended learning continue to play an increasingly central role in education at all levels, the insights from these SIG OTL scholars provide both theoretical foundations and practical guidance for creating more effective, inclusive, and transformative online learning environments that serve diverse populations and contexts.

Our gratitude goes out to the OLJ editor-in-chief, Peter Shea, as well as the AERA OTL SIG executive committee and all the authors. We hope you'll find these articles as enlightening and informative as we did.

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## References

The American Educational Research Association. (2024, November 8). About AERA.  
<https://www.aera.net/About-AERA>

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# Online Assessment Tools: The Challenge of Training Pre-Service Teachers

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## Abstract

This study explores how online assessment tools can support the development of pre-service secondary teachers' assessment competencies, with a focus on the impact of prior teaching experience. It was conducted with a sample of 3,780 pre-service teachers at Pegaso University in Italy, 64.9% of whom had experience of working in a school for an average of eight years each. A questionnaire was administered in early 2024 to examine the participants' attitudes toward knowledge and use of digital assessment tools. The results revealed a strong preference for online tools due to their perceived efficiency, clarity, and transparency. Although there was little correlation between experience and overall frequency of use ( $r = 0.02$ ), more experienced teachers reported a higher appreciation of tool selection ( $r = 0.11$ ), format suitability ( $r = 0.15$ ), and assessment utility ( $r = 0.42$ ). These findings highlight that teaching experience enhances critical engagement with digital assessment as well as familiarity. Based on the teacher assessment literacy in practice model, this study recommends that teacher education programs should adapt their training to different levels of experience to promote the development of effective and ethical digital assessment skills.

*Keywords:* Assessment; Tools; Pre-service teachers

Agrati, L.S., Perla, L., Vinci, V., and Beri, A. (2025). Online Assessment Tools: The Challenge of Training Pre-Service Teachers. *Online Learning*, 29(4), 1-24.  
<https://doi.org/10.24059/olj.v29i4.5217>

## Introduction

The rapid integration of digital technologies into education has profoundly transformed teaching and learning processes, particularly in the field of assessment. This shift has not only revolutionized the way students learn and are evaluated but has also become a critical area of focus for educational research (Perla & Vinci, 2024). The global pandemic further accelerated the adoption of online learning platforms, making digital assessment tools essential for measuring students' knowledge, providing timely feedback, and supporting personalized learning experiences (Lipnevich et al., 2021; Lobos et al., 2022).

However, despite their growing prevalence, effectively using these tools requires not only technical skills, but also a solid understanding of pedagogical principles, assessment literacy, and alignment between learning objectives and assessment methods.

The research history of online assessment tools began in the 1980s and has evolved through multiple generations, from basic computer-based testing to adaptive systems, continuous measurement and intelligent measurement. While the historical evolution of online assessment from basic computer-based testing to intelligent measurement has been well-documented, the innovations present significant challenges, including the need for digital competencies, data privacy protection, equitable access, and the risk of academic misconduct (Garg & Goel, 2022).

For pre-service teachers, developing competence in using online assessment tools is essential, yet many report feeling unprepared to integrate these technologies into their practice (Xu & He, 2019). This highlights a crucial gap in initial teacher education: while the literature has explored the benefits and challenges of online assessment, there is limited empirical evidence on how educational programs can effectively enhance assessment competencies in digital contexts (Agrati, 2021; Gisbert-Cervera et al., 2022).

To address this gap, this exploratory study examines how online assessment tools influence the development of assessment competencies among pre-service teachers. Specifically, it investigates the factors that shape their understanding and use of these tools, considering the role of prior teaching experience and the criteria they deem most useful for tool selection. Additionally, this research describes how initial teacher training programs address assessment literacy, focusing on the curriculum structure and the pedagogical practices that are prioritized in the context of online assessment.

The findings of this research aim to provide actionable insights for developing robust teacher education curricula that better prepare future educators for the demands of the digital classroom.

## Literature Review

### *Research on Online Assessment Tools: From Historical Evolution to Current Challenges*

The body of research on online assessment traces its origins back to the 1980s, spurred by the integration of information technologies into education. The evolution of these tools can be understood through a framework of four distinct generations (Bunderson et al., 1989; Puentedura, 2012).

The first generation, known as computerized testing, focused on delivering conventional standardized tests to reduce teachers' workload, particularly with large student groups. Building on this, the second generation introduced computerized adaptive testing, allowing for the personalization of assessments by adjusting question difficulty based on student responses.

The shift toward more detailed data collection began with the third generation, continuous measurement, which captured granular data on student performance, such as frequency and duration of learning activities. This approach provided rich insights into performance in relation to individual and contextual factors. Finally, the fourth and most recent generation, intelligent measurement, leverages advanced data processing to generate "intelligent scores" that not only interpret performance but also offer real-time guidance to students and educators, enabling a more holistic and personalized approach to learning (Redecker & Johannessen, 2013). This conceptual shift from efficiency-focused testing to a transformative, embedded assessment paradigm marks a key development in the field.

These technological advancements have given rise to a diverse ecosystem of online assessment tools currently available for educational use. This includes widely used platforms like Kahoot! and Quizizz for creating quizzes and tests, advanced adaptive tests that leverage AI to personalize learning experiences, and authentic performance assessments that use simulation platforms like TestGorilla to evaluate practical skills in realistic scenarios. Interactive video platforms like EDpuzzle also integrate assessments directly within video content to enhance engagement. Collectively, these tools highlight the varied and data-driven ways that online assessment can support education.

Research on the benefits of these tools has reported numerous positive outcomes, particularly with regard to verifying student learning and providing prompt, relevant feedback. For instance, the use of learning analytics and data mining has been shown to support formative assessment and personalized tutoring by identifying underperforming students, generating diagnostic reports, and analyzing interaction patterns (Nguyen et al., 2020). Some studies have even found that computer-based performance may surpass traditional paper-based formats for specific skills (Northcote, 2008; Taylor, 2024). Furthermore, online tools offer a significant advantage in scalability, making it possible to administer assessments to large groups simultaneously, thereby saving time and resources (Milat et al., 2020). Studies have also emphasized students' increased engagement through features such as interactivity, gamification, and personalized feedback (Mate & Weidenhofer, 2021). Online tools also facilitate formative assessment, enabling continuous progress monitoring and the adaptation of teaching strategies based on real-time data (Heil & Ifenthaler, 2023).

Despite these significant benefits, the literature also identifies several practical and pedagogical challenges. Technical issues, such as internet connectivity problems, software incompatibility, and device malfunctions, can disrupt the smooth administration of assessments and negatively impact students' experiences (Garg & Goel, 2022). Concerns about academic integrity are paramount, as the ease with which unauthorized materials can be accessed or inappropriate collaboration can occur during online assessments increases the risk of cheating and plagiarism. This has prompted studies to identify the gaps that facilitate online cheating in tools integrated into digital platforms like Canvas LMS and Moodle (Trifonova & Ivanova, 2024; Mehrishi et al., 2025). Additionally, the integration of learning analytics raises important concerns about student privacy and data security, as sensitive

information is collected and stored without adequate protection. Furthermore, issues of access and equity persist, as a lack of reliable internet and devices can create a significant digital divide. Critically, the effective use of these tools is often hampered by limited digital literacy among both teachers and students (Kruger et al., 2015). This has been particularly evident in studies highlighting how individual factors, such as prior experience with these tools, appear to outweigh contextual factors in shaping teachers' competence (Zhang et al., 2021). Finally, the field still lacks validated theoretical models to guide teachers' critical pedagogical practice in a digital assessment context, representing a fundamental challenge that needs to be addressed by future research (Viberg et al., 2024).

### ***Training Pre-Service Teachers to Use Online Assessment Tools***

Since technology is now integral to contemporary learning environments, it is essential to train teachers in the use of online assessment tools. Teachers must understand the different tools and how they work, including creating quizzes, providing real-time feedback and monitoring student progress. They must also be able to integrate these tools effectively into instructional design. This involves aligning learning objectives with assessment methods and feedback mechanisms while ensuring accessibility and security for all learners (Agrati, 2021; Gisbert-Cervera et al., 2022).

During the COVID-19 pandemic, many educational institutions adopted a wide range of online assessment systems. In schools, tools hitherto used only in experimental or innovative contexts became part of everyday practice. This shift necessitated emergency digital training for teachers and staff who were not yet proficient in instructional and assessment technologies (Agrati & Vinci, 2022; Perla et al., 2025; Topuz et al., 2022).

Research on assessment training for pre-service teachers has become increasingly structured over time (Looney et al., 2018). However, despite growing interest, studies have shown that pre-service teachers often feel unprepared for conducting assessments (Lutovac & Flores, 2022; Poth, 2013; Xu & He, 2019).

A study conducted in Ukraine with a sample of 162 prospective primary school teachers confirmed the value of training programs dedicated to online assessment tools (Zhorova et al., 2022). However, it also highlighted the need for enhanced postgraduate pedagogical training, as many participants reported difficulties in effectively integrating technological and pedagogical elements. Similarly, a recent qualitative study in Turkey involving 136 pre-service teachers revealed that summative assessment formats were still most prevalent despite the participants acknowledging the limited feedback and adaptability these formats offer (Öztürk, 2024). They also reported encountering difficulties in monitoring student performance, particularly when dealing with large groups of learners, which can undermine the fairness and adequacy of the assessment process.

## **Exploratory Study of Online Assessment Tools**

This section presents an exploratory study examining the impact of online assessment tools on the development of pre-service teachers' assessment competencies. Conducted between February and March 2024, it included students enrolled in the 60-credit teacher qualification program (as per Article 23 of the Italian Ministerial Decree of August 4, 2023). These students were attending cross-disciplinary courses at Pegaso Online University.

## ***Purpose and Research Questions***

The study's primary objective was to examine how online assessment tools facilitate the acquisition of assessment knowledge and skills among early-career teachers. In particular, it addressed the following research questions (RQs):

- RQ1. How does prior teaching experience influence pre-service teachers' understanding of and ability to use online assessment tools?
- RQ2. What factors do teachers consider to be more or less useful when choosing online assessment tools?

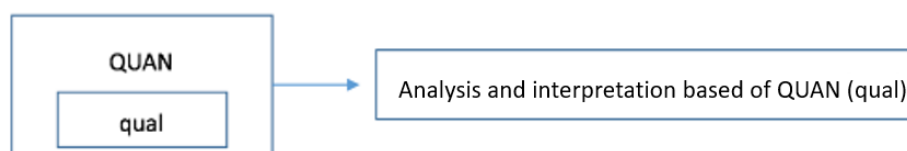
The study also aimed to describe how initial teacher training in secondary education addresses assessment literacy, focusing on the program delivered by the university. To this end, it examined the structure of training curricula, the dimensions of assessment competence that were prioritized and the types of knowledge and practices that were emphasized, particularly concerning the selection and use of online assessment tools.

## ***Research Design and Methodology***

This exploratory investigation employed a mixed embedded design (see Figure 1) that combined simultaneously collected quantitative and qualitative data (Creswell, 2013; Teddlie & Tashakkori, 2009; Trinchero & Robasto, 2019).

**Figure 1**

*The Mixed Embedded Design*



*Note.* Adapted from Teddlie and Tashakkori (2009).

The authors selected this method because of the characteristics of the available data. A mixed embedded design allows for the use of one primary approach (quantitative, in our case) while embedding another approach (qualitative) to obtain further, more in-depth information. This made it possible, in the context of this study, to explore the quantitative aspects more thoroughly, which—without open-ended responses—would have remained mere mentions rather than the subjects of in-depth examination. This method was employed by the authors in previous studies—on pre-service teachers (Perla et al., 2025) and assessment systems (Agrati & Beri, 2025)—and proved to be particularly suitable for this type of data.

The data were analyzed on three levels: (a) through a descriptive statistical analysis, (b) through an inferential analysis of the quantitative data, and (c) through a qualitative analysis of open-ended responses, which was performed using text coding based on grounded theory principles (Glaser et al., 1968). This coding process was conducted by the authors following an inductive approach, allowing categories to emerge directly from the data. After



initial familiarization with the data, the coders jointly developed a coding framework, which was subsequently applied independently.

### ***Context, Participants, and Data Collection***

A convenience sample was drawn from teacher candidates enrolled in a national initial teacher training program for upper secondary education that aimed to prepare them for obtaining subject-specific teaching certification. The course was delivered by Pegaso Online University (Italy).

The sample included 3,780 pre-service teachers<sup>1</sup> (see Table 1). The majority were women (82.9%), 54% held a bachelor's degree, and 32.9% had a postgraduate specialization. Most participants were already employed in schools and had permanent teaching contracts (64.9%).

Prior teaching experience, which was treated as a variable in the statistical analysis, ranged from 5 to 13 years, with an average of 7.95 years and a standard deviation of 1.003.

**Table 2**

*Characteristics of the Participants (n = 3780)*

|                     | Number of participants | Percentage of participants (%) |
|---------------------|------------------------|--------------------------------|
| Male                | 646                    | 17.1                           |
| Female              | 3134                   | 82.9                           |
| Bachelor's degree   | 2040                   | 54.0                           |
| Postgraduate degree | 1242                   | 32.9                           |
| PhD                 | 224                    | 5.9                            |
| Other               | 274                    | 7.2                            |
| Permanent teachers  | 2453                   | 64.9                           |
| Fixed-term teachers | 1229                   | 32.5                           |
| Non-teachers        | 52                     | 1.4                            |
| Other               | 46                     | 1.2                            |

The questionnaire was administered remotely via Google Forms during dedicated sessions on assessment tools as part of the course. Participant anonymity was ensured, and informed consent to use the data for research purposes was obtained via an introductory explanatory text.

The exploratory questionnaire was aimed at collecting information on the representations and needs of pre-service teachers, in a functional way for a next validation.

For the quantitative data, there were no missing values, as all closed-ended questions were mandatory. For the qualitative data, the percentage of missing responses is reported in

<sup>1</sup> Note that the participants in the study, although referred to as pre-service teachers, already had work experience. This is because it is very common in Italy for teachers to have worked before completing their degree. On the one hand, the law allows those who possess the required university credits to be included in ranking lists for teaching assignments even before completing their university studies. On the other hand, many pre-service teachers have already earned a degree and, after gaining experience in schools, decide to obtain teaching certification in order to move beyond precarious employment.

the manuscript (72% response rate for the first open-ended question and 70% for the second). The questionnaire, designed specifically for this study by the authors, was divided into four sections: (a) an introduction and explanation of the core constructs used, (b) socio-professional information (qualitative and quantitative data), (c) basic knowledge related to assessment concepts, such as assessment phases and the use of paper-based and digital tools (quantitative data), and (d) personal reflections and opinions (qualitative data).

The second section included four closed questions and two open questions designed to explore the following specific aspects of online assessment tools:

- The importance of selecting appropriate assessment tools based on the target of evaluation, available resources, and average student ability.
- The frequency with which online tools were used compared to traditional paper-and-pencil methods.
- The preferred formats for online delivery (e.g., multiple choice, short answers, fill-in-the-blank, or short essays).
- The perceived usefulness of online assessment tools in the various stages of the assessment process, such as tool selection, criteria definition, test administration, data collection, analysis and interpretation and communicating results.

## Results

### *Data Analysis and Preliminary Quantitative Results*

To answer the RQs, an initial descriptive and inferential analysis was conducted on in-service teachers' assessment knowledge, based on a questionnaire designed to capture knowledge of and attitudes towards assessment practices (Barnes et al., 2017). The statistical analysis was conducted at two levels:

- A descriptive analysis of the responses, including the calculation of means and standard deviations (see Table 2).
- A correlation analysis between the responses and years of teaching experience to assess the influence of experience on teachers' knowledge and attitudes (see Table 3).

**Table 2**

*Answers to the Teacher Knowledge/Attitudes Questionnaire (n = 3780)*

| Question                                                                                                      | Response option       | Percentage (%) |
|---------------------------------------------------------------------------------------------------------------|-----------------------|----------------|
| 1. In reference to the phases of the assessment process, what weight does the choice of evaluation tool have? | Very low              | 0.2%           |
|                                                                                                               | Low                   | 0.6%           |
|                                                                                                               | Medium                | 12.0%          |
|                                                                                                               | High                  | 39.4%          |
|                                                                                                               | Very high             | 47.8%          |
| 2. How often do you use online assessment tools compared to traditional tools?                                | Never                 | 2.6%           |
|                                                                                                               | Almost never          | 10.1%          |
|                                                                                                               | Sometimes             | 41.4%          |
|                                                                                                               | Often                 | 36.6%          |
|                                                                                                               | Always                | 9.3%           |
| 3. Which of the following assessment tool formats do you                                                      | Multiple-choice tests | 74.0%          |
|                                                                                                               | Short answers         | 7.8%           |
|                                                                                                               | 'Fill the gap'        | 11.5%          |

|                                                                                              |                                              |       |
|----------------------------------------------------------------------------------------------|----------------------------------------------|-------|
| consider most appropriate to administer online?                                              | Short essays                                 | 3.0%  |
|                                                                                              | Other                                        | 3.6%  |
| 4. For which stage of the assessment process do you consider online assessment tools useful? | Choice of the tool/clarification of criteria | 30.4% |
|                                                                                              | Administration of tests                      | 11.5% |
|                                                                                              | Collection–analysis–interpretation of data   | 42.6% |
|                                                                                              | Communication of results                     | 8.4%  |
|                                                                                              | Other                                        | 3.5%  |

Table 2 provides a statistical summary of the responses, presenting the mean and standard deviation for each item. A descriptive analysis was performed by assigning numerical values to the various response types.

The participants assigned very high importance (47.8%) or high importance (39.4%) to selecting the appropriate assessment tools. Furthermore, 41.4% of the teachers reported using online assessment tools *sometimes*, while 36.6% indicated using them *frequently*.

Online assessment tools were considered particularly suitable for multiple-choice tests (74%). They were deemed most effective during the data collection, analysis, and interpretation phase (42.6%), followed by the tool selection and assessment criteria clarification phase (30.4%).

### Table 3

#### *Answers—Classroom Experience: Correlational Analysis*

| Correlated Variables                               | Spearman's $\rho$ | $\chi^2$ (Chi-Square) | Sig. (p-value) |
|----------------------------------------------------|-------------------|-----------------------|----------------|
| Years of teaching → Choice of evaluation tool      | 0.030             | -                     | 0.068          |
| Years of teaching → Use of online assessment tools | -0.046            | -                     | 0.006          |
| Years of teaching → Assessment tool formats        | -                 | 8.093                 | 0.088          |
| Years of teaching → Process of assessment          | -                 | 2.902                 | 0.574          |

The relationship between years of teaching experience and various aspects of software evaluation tool usage was investigated. Spearman's rank correlation coefficients ( $\rho$ ) were computed to assess monotonic associations between years of teaching and ordinal variables such as choice and use of evaluation tools. For categorical variables, Chi-square ( $\chi^2$ ) tests were performed to examine potential associations.

Specifically, the Kruskal-Wallis test, which relies on a  $\chi^2$  distribution, was employed to determine whether the distribution of teaching experience differed significantly across categories of the assessment process phase deemed most useful for software evaluation tools. (see Table 3).

### *Data Analysis and Preliminary Qualitative Results*

To address the second research question, the textual data collected from the two open-ended questions were analyzed using inferential coding procedures (Creswell, 2013) structured into the following three phases:

1. Open coding: This involved conceptualizing meaningful textual units and identifying descriptive labels.
2. Axial coding: This involved identifying frequent macro-categories emerging from the data, along with their number of occurrences.
3. Selective coding: This consisted of the hierarchical and analytical organization of macro-categories to extract the final core categories.

Table 4 refers to the following question: “Thinking about your teaching (or general school) experience, what do you consider to be the most helpful factor in selecting appropriate assessment tools?” This question (Q15) received 2,726 open responses, representing 72% of the total sample.

**Table 4**

*Answers—Useful Factors for Assessment (n = 2726)*

| Main category<br>(n)                        | Axial coding<br>(n)                    | Open coding (n)                               | Example                                                                                                                                        |
|---------------------------------------------|----------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| General<br>answers (99)                     | Nothing (11)                           | -                                             | ‘Nothing’                                                                                                                                      |
|                                             | I don’t know<br>(20)                   | -                                             | ‘I don’t know’                                                                                                                                 |
|                                             | No additional<br>specification<br>(68) | -                                             | ‘I think there are many of them’                                                                                                               |
| Variables upon<br>which it<br>depends (814) | Contextual<br>issues (361)             | Time (56)                                     | ‘The time available’                                                                                                                           |
|                                             |                                        | Contextual<br>knowledge and<br>analysis (246) | ‘Knowledge of the classroom<br>context’                                                                                                        |
|                                             |                                        | Resources (59)                                | ‘Resources made available’                                                                                                                     |
|                                             | What you<br>want to assess<br>(453)    | Objective to be<br>achieved (193)             | ‘The choice should be made<br>according to the training<br>objectives and the activity to be<br>designed’                                      |
|                                             |                                        | Topic/subject<br>covered (128)                | ‘The type of subject taught’                                                                                                                   |
|                                             |                                        | Type of test (64)                             | ‘Type of test’                                                                                                                                 |
| Assessment<br>tool (437)                    | Tool type<br>(274)                     | Competence to be<br>assessed (68)             | ‘Skills/knowledge and<br>competence to be assessed’                                                                                            |
|                                             |                                        | Observation (139)                             | ‘Class observation’                                                                                                                            |
|                                             |                                        | Structured/semi-<br>structured tests (58)     | ‘The most commonly used<br>structured tests are those<br>involving multiple-choice<br>answers, true/false answers,<br>reordering, matching and |

|                                  |                                         |                                     |                                                                                                                                                                                                                                                                       |
|----------------------------------|-----------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  |                                         | Feedback (56)                       | associating words and concepts and inserting missing words'<br>'The decision-making process concerning the most appropriate assessment instrument should be guided by the educational objectives, the diversity of the students and the need for meaningful feedback' |
|                                  |                                         | Other tools (21)                    | 'Evaluation grids'; 'Scheme'                                                                                                                                                                                                                                          |
|                                  | Use of different tools (n = 68)         |                                     | 'Having different tools at your disposal'                                                                                                                                                                                                                             |
|                                  | Tool mode (n = 95)                      |                                     | 'Types of tests used and knowing how to use technology'                                                                                                                                                                                                               |
|                                  |                                         |                                     | 'Paper and computer mode'                                                                                                                                                                                                                                             |
| Assessment characteristics (299) | Need for transparency/objectivity (112) |                                     | 'Clarity and transparency'                                                                                                                                                                                                                                            |
|                                  | Usefulness (51)                         |                                     | 'Utility, applicability, usability'                                                                                                                                                                                                                                   |
|                                  | Speed (48)                              |                                     | 'Speed of administration of the evaluation instrument'                                                                                                                                                                                                                |
|                                  | Accessible (54)                         |                                     | 'Inclusiveness of tests and accessibility of tools'                                                                                                                                                                                                                   |
|                                  | Formative (34)                          |                                     | 'Formative value and the capacity for "faithful" restitution'                                                                                                                                                                                                         |
| Educational relationship (1078)  | Teacher (468)                           | Knowledge of students/classes (142) | 'Knowledge of the students in the class'                                                                                                                                                                                                                              |
|                                  |                                         | Teacher experience (190)            | 'Experience and training'                                                                                                                                                                                                                                             |
|                                  |                                         | Relationship with students (40)     | 'Taking into account the importance of relationship and communication'                                                                                                                                                                                                |
|                                  |                                         | Planning/organization (96)          | 'The organization and planning of teaching activities'                                                                                                                                                                                                                |
|                                  | Students (610)                          | Student motivation (29)             | 'Student motivation'                                                                                                                                                                                                                                                  |
|                                  |                                         | Student characteristics (581)       | 'Heterogeneity of student characteristics'                                                                                                                                                                                                                            |

The responses were grouped into five main macro-categories. These were then further detailed through axial and open coding, accompanied by illustrative examples.

The first category, *general responses* ( $n = 99$ ), included vague or non-informative answers and expressions of uncertainty. Examples include statements such as "Nothing" and

“I don’t know,” as well as generic declarations such as “I think there are many of them,” which did not provide specific insights into the topic.

The second category, *dependent variables* ( $n = 814$ ), included factors that influenced the choice of assessment tools. These included contextual issues, such as available time, knowledge of the educational context and accessible resources. A significant proportion of the responses related to what was intended to be assessed, considering the educational objective, the subject matter, the type of test and the competence to be verified.

The third macro-category, *assessment tools* ( $n = 437$ ), included the various types of tools that could be adopted, such as observation, structured or semi-structured tests, feedback mechanisms and other instruments, such as rubrics or schemes. Consideration was also given to the combined use of multiple tools and their modes of use, including technology and the distinction between paper-based and digital tools.

The fourth category, *assessment characteristics* ( $n = 299$ ), included references to the desired qualities of assessment tools, such as transparency and objectivity, usefulness and ease of use, speed of administration, accessibility, and inclusiveness. The formative value attributed to the assessment was also considered.

Finally, the largest category was *Educational Relationship* ( $n = 1078$ ), which was subdivided into two main areas: the teacher’s role—referring to their knowledge of the class, their professional experience, the quality of the teacher-student relationship and their ability to plan instruction—and aspects related to the students, including their motivation and, above all, the heterogeneity of their characteristics, which emerged as a particularly significant factor.

An analysis was conducted on question Q16, which asked, “Thinking about your teaching (or general school) experience, what do you consider to be the main obstacle to selecting the most appropriate assessment tools?” There were 2638 valid responses to this question (70% of the total; see Table 5).

**Table 5**

*Answers—Hindering Factors for Assessment* ( $n = 2638$ )

| Main category ( $n$ )                 | Axial coding ( $n$ )                                                   | Open coding ( $n$ )                                                                                                 | Example                                                                                                                                                                   |
|---------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General answers (237)                 | Nothing (116)<br>I don’t know (75)<br>No additional specification (46) |                                                                                                                     | ‘Nothing’<br>‘I don’t know’<br>‘I think there are many of them’                                                                                                           |
| Variables on which it depends (1,210) | Contextual issues (1043)                                               | Time (278)<br>Contextual problems (147)<br>Lack of resources (292)<br>Routine (13)<br>Cost (13)<br>Bureaucracy (95) | ‘Lack of time to assess’<br>‘Class context’<br>‘The limited availability of resources’<br>‘The scholastic routine’<br>‘Cost’<br>‘The bureaucracy of the education system’ |

|                                 |                                |                                              |                                                                                                                                              |
|---------------------------------|--------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Educational relationship (1191) | Assessment (167)               | Inadequate technology (192)                  | ‘Resistance to technology’                                                                                                                   |
|                                 |                                | Too much technology (13)                     | ‘The use of too much technology’                                                                                                             |
|                                 |                                | Topic type (29)                              | ‘Topic type’                                                                                                                                 |
|                                 |                                | Too complex assessment (109)                 | ‘The need to encapsulate a complex evaluation of a grade or judgement’                                                                       |
|                                 |                                | Evaluation limited to grades (29)            | ‘A system based on votes’                                                                                                                    |
|                                 | Students (922)                 | Student behavior/lack of interest (136)      | ‘Class behaviour’                                                                                                                            |
|                                 |                                | Too large or heterogeneous class group (402) | ‘The heterogeneity of classes and different needs’                                                                                           |
|                                 |                                | Lack of collaboration (93)                   | ‘Student non-cooperation’                                                                                                                    |
|                                 |                                | Unpreparedness (291)                         | ‘Lack of knowledge’                                                                                                                          |
|                                 |                                | Unpreparedness (151)                         | ‘Parents’ comments’                                                                                                                          |
|                                 | Parents (16)<br>Teachers (253) |                                              | ‘The lack of specific training on the different assessment tools available and modern pedagogical methodologies might be a further obstacle’ |
|                                 |                                | Lack of innovation (102)                     | ‘Lack of support in promoting and sustaining innovation’                                                                                     |

The responses were organized into three main categories. The first, *general responses*, included 237 codes and consisted of vague or non-informative statements. Subcategories consisted of answers such as “Nothing” ( $n = 116$ ), “I don’t know” ( $n = 75$ ) and other unspecified expressions ( $n = 46$ )—for example, “I think there are many of them.”

The second macro-category, *dependent variables*, include 1,210 codes—representing a substantial portion. Within this category, contextual issues dominated, with 1,043 codes, encompassing various factors perceived as obstacles to assessment. The most frequently mentioned issues were lack of time ( $n = 278$ ), scarcity of resources ( $n = 292$ ) and class-context problems ( $n = 147$ ). Structural aspects of the school system were also mentioned, including bureaucracy ( $n = 95$  codes), cost ( $n = 13$  codes), and school routine ( $n = 13$  codes). Technology was viewed ambivalently—technological inadequacy was highlighted ( $n = 192$ ), but there was also a perception of excessive reliance on technology ( $n = 13$ ). Within this macro-category, there was also a section dedicated to the challenges inherent in the assessment process itself ( $n = 167$ ). These included the nature of the subject matter ( $n = 29$ ), the fact that assessment processes were reduced to simplified grades or judgments ( $n = 109$ ) and the limitations of a grading-centric system ( $n = 29$ ).

The third and largest category, *educational relationship*, received 1,191 responses. Most of these were related to students ( $n = 922$ ) and emphasized factors that hindered the assessment process. These included problematic behaviors or a lack of interest ( $n = 136$ ), the excessive heterogeneity of classroom groups ( $n = 402$ ), a lack of collaboration ( $n = 93$ ) and student unpreparedness ( $n = 291$ ). Parents were mentioned to a much lesser extent ( $n = 16$ ), often in relation to comments or attitudes that interfered with the assessment process. Regarding teachers ( $n = 253$ ), the main difficulties lay in their lack of preparation ( $n = 151$ ), which was linked to a lack of specific training on assessment tools and modern teaching methodologies. Another issue was the lack of support for innovation ( $n = 102$ ).

***RQ1. How Does Prior Teaching Experience Influence Pre-Service Teachers' Understanding of and Ability to Use Online Assessment Tools?***

The descriptive analysis (Table 2) revealed that the participating teachers were inclined to use online assessment tools in their teaching practice. They assigned great importance to selecting appropriate tools and reported using these with a frequency equal to—or even exceeding—that of traditional assessment methods. Teachers particularly valued the usefulness of online tools during the phases of data collection, analysis and interpretation, as well as for clarifying the evaluation criteria.

The correlation analysis (Table 3) showed a very low direct correlation between years of classroom experience and responses to Question 2 ( $r_2 = 0.02$ ). More significant correlations emerged with responses to Questions 1 ( $r_{(1,q)} = 0.11$ ) and 3 ( $r_{(3,q)} = 0.15$ ). The strongest correlation was identified with Question 4 ( $r_4 = 0.42$ ), indicating a closer relationship between years of experience and the perceived usefulness of online assessment tools in various phases of the evaluation process.

Overall, the descriptive and correlational analyses suggested that years of classroom experience were an influential factor in the perception of the usefulness of online tools in the various phases of the assessment process (Question 4,  $r = 0.42$ ) but had less influence on the choice of assessment tools (Question 1,  $r = 0.11$ ).

***RQ2. What Factors Do Teachers Consider to Be More or Less Useful When Choosing Online Assessment Tools?***

A qualitative analysis of the open-ended responses ( $n = 2,726$  for facilitating factors and  $n = 2,638$  for hindering factors) revealed a complex set of elements that influenced the selection of assessment tools. According to the participating teachers, these elements could be categorized as either facilitating or hindering.

Teachers indicated that the following four domains were the most relevant in the selection of assessment tools: the educational relationship, the characteristics of the assessment tool, contextual variables that influence the choice, and the assessment tools themselves.

The most prevalent category related to the educational relationship ( $n = 1,078$ ) and included elements pertaining to both the teacher—such as personal experience ( $n = 190$ ), knowledge of the class ( $n = 142$ ), and planning ability ( $n = 96$ )—and the students, particularly individual characteristics ( $n = 581$ ) and motivation ( $n = 29$ ).



Another central category concerned contextual variables ( $n = 814$ ), particularly knowledge of the context ( $n = 246$ ), availability of resources ( $n = 59$ ) and time available ( $n = 56$ ). Important dimensions also related directly to the assessment tools themselves ( $n = 437$ ), including observation tools ( $n = 139$ ), structured or semi-structured tests ( $n = 58$ ), and feedback ( $n = 56$ ). The variety of available tools ( $n = 68$ ) and the mode of administration (paper-based or digital;  $n = 95$ ) were also valued.

Finally, the intrinsic characteristics of the tools were valued for their transparency ( $n = 112$ ), accessibility ( $n = 54$ ), ease of use ( $n = 48$ ), and formative function ( $n = 34$ ).

Conversely, the factors perceived as obstacles largely mirrored the same categories, but from a problematic perspective. Contextual variables emerged as the main critical area ( $n = 1,210$ ), with a marked prevalence of references to lack of time ( $n = 278$ ), scarcity of resources ( $n = 292$ ) and technological barriers ( $n = 192$ ). Systemic elements, such as school bureaucracy ( $n = 95$ ) and costs ( $n = 13$ ), were also reported.

Within the educational relationship domain ( $n = 1,191$ ), critical factors included student behavior and lack of interest ( $n = 136$ ), the complexity and heterogeneity of classes ( $n = 402$ ) and students' insufficient preparation ( $n = 291$ ).

The teachers acknowledged personal limitations, such as insufficient specific training ( $n = 151$ ) and resistance to innovation ( $n = 102$ ), which hindered the adoption of more effective assessment tools.

Finally, it is noteworthy that there was a negative perception of assessment being reduced to mere numeric grades ( $n = 29$ ) or too complex to summarize ( $n = 109$ ), fostering a sense of inadequacy of the available tools in relation to educational objectives.

## Discussion

The results obtained enabled some interesting inferences to be drawn about the impact of prior teaching experience on understanding and using online assessment tools. Furthermore, they provided insights into the factors that teachers perceived as facilitating or hindering the selection of such tools.

The majority of teachers ( $n = 3,296$ , 87.2%) acknowledged the significant role of the choice of assessment tool in the assessment process and, more broadly, in teaching and learning. This is consistent with previous findings by Heil and Ifenthaler (2023), who noted that online assessment tools can support real-time monitoring and improve feedback delivery—thus enhancing both instructional design and student learning outcomes.

However, the actual use of online assessment tools was concentrated primarily on the responses “sometimes” ( $n = 1,565$ , 41.4%) and “often” ( $n = 1,383$ , 36.6%), suggesting that while these tools are widely used, they are not used systematically in daily teaching activities.

This partial adoption aligns with the observations by Agrati and Vinci (2022), who argued that despite increased exposure to digital tools during the COVID-19 pandemic, many teachers still struggle to fully incorporate them into routine assessment practices.

Online tools were predominantly used for multiple-choice tests ( $n = 2,864$ , 74%), confirming what Taylor (2024) and Öztürk (2024) also reported: traditional assessment formats continue to dominate, despite increased awareness of the benefits of formative and personalized assessment approaches. Other types of tools were used marginally, suggesting a need for more widespread training and familiarity with a broader range of functionalities.

Regarding the assessment phase, teachers were divided between *tool selection/criteria clarification* and *data collection–analysis–interpretation*. This confirms that many educators still adopt a procedural rather than a conceptual approach to assessment—an issue noted by Redecker and Johannessen (2013), who emphasized the importance of a paradigm shift from procedural efficiency to transformative, embedded assessment supported by learning analytics.

These results were then analyzed in relation to years of classroom experience to understand the influence of teaching experience on the choice and use of online assessment tools.

The results indicated negligible or non-significant correlations and associations between years of teaching and the examined variables, suggesting that teaching experience does not significantly influence educators' preferences or usage patterns of software evaluation tools across different phases of the assessment process.

The second phase of the research involved a textual analysis of the open-ended responses, enabling a deeper exploration of the teachers' perceptions that had been expressed in the closed-ended questions. The percentage of valid responses remained high for both factors considered useful ( $n = 2,722$ , 72%) and those viewed as obstacles ( $n = 2,646$ , 70%).

In both categories, aspects related to the teacher–student relationship emerged strongly. Among the useful factors, teachers emphasized the importance of getting to know the class and its needs as well as the level of the students. These are considered fundamental elements for choosing the most appropriate assessment tool, which reflects the emphasis on personalization in adaptive and intelligent measurement models (Bunderson et al., 1989; Redecker & Johannessen, 2013).

In contrast, the most frequently reported obstacles included student misconduct, large or heterogeneous class sizes, and lack of preparation—both technological and pedagogical—on the part of students and teachers. These concerns echo those discussed by Garg and Goel (2022) and Kruger et al. (2015), who found that digital literacy and classroom management challenges are major barriers to effective online assessment.

Interestingly, while responses concerning useful factors were often vague—referring to general objectives or competencies without operational detail—the descriptions of hindering factors painted a clearer picture of systemic issues. Teachers frequently mentioned bureaucratic overload, financial constraints and inadequate technological infrastructure. These practical concerns mirror those identified by Nguyen and colleagues (Nguyen et al., 2020) and highlight the importance of institutional support and investment in infrastructure if the pedagogical potential of online assessment tools is to be fully realized.

## Limitations

While this study provides valuable insights into teachers' perceptions of the use of online assessment tools, it has several limitations that must be acknowledged. First, a convenience sample of participants from a specific initial teacher training course at an Italian online university was used, which may limit the generalizability of the results to broader teacher populations or other educational contexts. Additionally, the self-reported nature of the data—particularly with regard to attitudes and the perceived use of assessment tools—introduced potential biases, such as social desirability.

Although the mixed methods approach enabled an in-depth exploration of both quantitative trends and qualitative nuances, the embedded design prioritized quantitative data, which may have limited the depth of the qualitative analysis. Furthermore, while the coding of open responses adhered to the principles of grounded theory, the lack of triangulation with other data sources, such as classroom observations or interviews, could have reduced the robustness of the qualitative interpretations.

Finally, many qualitative responses were very brief—often consisting of a single word. This made it difficult to interpret the underlying motivations and intentions, suggesting the need for further qualitative research in future studies.

## Conclusion

Research has highlighted the valuable opportunities offered by online assessment tools to enhance teaching and learning (Heil & Ifenthaler, 2023; Taylor, 2024). These tools have the potential to improve student engagement, provide timely feedback, and adapt to diverse learning needs. However, the challenges associated with online assessments, such as academic integrity and the need for digital training of students and teachers, must also be addressed (Garg & Goel, 2022).

Digital literacy among teachers is a particularly complex challenge. Using online assessment tools requires an understanding of their technical features and can entail a considerable workload (Kruger, 2015), for which specific training is not always available. It also demands the ability to manage online learning environments in which traditional roles are altered—for instance, students become more active participants, while teachers become facilitators rather than mere information providers.

Therefore, pre-service teacher training in the use of online assessment tools must not be limited to technical and technological aspects but must also develop competences that bridge techno-pedagogical skills in content management (Koehler & Mishra, 2009) and the personalization of learning proposals based on students' needs, abilities and resources, as well as the culture of learning contexts (Xu & Brown, 2016).

Although research into assessment processes has provided robust descriptive models of teachers' assessment competences—for example, the framework of teacher assessment literacy in practice (Xu & Brown, 2016)—in the context of pre-service teacher education, there is an increasing need to develop even more sophisticated models, such as the “sophisticated” knowledge framework (Agrati, 2021; Perla et al., 2019). These models should be capable of integrating the technological skills dimension (e.g., selection of tools based on offered services and ease or difficulty of access) with a specifically pedagogical dimension

(e.g., alignment with curriculum learning objectives and students' learning needs), particularly in relation to online teaching and learning.

Teacher training in the use of online assessment tools faces demanding future directions, including understanding the sophisticated mechanisms of artificial intelligence that enable timely feedback and adaptive testing based on students' learning levels, developing strategies to personalize learning experiences and meet diverse student needs and implementing methods to uphold academic integrity while mitigating the potential risks of inequity and exclusion associated with online assessments.

## **Declarations**

### ***Conflicts of Interest***

The authors declare no conflicts of interest.

### ***Ethics Board Approval***

The study was conducted in Italy, where institutional guidelines and national legislation, aligned with the European Union's General Data Protection Regulation (GDPR), provide a clear framework for when formal ethics board review is required.

According to Italian law (Legislative Decree No. 196/2003, as amended, and in line with EU Regulation 2016/679), formal IRB approval is not mandated for research that uses exclusively anonymized or pseudonymized data and does not involve "sensitive personal data." This category of data is strictly defined to include information that could reveal racial or ethnic origin, political opinions, religious or philosophical beliefs, or data concerning health, sexual life, or genetic and biometric data.

The questionnaire for this study collected only non-sensitive personal data, such as age, gender, educational background, and prior teaching experience. This type of information is not considered sensitive under the aforementioned Italian and EU regulations. Furthermore, all data were collected and processed in an anonymized format, ensuring that no individual participant could be identified.

Consistent with all ethical research practices, participants were fully informed about the study's purpose, the nature of the data collected, and the voluntary nature of their participation. Informed consent was obtained from all participants before data collection began. This rigorous adherence to national and EU data protection regulations, which govern the ethical use of non-sensitive, anonymized data, ensured the study was conducted to the highest ethical standards applicable in our jurisdiction.

## References

- Agrati, L. S. (2021). Remote support through technologies: A research-training on teachers' "sophisticated knowledge." In M. J. Hernandez-Serrano (Ed.), *Teacher education in the 21st century—Emerging skills for a changing world* (pp. 1–20). Intech Open. <https://doi.org/10.5772/intechopen.95949>
- Agrati, L. S., & Beri, A. (2025). Intelligenza artificiale e prassi didattica: Indagine esplorativa sugli atteggiamenti degli insegnanti. *Research Trends in Humanities Education & Philosophy*, 12(1), 43–54. <https://doi.org/10.6093/2284-0184/11563>
- Agrati, L. S., & Vinci, V. (2022). Evaluative knowledge and skills of student teachers within the adapted degree courses. *Frontiers in Education*, 7. <https://doi.org/10.3389/feduc.2022.817963>
- Bunderson, V. C., Inouye, D. K., & Olsen, J. B. (1989). The four generations of computerized educational measurement. In R. L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 367–407). Macmillan.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage.
- Garg, M., & Goel, A. (2022). A systematic literature review on online assessment security: Current challenges and integrity strategies. *Computers & Security*, 113. <https://doi.org/10.1016/j.cose.2021.102544>
- Glaser, B. G., Strauss, A. L., & Strutzel, E. (1968). The discovery of grounded theory: Strategies for qualitative research. *Nursing Research*, 17(4), 361. <https://doi.org/10.1097/00006199-196807000-00014>
- Gisbert-Cervera, M., Usart, M., & Lázaro-Cantabrana, J. L. (2022). Training pre-service teachers to enhance digital education. *European Journal of Teacher Education*, 45(4), 532–547. <https://doi.org/10.1080/02619768.2022.2098713>
- Heil, J., & Ifenthaler, D. (2023). Online assessment in higher education: A systematic review. *Online Learning*, 27(1), 187–218. <https://doi.org/10.24059/olj.v27i1.3398>
- Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60–70.
- Lipnevich, A. A., Murano, D., Krannich, M., & Goetz, T. (2021). Should I grade or should I comment: Links among feedback, emotions, and performance. *Learning and Individual Differences*, 89, 102020. <https://doi.org/10.1016/j.lindif.2021.102020>
- Lobos, K., Cobo-Rendon, R., Maldonado-Trapp, A., Fernandez Branada, C., Jofrè, C. B. (2022). Expectations and experiences with online education during the COVID-19 pandemic in university students. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.815564>

- Looney, A., Cumming, J., van der Kleij, F., & Harris, K. (2018). Reconceptualising the role of teachers as assessors: Teacher assessment identity. *Assessment in Education: Principles, Policy & Practice*, 25(5), 442–467. <https://doi.org/10.1080/0969594X.2016.1268090>
- Lutovac, S., & Flores, M. A. (2022). Conceptions of assessment in pre-service teachers' narratives of students' failure. *Cambridge Journal of Education*, 52(1), 55–71. <https://doi.org/10.1080/0305764X.2021.1935736>
- Mate, K., & Weidenhofer, J. (2021). Considerations and strategies for effective online assessment with a focus on the biomedical sciences. *FASEB BioAdvances*, 4, 9–21. <https://doi.org/10.1096/fba.2021-00075>
- Mehrishi, A. A., Sarmah, D. K., & Daneva, M. (2025). How Can cryptography secure online assessments against academic dishonesty? *Security and Privacy*, 8, e70065. <https://doi.org/10.1002/spy2.70065>
- Milat, A., Lee, K., Conte, K., Grunseit, A., Wolfenden, L., van Nassau, F., Orr, N., Sreeram, P., & Bauman, A. (2020). Intervention scalability assessment tool: A decision support tool for health policy makers and implementers. *Health Research Policy and Systems*, 18(1), 1. <https://doi.org/10.1186/s12961-019-0494-2>
- Nguyen, A., Tuunanen, T., Gardner, L., & Sheridan, D. (2020). Design principles for learning analytics information systems in higher education. *European Journal of Information Systems*, 30(5), 541–568. <https://doi.org/10.1080/0960085X.2020.1816144>
- Northcote, M. (2008). Online assessment: Friend, foe or fix? *British Journal of Educational Technology*, 39(5), 623–625. <https://doi.org/10.1111/1467-8535.00335>
- Öztürk, M. (2024). Rethinking online assessment quality from pre-service teachers' perspectives. *Open Praxis*, 16(4), 696–711. <https://doi.org/10.55982/openpraxis.16.4.689>
- Perla, L., Agrati, L. S., & Beri, A. (2025). Post-teaching and professional learning: An investigation on teachers' attitudes towards AI. *Professional Development in Education*, 51(3), 1–12. <https://doi.org/10.1080/19415257.2025.2465970>
- Perla, L., Agrati, L. S., & Vinci, V. (2019). The 'sophisticated' knowledge of e-teacher. Re-shape digital resources for online courses. In D. Burgos et al. (Eds.), *Higher education learning methodologies and technologies online. HELMeTO 2019. Communications in Computer and Information Science*, vol 1091. Springer, Cham. [https://doi.org/10.1007/978-3-030-31284-8\\_1](https://doi.org/10.1007/978-3-030-31284-8_1)
- Perla, L., Agrati, L. S., Karkina, S., Singh, B., Kaur, M., & Vinci, V. (2025). Technologies for corona teaching. teachers' new relationships with students and knowledge amid the COVID-19 pandemic. In R. G. Kane, C. J. Craig, & J. Mena (Eds.), *A pedagogical view of the COVID-19 pandemic. International Perspectives, Experiences, and Analysis* (pp. 67–85). Brill. [https://doi.org/10.1163/9789004710146\\_004](https://doi.org/10.1163/9789004710146_004)

- Perla, L., & Vinci, V. (2024). Processi valutativi supportati dalle tecnologie: Prospettive didattiche della computer-based assessment. *Cross-Media Languages, Applied Research, Digital Tools and Methodologies*, 2, 28–37. <https://ojs.cimedoc.uniba.it/index.php/cml>
- Poth, C. A. (2013). What assessment knowledge and skills do initial teacher education programs address? A Western Canadian perspective. *Alberta Journal of Educational Research*, 58(4), 634–656. <https://doi.org/10.11575/ajer.v58i4.55670>
- Puentedura, R. (2012). Building upon SAMR. <https://www.hippasus.com/rrpweblog/archives/2012/09/03/BuildingUponSAMR.pdf>
- Redecker, C., & Johannessen, Ø. (2013). Changing assessment: Towards a new assessment paradigm using ICT. *European Journal of Education*, 48(1), 79–96. <https://doi.org/10.1111/ejed.12018>
- Taylor, M. (2024). Comparative analysis of online assessment methods and their impact on student satisfaction in higher education in Australia. *International Journal of Online and Distance Learning*, 5(2), 19–29. <https://doi.org/10.47604/ijodl.2744>
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage.
- Trifonova, I., & Ivanova, M. (2024). Preserving privacy and security in online assessment process: Exploration and analysis. *International Conference Automatics and Informatics (ICAI)*, 574–579. <https://doi.org/10.1109/ICAI63388.2024.10851614>
- Trinchero, R., & Robasto, D. (2019). *I mixed methods nella ricerca educativa*. Mondadori.
- Topuz, A. C., Saka, E., Fatsa, Ö. F., & Kursun, E. (2022). Emerging trends of online assessment systems in the emergency remote teaching period. *Smart Learning Environments*, 9, 17. <https://doi.org/10.1186/s40561-022-00199-6>
- Viberg, O., Mutimukwe, C., Hrastinski, S., CerrattoPargman, T., Lilliesköld, J. (2024). Exploring teachers' (future) digital assessment practices in higher education: Instrument and model development. *British Journal of Educational Technology*, 55, 2597–2616. <https://doi.org/10.1111/bjet.13462>
- Xu, Y., & Brown, G. T. L. (2016). Teacher assessment literacy in practice: Reconceptualization. *Teaching and Teacher Education*, 58, 149–162. <https://doi.org/10.1016/j.tate.2016.05.010>
- Xu, Y., & He, L. (2019). How pre-service teachers' conceptions of assessment change over practicum: Implications for teacher assessment literacy. *Frontiers in Education*, 4, 145. <https://doi.org/10.3389/educ.2019.00145>
- Zhang, C., Yan, X., & Wang, J. (2021). EFL teachers' online assessment practices during the COVID-19 pandemic: Changes and mediating factors. *Asia-Pacific Education Researcher*, 30, 499–507. <https://doi.org/10.1007/s40299-021-00589-3>

Zhorova, I. Y., Kokhanovska, O. V., Khudenko, O. M., Osypova, N. V., & Kuzminska, O. H. (2022). Teachers' training for the use of digital tools of the formative assessment in the implementation of the concept of the New Ukrainian School. *Educational Technology Quarterly*, 1, 56–72. <https://doi.org/10.55056/etq.11>



## Appendix

### Questionnaire Used in the Study

| Introduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>This questionnaire aims to investigate trainee teachers' perceptions of their personal assessment skills, particularly their knowledge of the types of assessment tools used in schools.</p> <p>The constructs used refer to the main studies in this area of research (see below), and the statements refer to possible assessment practices that have already been implemented or have yet to be implemented for typical students.</p> <p>You are therefore asked to answer the questions anonymously, either by selecting an answer option or by providing a brief written response.</p> <p>These responses may be analyzed, and the resulting data will be processed in aggregate form for research purposes only. This will be done in accordance with EU General Data Protection Regulation No. 679/2016 and Legislative Decree No. 196/2003 and the Personal Data Protection Code (amended by Legislative Decree No. 101 of 10/08/2018).</p> <p>The data controllers are Prof. Laura Sara Agrati (laurasara.agrati@unipegaso.it) and Prof. Viviana Vinci (viviana.vinci@unifg.it).</p> <p style="text-align: center;">Thank you for your cooperation.</p> <p><b>Constructs</b></p> <ul style="list-style-type: none"> <li>• Stages of the assessment process:             <ol style="list-style-type: none"> <li>a. Develop/select appropriate assessment methods and techniques to collect valid and reliable data.</li> <li>b. Administer tools according to appropriate procedures.</li> <li>c. Efficiently collect, analyse and interpret the obtained data without neglecting important information.</li> <li>d. Communicate the results to parents and students to guide them in their educational journeys (Gardner et al., 2010).</li> </ol> </li> <li>• Assessment tools are means, devices or settings that are used to adequately express the knowledge, skills and/or competences being assessed.</li> <li>• A software assessment tool allows the assessor (e.g. a teacher) to carry out the stages of the assessment process with digital support, such as choosing formats, assessment criteria, the scores/levels to be assigned, methods of interpretation and the communication of results.</li> <li>• 'Pen and paper' assessment tools are a general type of assessment tool in which students read the stimulus (e.g. a question) and respond in writing. Formats include multiple-choice tests, quizzes, short answers, fill-in-the-blank answers and short essays.</li> </ul> |
| Socio-professional information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>Sex</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Educational qualification (mark the highest qualification)</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Master's degree</li> <li><input type="radio"/> Postgraduate degree</li> <li><input type="radio"/> PhD</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------|--|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------|
| <ul style="list-style-type: none"> <li>○ Other</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| <b>Job position</b> <ul style="list-style-type: none"> <li>○ Permanent teacher</li> <li>○ Fixed-term teacher</li> <li>○ Non-teacher</li> <li>○ Other</li> </ul>                                                                                                                                                                                                                                                                                                                                |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| Years of teaching (if a teacher, include the current year and use numbers, e.g. 3) <p style="text-align: center;"><i>Short answer text</i></p>                                                                                                                                                                                                                                                                                                                                                 |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| <b>School level in which you currently work (if a teacher)</b> <ul style="list-style-type: none"> <li>○ Kindergarten</li> <li>○ Primary school</li> <li>○ Secondary school (first level)</li> <li>○ Secondary school (second level)</li> </ul>                                                                                                                                                                                                                                                 |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| University where you are taking the course <p style="text-align: center;"><i>Short answer text</i></p>                                                                                                                                                                                                                                                                                                                                                                                         |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| Motivation that led you to enroll in the course <p style="text-align: center;"><i>Short answer text</i></p>                                                                                                                                                                                                                                                                                                                                                                                    |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| <b>Basic knowledge</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| With respect to the main phases of the evaluation process, what weight do you give to the appropriate choice of evaluation tools? <table style="width: 100%; text-align: center;"> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>not at all</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>very much</td> </tr> </table> |                       | 1                     | 2                     | 3                     | 4                     | 5         |  | not at all | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | very much |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1                     | 2                     | 3                     | 4                     | 5                     |           |  |            |                       |                       |                       |                       |                       |           |
| not at all                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | very much |  |            |                       |                       |                       |                       |                       |           |
| How much do you use/would you use 'paper and pencil' assessment tools? <table style="width: 100%; text-align: center;"> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>not at all</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>very much</td> </tr> </table>                                                            |                       | 1                     | 2                     | 3                     | 4                     | 5         |  | not at all | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | very much |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1                     | 2                     | 3                     | 4                     | 5                     |           |  |            |                       |                       |                       |                       |                       |           |
| not at all                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | very much |  |            |                       |                       |                       |                       |                       |           |
| Which of the following assessment tool formats do you think is most appropriate to administer in the 'paper and pencil' format? <ul style="list-style-type: none"> <li>○ Multiple choice tests</li> <li>○ Short answers</li> <li>○ 'Fill the gap'</li> <li>○ Short essays</li> <li>○ Other</li> </ul>                                                                                                                                                                                          |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |
| For which phase of the evaluation process do you consider 'paper and pencil' evaluation tools useful? <ul style="list-style-type: none"> <li>○ Choice of tool/clarification of criteria</li> <li>○ Administering tests</li> <li>○ Collection–analysis–interpretation of data</li> </ul>                                                                                                                                                                                                        |                       |                       |                       |                       |                       |           |  |            |                       |                       |                       |                       |                       |           |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>○ Communication of results</li> <li>○ Other</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>How much do you use/would you use software evaluation tools?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">1</div> <div style="text-align: center;">2</div> <div style="text-align: center;">3</div> <div style="text-align: center;">4</div> <div style="text-align: center;">5</div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <span>not at all</span> <div style="text-align: center;">○</div> <div style="text-align: center;">○</div> <div style="text-align: center;">○</div> <div style="text-align: center;">○</div> <div style="text-align: center;">○</div> <span>very much</span> </div> |
| <p>Which of the following assessment tool formats do you think is most appropriate for administering in 'software' mode?</p> <ul style="list-style-type: none"> <li>○ Multiple-choice tests</li> <li>○ Short answers</li> <li>○ 'Fill the gap'</li> <li>○ Short essays</li> <li>○ Other</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>For which phase of the evaluation process do you consider software evaluation tools useful?</p> <ul style="list-style-type: none"> <li>○ Choice of tool/clarification of criteria</li> <li>○ Administering tests</li> <li>○ Collection–analysis–interpretation of data</li> <li>○ Communication of results</li> <li>○ Other</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>Personal considerations</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>Consider your experience as a teacher (or in education in general). What do you think facilitates the choice of the most appropriate assessment tools?</p> <p style="text-align: center;"><i>Short answer text</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>Consider your experience as a teacher (or in education in general). What do you think is the factor that hinders the choice of the most appropriate assessment tools?</p> <p style="text-align: center;"><i>Short answer text</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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# Effects of Accountability Interventions on Environmental Educators' Engagement in MOOCs

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## Abstract

Many participants in online courses struggle to remain engaged and complete the course, often due to a lack of perceived accountability. This study experimentally tested the effects of accountability interventions designed to encourage learners to discuss their progress with someone either inside or outside the course who could help hold them accountable. In a Massive Open Online Course (MOOC) on *Environmental Education Outcomes*, developed for a global audience of environmental educators, 1,259 participants were randomly assigned to one of three conditions: accountability-inside, accountability-outside, or a business-as-usual control. Overall, the interventions did not significantly affect the average number of discussion posts or project completion rates. However, participants in the accountability-inside condition made significantly fewer comments across all countries. Notably, among U.S. participants, those in the accountability-outside made more posts and comments and had higher project completion rates than those in the accountability-inside condition. These findings offer insights into culturally contingent responses to accountability structures and point to a scalable approach for enhancing engagement in online learning environments. They also raise important theoretical questions about the psychological mechanisms through which accountability influences learner behavior.

**Keywords:** Online learning; Accountability; Field experiment; Cultural differences

Li, Y., Kizilcec, R. F., Cho, J., & Krasny, M. E. (2025). Effects of accountability interventions on environmental educators' engagement in MOOCs. *Online Learning*, 29(4), 25-51. <https://doi.org/10.24059/olj.v29i4.5215>

## Introduction

Massive Open Online Courses (MOOCs) continue to play a significant role in expanding access to education and fostering global learning communities around complex challenges such as sustainability (Adefila et al., 2021; Jekabsone & Gudele, 2023). Yet, persistent disparities in learner engagement and completion rates remain a major concern (2U, 2024), particularly across national contexts (Ruipérez-Valiente et al., 2020). These disparities underscore the need for more targeted and culturally responsive interventions (Hansen & Reich, 2015; Kizilcec et al., 2017). Prior research has identified a range of barriers to MOOC participation, including challenges related to digital literacy, course design, and learner motivation (Henderikx et al., 2018). Among these factors, accountability has stood out as particularly salient, as perceived obligations to oneself or others may influence persistence in self-paced, low-structure learning environments such as MOOCs. In contrast to traditional classrooms, MOOCs typically lack built-in mechanisms that encourage commitment and follow-through, which contribute to high dropout rates.

Accountability is defined as the “perceived expectation that one’s decisions or actions will be evaluated by a salient audience and that rewards or sanctions are believed to be contingent on this expected evaluation” (Hall & Ferris, 2011, p. 134). In the context of online learning, it reflects the extent to which learners assume responsibility for their goals, monitor their own progress, and feel a sense of obligation toward others (Winrotte, 2022). Understanding how accountability can be purposefully activated, particularly across diverse cultural contexts, is therefore critical. Comparative research has suggested that online learners from collectivist cultures, such as China, may be more responsive to socially oriented accountability mechanisms, whereas learners from individualist cultures, such as the United States, may be more influenced by self-directed regulatory strategies (Kizilcec & Cohen, 2017; Rizvi et al., 2022a, 2022b). While prior studies have indicated that accountability interventions hold promise for enhancing learner engagement (Kizilcec et al., 2020), empirical research on how such interventions function across cultural settings in MOOCs remains limited.

To address this gap, we implemented an accountability intervention in an *Environmental Education Outcomes* MOOC designed for environmental educators worldwide. Participants were randomly assigned to one of three groups: a control group, a group prompted to seek accountability from someone within the course (“accountability-inside”), and a group prompted to seek accountability from someone outside the course (“accountability-outside”). In the two treatment groups, participants were encouraged to engage in conversations with individuals who could help hold them accountable for making progress in the course. This study investigated two primary research questions:

1. How does accountability during MOOCs influence environmental educators’ learning engagement and practice?
2. How do the effects of accountability interventions differ across various cultural contexts, particularly between China and the United States?

The study was preregistered to ensure transparency and minimize post-hoc bias in analysis. The results contribute to the existing literature on online learning by highlighting how culturally responsive accountability structures can enhance learner engagement in MOOCs, offering insights to inform the design of more inclusive and effective global online education experiences.

## Literature Review

### *Psychological Interventions in Online Learning*

Prior research has investigated a variety of interventions aimed at enhancing learner engagement and completion in online learning environments. One such intervention focuses on self-regulated learning (Arnesen et al., 2025; Guntur & Purnomo, 2024; Xu & Richardson, 2024), which includes strategies such as goal setting (Bipp et al., 2021; Handoko et al., 2019; Wong et al., 2021), strategic planning (Hoch et al., 2020; Sitzmann & Johnson, 2012), self-evaluation (Sitzmann & Ely, 2010; Leris et al., 2017), and task strategy (Kizilcec et al., 2017; Sonnenberg & Bannert, 2019). Another category of intervention emphasizes social comparison, employing tools such as using learning analytics dashboards (Davis et al., 2017; Cogliano et al., 2022), badge systems (Anderson et al., 2014), and reputation scores (Coetzee et al., 2014) to display peer progress, as well as using social norm messages to highlight course-specific and broader community norms (Cho et al., 2021). Additionally, Borrelli et al. (2022) found that making course contents more approachable was more effective to reduce dropout rates than communication-based strategies.

Recently, an increasing number of studies on MOOC learner outcomes have explored the intention fulfillment from learners' perspectives rather than focusing solely on course completion (Henderikx et al., 2017; Semenova, 2022). Rabin et al. (2019) argued that learner-centered outcomes, which emphasize learners' intentions rather than course developers' objectives, are essential for evaluating nonformal lifelong learning opportunities such as MOOCs. A study investigating MOOC participants' motivational dispositions and found that those with intrinsic motivation performed better than those with extrinsic motivation (Moore & Wang, 2021). Extending from these and other studies on learner intentions and motivations, Moore et al. (2025) proposed a Learner-Intention Continuum to examine how different personas, including knowledge seeker, undecided explorer, and goal-oriented learner, influence learner engagement and outcomes in MOOCs. Focusing on learner's intention fulfillment could provide an alternative way to examine success and offer insights for MOOC providers to design experiences that align with learners' intentions.

Culture is an important consideration in the design of educational interventions. Hofstede (2001) proposed that national cultures are characterized by distinct configurations of value dimensions, including power distance, uncertainty avoidance, individualism versus collectivism, masculinity versus femininity, and long-term versus short-term orientation. Similarly, Schwartz's theory of basic values identified ten universal values, including self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism, which are shared across cultures but vary in relative importance (Schwartz, 2012). These cultural differences can shape how learners engage with and respond to educational interventions, resulting in varied learning behaviors and outcomes. For example, a self-regulation intervention incorporating goal setting and goal striving significantly improved completion rates among learners from individualist cultures but had no such effect among those from collectivist cultures (Kizilcec & Cohen, 2017). In another study, a social norm intervention using injunctive norm messaging increased course completion among U.S. learners but not among learners from China (Cho et al., 2021). Further cultural contrasts have been observed in learner engagement. Grothaus (2023) reported distinct participation patterns between Thai and German learners. Learners from Thailand, a feminine, collectivist, and harmony-oriented culture, often refrained from speaking in video conferences to avoid disrupting group harmony or causing discomfort. In

contrast, German learners, whose culture emphasizes separation between private and academic life, were reluctant to contact peers outside of class, citing concerns about privacy. In line with these cultural differences, the U.S. students perceived greater privacy risks and less personal control over their data in learning analytics compared to students from other cultural contexts (Viberg et al., 2024). Moreover, the design and variation of course activities like discussion forums can yield different effects depending on cultural background. For example, discussion activities facilitated learner progress in Anglo-Saxon contexts but were associated with inhibited progress among learners from South Asia (Rizvi, 2022a).

Additionally, social interaction plays a critical role in engaging and supporting learners in online environments (Loh et al., 2024). Interaction with instructors and peers has been shown to increase students' sense of engagement (Limbu, 2025; Redmond et al., 2023) and positively influence their persistence in online learning (Tang et al., 2025). Learners' social capital, particularly having more, and more diverse peers, can further enhance learning outcomes (Canals et al., 2025). Moreover, instructor interaction has been linked to improved learners' retention (Hone & El Said, 2016) and satisfaction (Kucuk & Richardson, 2019). However, given the scale of MOOCs, frequent instructor-learner interaction is often difficult to achieve (Hew & Cheung, 2014), making peer interaction especially important for providing support and improving retention (Castellanos-Reyes, 2021; Rahimi, 2024). MOOC discussion boards are commonly used to facilitate peer interaction and support learning (Kellogg et al., 2014; Zhang et al., 2016; Liu et al., 2022). Some studies found that social media platforms offer more accessible avenues for interaction than traditional course forums (Huang et al., 2023; Li et al., 2025; Zheng, et al., 2016). Others have explored the use of video-based commenting tools that allow learners to interact with each other during video watching, which can enhance learning engagement (Yang & He, 2022) and promote knowledge convergence (Xiang et al., 2025). Group work has also been used to support learning (Sanz-Martínez et al., 2017) and increase course completion rates (Jitpaisarnwattana et al., 2021). When integrated into MOOCs, group work has shown to encourage greater participation among women and foster peer recruitment (Bayeck, 2016). Finally, social interactions can also extend beyond the MOOC itself as learners often share their experiences with family members or friends.

Social interaction plays a crucial role in the professional development of educators (Bell & Gilbert, 1996). A number of studies have examined the role of interaction in online professional development courses for environmental educators. For example, Li et al. (2016) analyzed the course discussion board of a U.S.-based online course and found that participant-participant interactions were positively associated with increased motivation to learn and the development of professional networks. In addition, instructor-participant interactions can contribute to fostering professional networks among participants. In a global context, DuBois et al. (2019) applied Garrison et al.'s (2010) Community of Inquiry framework to analyze three types of presences, including cognitive, teaching, and social, in both the course discussion board and the course-associated Facebook group. The study found that cognitive presence was more prominent on the discussion board, while social presence was more prevalent in the Facebook group. In China, Xiang et al. (2025) found that knowledge convergence occurred through participants' use of social annotation in course video lectures. Additionally, Krasny et al. (2018) proposed the concept of a "social learning MOOC" to emphasize the importance of peer interactions in supporting learning and collaboration. Their findings indicated that study groups could enhance participants' learning by addressing challenges related to language, content, culture, and internet access, and by facilitating collaborative group projects.

## *Accountability*

Accountability has been defined and conceptualized in various ways (Hall et al., 2017). At the micro-level, *felt accountability* refers to an individual's perception of being accountable for their own actions (Frink & Klimoski, 1998). Key elements of accountability typically include an expected evaluation, potential consequences for non-compliance identified during the evaluation, and the presence of a salient audience to whom the behavior is visible (Hall et al., 2017). Perceived accountability for others involves being held answerable for the beliefs or actions of others, extending beyond formal roles, with outcomes often dependent on the adequacy of justification provided (Zellars et al., 2011). Expanding on Bovens' (2005) research on public accountability, Levitt et al. (2008) defined accountability as "proper behavior" relating to "the responsibilities of individuals and organizations for their actions towards other people and agencies" (p. vii). In this framing, responsibility is considered as a core component of accountability and can also serve to promote greater accountability (Cummings & Anton, 1990; Schlenker et al., 1991).

Various models have been developed to conceptualize different facets of accountability. For example, Schlenker et al.'s (1994) pyramid model emphasizes social psychological aspects, illustrating how others influence an individual's thinking and behavior. Tetlock's (1992) social contingency model focuses on internal psychological processes and coping strategies. Building on the role theory, which emphasizes role-making and role-taking (Frink and Klimoski, 1998), Ammeter et al. (2004) developed a framework integrating role theory, trust, and accountability, suggesting that increased trust may reduce the need to enforce accountability. Frink et al. (2008) proposed a meso-level theory of accountability in organizations, including individual, dyad, group, and organizational levels. Features of the work environment, such as source, focus, salience, and intensity of accountability (Hall et al., 2007), as well as personability and perceived organizational support (Dewi & Riantoputra, 2019), can shape individuals' experiences of accountability.

Accountability in education is conceptualized as performance reporting, a technical process, a political process, or an institutional process (Levin, 1974). It can apply to various stakeholders, including teachers, students, parents, administrators, schools, and external entities. Teachers are expected to be accountable to their students, parents, school, profession, and the broader society (Rahmatollahi & Mohamadi Zenouzagh, 2021), with teacher accountability often assessed through teacher evaluations and student achievement (Darling-Hammond, 2004; Huber & Skedsmo, 2016). Student accountability, the focus of this study, refers to students taking ownership of their educational performance (Levin, 1974). Parental accountability involves the roles and responsibilities of parents in supporting their child's education (Đurišić & Bunijevac, 2017). A recent study found that parents played a critical role in supporting young learners by co-creating and co-constructing visuals through a digital-screen-mediated design (Guo et al., 2025). Administrative accountability concerns school leaders and administrators being held responsible for overall school performance (Normore, 2004), while organizational accountability refers to an institution-wide obligation to ensure performance, transparency, and alignment with stated goals (Choi & Chun, 2021). External accountability involves schools being held responsible by outside entities, such as governments and the public, which can in turn impact student outcomes (Carnoy & Loeb, 2002).

Student accountability can take the form of either self-accountability or peer accountability. Self-accountability is considered a key element of self-regulated learning, enabling students to manage their learning processes effectively (Zimmerman, 2002). Peer



accountability, often examined in collaborative or team-based contexts, involves students taking responsibility for their contribution to group tasks, which is essential for team success (Stein et al., 2016). Student accountability is shaped by multiple influences, including teachers, peers, parents, and schools. In the MOOC context, traditional accountability structures are often absent; however, the scale and openness of MOOCs provide unique opportunities for participants to interact with others from diverse backgrounds (Sparke, 2017). While teacher accountability remains important for instructional quality, peer interaction also plays a key role in fostering learner engagement (Rahimi, 2024). Moreover, research showed that both self-regulated and social learning approaches can support high-quality learning experiences in MOOCs (Askeroth & Richardson, 2019). External support systems, such as encouragement from family and friends, have also been shown to positively impact learners' self-efficacy, engagement, and academic outcomes (Chu, 2010; Gao et al., 2021; Singh & Ishrat, 2025). Therefore, interventions that promote peer interaction and family support may be crucial for enhancing learner engagement in MOOCs. Nevertheless, the extent to which peers, families, and friends can help learners maintain commitment to their learning goals in open online environments remains an open question.

Research on online learning has examined learners' tendencies to seek accountability. Kizilcec & Cohen (2017) found that Indian learners, compared to U.S. learners, were more inclined to engage others in monitoring their learning progress as a form of external accountability. However, an accountability intervention that encouraged learners to develop a plan for regular check-ins about their course progress did not lead to improved completion rates among learners from non-individualistic cultural contexts (Kizilcec et al., 2020). It remains unclear whether identifying a specific group for accountability, such as peers within the course or individuals outside the course, might differentially affect learners' engagement and course completion.

In sum, theoretical and empirical evidence suggests that cultural differences shape learners' responses to intervention cues. China, characterized as a collectivist, high power distance, and more restrained culture, contrasts with the United States, which is highly individualist, low in power distance, and more indulgent (Hofstede, 2001). Similarly, while both countries value mastery, China places greater emphasis on embeddedness and hierarchy, whereas the United States prioritizes autonomy (Schwartz, 2012). These cultural contrasts may lead to differing responses to interventions such as self-regulation prompts and progress-sharing with peers (Cho et al., 2021; Kizilcec & Cohen, 2017; Kizilcec et al., 2020). A comparative study between China and the United States would offer valuable insights into the design of culturally responsive interventions.

## Methods

### *Research Context*

We conducted the experiments in the *Environmental Education Outcomes* MOOC, which was offered twice in 2020 and 2021 by Cornell University in the United States. The course was co-taught by the first and fourth authors and was designed to help participants define their environmental education goals and apply research-based approaches to achieve them. Each offering lasted six weeks, consisting of five weekly modules followed by a final project week, during which participants applied what they had learned to their environmental education practice. The course featured short, pre-recorded lectures, podcasts, readings, and weekly live webinars. While most participants accessed the course through the EdX Edge

platform, a separate Chinese course site was maintained to store course materials for participants in China. To support non-English-speaking participants, captions were provided in English, Spanish, and Chinese. To facilitate global interaction, we supported various social media platforms, including Facebook, WhatsApp, Telegram, and WeChat, depending on their regional popularity. To complete the course, participants were required to create at least five discussion posts, submit one webinar reflection, reply to a minimum of two other participants per week (for a total of 10 comments), and complete a final project. To increase global accessibility, we offered an optional payment model. Participants could pay a standard fee of \$60, a sponsorship fee of \$120, contribute any amount they could afford, or enroll for free due to financial or technical barriers. The study was approved by the Cornell University Institutional Review Board (Protocol ID: 1603006192).

### ***Participants***

A total of 1,259 participants enrolled in the courses. Among them, 65% were female and 87% held a bachelor's degree or higher. The average age was 34 years, with a range from 16 to 86 (SD = 11, Median = 32). Regarding work experience in environmental education, 27% had more than five years of experience, 50% had between one and five years, and 23% had no prior experience. Nearly half of the participants (49%) were actively conducting environmental education programs during the course. Participants came from a wide range of countries, with 29% from China, 27% from the United States, 13% from Nigeria, and 31% from 80 other countries. They represented diverse professional backgrounds, including non-formal educators (25%), university students (24%), self-employed (9%), K–12 teachers (8%), business employees (7%), university professors (7%), and others (21%). Most participants (44%) paid the standard course fee of \$60, 10% paid more than \$60, ranging from \$75 to \$120, 6% paid a reduced fee between \$2 and \$50, and 41% participated for free.

To compare the influence of accountability interventions between participants in China and the United States, we analyzed a subset of 705 participants, 51% of whom were from China. In both countries, the majority of participants were female, with 80% in China and 79% in the United States. A higher percentage of U.S. participants (91%) held a bachelor's degree or higher, compared to 79% of Chinese participants. On average, U.S. participants were older, with a mean age of 40 (ranging from 16 to 86), while Chinese participants had a mean age of 30 (ranging from 17 to 69). U.S. participants also reported more experience in environmental education. Specifically, 87% had prior experience, compared to 53% for Chinese participants, and 62% were conducting ongoing environmental education programs at the time of the course, compared to 37% for Chinese participants. Professional backgrounds also varied between the two groups. Among Chinese participants, the largest group was university students (29%), followed by non-formal educators (24%), business employees (10%), self-employed individuals (8%), university professors (7%), and K–12 teachers (4%). Among U.S. participants, non-formal educators made up the largest group (47%), followed by K–12 teachers (12%), self-employed individuals (8%), university students (6%), business employees (5%), and university professors (5%). Both groups exhibited similar payment patterns. Only 10% of the participants in each group took the course for free. Among Chinese participants who paid, most selected either \$60 (60%) or \$75 (30%) due to the fixed payment system. In contrast, U.S. participants showed greater variability in payment amounts, which ranged from \$5 to \$120, with 73% paying \$60 and 3% paying more than \$60.

## Procedure

Prior to collecting data in 2021, we preregistered our research design on AsPredicted.org (<https://aspredicted.org/9fmh-5z8r.pdf>). The pre-registration specified the independent and dependent variables, sample size, and data analysis plan. Only one deviation from the preregistered plan was made: we did not exclude participants who did not complete the intervention activities to avoid selection bias. Further details are provided in the data analysis section below.

We randomly assigned participants to one of three conditions: control, accountability-inside, and accountability-outside (Table 1), based on course registration data to ensure balance across the bivariate distribution (Baiocchi & Kizilcec, 2018). At the beginning of the second week of the course, all participants were asked to fill out a survey embedded in the course platform and sent via email. Participants in the control condition were asked only two questions: whether they had any friends or colleagues taking the course, and how likely they were to complete it. In the two treatment conditions, we embedded the accountability intervention activities into the survey. Participants in the accountability-inside condition were asked to contact somebody within the course who could hold them accountable. Participants in the accountability-outside condition were asked to contact somebody outside the course who could hold them accountable (Table 2). In both treatment conditions, participants were asked to provide the names of their accountability contacts, describe their plans for what they would share about their goals and progress, and specify how and when they would contact their selected individuals. Participants were given multiple opportunities to engage in the intervention activities by promoting the survey in the second, third, and fourth week of the course.

**Table 1**

*Counts of Participants, Certificate Earners, and Survey Respondents by Experimental Conditions (China and the United States)*

|                    | Control                   | Accountability-inside | Accountability-outside |
|--------------------|---------------------------|-----------------------|------------------------|
| <u>2020</u>        | <u>Total (China, USA)</u> |                       |                        |
| Participants       | 259 (73, 74)              | 259 (69, 74)          | 259 (70, 73)           |
| Certificates       | 117 (50, 34)              | 109 (46, 32)          | 120 (47, 45)           |
| Survey respondents | 167 (62, 47)              | 165 (61, 45)          | 165 (56, 57)           |
| <u>2021</u>        | <u>Total (China, USA)</u> |                       |                        |
| Participants       | 160 (47, 44)              | 162 (53, 39)          | 160 (47, 42)           |

|                    |              |             |             |
|--------------------|--------------|-------------|-------------|
| Certificates       | 66 (20, 23)  | 60 (20, 16) | 68 (22, 20) |
| Survey respondents | 101 (28, 35) | 91 (23, 24) | 98 (27, 33) |

### Measure

We used the MOOC participants' learning engagement and practice to determine the impact of accountability interventions. Learning engagement was measured by the number of discussion posts and comments participants made throughout the course. Practice was assessed by whether participants completed the course project, which required them to apply course concepts to develop a theory of change for their environmental education practice. Participants who completed at least six posts, including five weekly discussion posts and one webinar reflection, at least 10 comments on peers' posts, and the course project were eligible to receive a course certificate. In addition, a post-course survey asked participants whether they had discussed their learning with individuals inside or outside the course, and how these interactions influenced their learning experience. De-identified data are available upon request.

**Table 2**

#### *Accountability Intervention Activity Instructions*

| Accountability-inside Intervention Instructions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Accountability-outside Intervention Instructions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Now is the best time to think about finding peers to hold each other accountable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Now is the best time to think about who can hold you accountable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>If you already know someone else in the course:</p> <ol style="list-style-type: none"> <li>1. Write down the names of one or more course participants who could hold you accountable.</li> </ol> <p>If you don't know anyone in the course yet:</p> <ol style="list-style-type: none"> <li>1. Write down how you will find someone through the course social media or the discussion board.</li> <li>2. Now make a plan for what you will tell them about your goal and progress.<br/><i>Tip: Ask them to check in often about your progress in the course.</i></li> <li>3. Finally, write down how and when you</li> </ol> | <ol style="list-style-type: none"> <li>1. Write down the names of one or more friends, co-workers, family members, or acquaintances who could hold you accountable.<br/><i>Tip: Pick people who you don't see too often but whose opinion matters to you.</i></li> <li>2. Now plan for what you are going to tell them about the course and your goal.<br/><i>Tip: Ask them to regularly check in with you about your progress in the course.</i></li> <li>3. Finally, write down how and when you will tell them about the course and your goal. For example, will you talk in person or on the phone, or send them an email or text message? Be sure to choose a time and place that works.</li> </ol> |

|                                                                                                                                                                                                                                                                             |                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <p>will tell them about your goal and progress.<br/>For example, will you talk in person, on the phone, or send them an email or text message? Be sure to choose a time and place that works.</p> <p>You can make a note of your plans above to help you remember them.</p> | <p>You can make a note of your plans above to help you remember them.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|

### **Data Analysis**

We conducted regression analysis to examine the effects of accountability conditions on participants' learning engagement and practice. The dependent variables included the number of posts (numeric), number of comments (numeric), and project completion (binary: 0 = no, 1 = yes). The accountability condition was coded into categories: control, inside, and outside. Control variables included the year of MOOC participation (binary: 2020 or 2021), as well as participants' demographic data: age (numeric), gender (categorical: female, male, other), education level (categorical: high school/associate, bachelor's, master's/doctoral), and work experience in environmental education (categorical: 0 years, 1–5 years, >5 years). Following our pre-registered analysis approach, adapted from prior intervention research in MOOCs (Cho et al., 2021), we used a linear multiple regression model with robust standard error estimation, applying the 'lm\_robust' function from the *estimatr* R package (Blair et al., 2025). In terms of R formula syntax, we specify our regression model as follows:

$$\text{Outcome} \sim \text{Condition} + \text{Year} + \text{Age} + \text{Gender} + \text{Education} + \text{WorkExp}$$

For the binary project completion outcome, this specification estimates a linear probability model (von Hippel, 2017). We also conducted a subgroup analysis by restricting the sample to compare the effects between U.S. and Chinese participants. To examine whether the effect of condition on outcome differ by country, we tested a Condition-by-Country interaction term in the model and conducted a model comparison using an *F*-test, specified as:

$$\text{Outcome} \sim \text{Condition} * \text{Country} + \text{Year} + \text{Age} + \text{Gender} + \text{Education} + \text{WorkExp}$$

Initially, the control group was used as the reference category for comparisons. However, when analyzing the differences between the accountability-inside and accountability-outside conditions, we shifted the reference group to the accountability-inside condition.

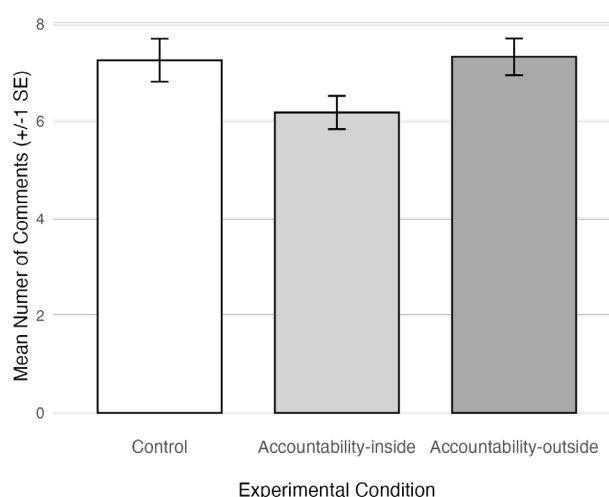
All data from randomized participants were analyzed, regardless of whether they engaged in the intervention activities, using an intent-to-treat approach, to avoid selection bias. Additionally, we analyzed the open-ended responses in the intervention activities to understand the plans of inside and outside condition participants for reaching out to their contacts.

## Results

The accountability interventions did not impact the average number of discussion posts or rates of project completion. However, we found that participants in the accountability-inside condition made significantly fewer comments ( $M = 6.18$ ,  $SD = 7.07$ ) compared to participants in the control condition ( $M = 7.25$ ,  $SD = 9.05$ ,  $b = -1.15$ ,  $SE = 0.55$ ,  $p = 0.036$ ) and participants in the accountability-outside condition ( $M = 7.32$ ,  $SD = 7.75$ ,  $b = -1.18$ ,  $SE = 0.49$ ,  $p = 0.018$ ); the accountability-outside intervention did not significantly increase commenting compared to the control condition ( $b = 0.02$ ,  $SE = 0.57$ ,  $p = 0.097$ ) (Figure 1). The overall model explained approximately 4.9% of the variance in the number of comments,  $R^2 = 0.049$ , *Cohen's*  $f^2 = 0.052$ , indicating a small effect size.

**Figure 1**

*Mean Number of Comments by Participants by Experimental Condition*



*Note.* Error bars indicate one standard error around the mean.

Among the 256 participants in the accountability-inside condition who completed the intervention activity, 205 wrote specific plans, and 128 identified specific individuals for contacts. Participants mentioned that they found other peers with similar interests or who lived in the same area on the course discussion board or social media, and then used email, Facebook, WhatsApp, or WeChat to make contact. For example, a participant indicated that she had contacted several participants from the course group. She mentioned that: “I can ask them if we can study together. I often share my learning progress in the course with them and learn about their work” and her plan was to “choose three participants and send them a WeChat message once a week” (female, 27 years old, China). Some participants chose their colleagues who took the course together. For example, a participant wrote as her plan: “We will update each other twice a week about our progress. Besides, we will discuss ideas with each other about our assignments”, and her approach for contacting: “we work together so we will talk about it at work. Normally on Wednesday and Friday afternoon” (female, 28 years old, Vietnam). Some participants felt no need to seek additional accountability support: “I do not need to find someone to monitor my learning at the moment. I feel that the WeChat group communication is rich and lively, which is enough” (female, 45 years old, China). Others

encountered challenges in connecting with peers: “I have been sending friend requests to my peers on Facebook but they are not approving them” (male, 41 years old, Zambia).

Among the 263 participants in the accountability-outside condition who completed the intervention activity, 233 wrote specific plans, and 229 identified specific individuals for contact. These individuals included family members, friends, colleagues, friends, and classmates. For example, a participant chose to contact his parents, stating: “Tell them in person when they come by for the usual visit during our discussion about my studies and work (male, 21 years old, Cameroon). Another participant planned to tell her supervisor, coworkers, and partner, noting she would share: “How I am learning more about assessment and theory of change models today at work and over dinner” (female, 24 years old, U.S.).

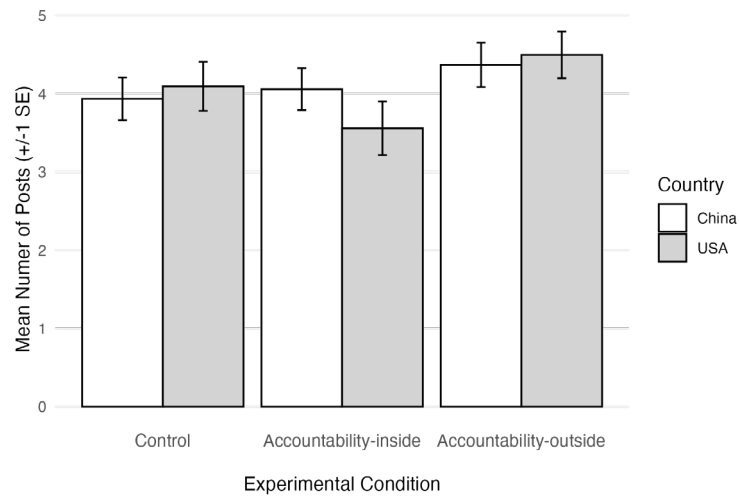
Among the 268 participants in the control condition who completed the survey questions asking about whether they had any friends or colleagues taking the course, and how likely they were to complete it, 92 indicated that they did have friends or colleagues enrolled. An ad hoc analysis comparing control group participants who had friends or colleagues in the course with those who did not show significant differences.

*F*-tests indicated that adding the interaction between condition and country (China vs. U.S.) did not significantly improve model fit compared to the main effects model for any of the outcome: number of posts ( $F(2, 691) = 0.84, p = 0.434$ ), number of comments ( $F(2, 691) = 0.94, p = 0.391$ ), and project completion ( $F(2, 691) = 0.85, p = 0.427$ ). These results suggest that the effect of condition on learning outcomes did not differ significantly between the two countries. Therefore, we proceed to analyze the data for participants from China and the United States separately.

When analyzed separately, participants from China and the United States demonstrated significant differences in learning engagement, including the number of discussion posts and comments, and project completion. Among U.S. participants, those in the accountability-outside condition created more posts ( $M = 4.50, SD = 3.20$ ) than those in the accountability-inside condition ( $M = 3.56, SD = 3.64, b = 0.90, SE = 0.46, p = 0.049, R^2 = 0.030, \text{Cohen's } f^2 = 0.031$ ) (Figure 2). They also made more comments on other students' posts ( $M = 9.02, SD = 6.87$ ) compared to those in the accountability-inside condition ( $M = 6.62, SD = 7.27, b = 2.46, SE = 0.95, p = 0.009, R^2 = 0.047, \text{Cohen's } f^2 = 0.049$ ) (Figure 3). In terms of practice, a higher percentage of U.S. participants in the accountability-outside condition completed the course projects compared to those in the accountability-inside course condition (57% vs. 42%,  $b = 0.15, SE = 0.07, p = 0.029, R^2 = 0.032, \text{Cohen's } f^2 = 0.033$ ). Additionally, a higher percentage of Chinese participants completed the course projects compared to U.S. participants (60% vs. 51%,  $b = 0.09, SE = 0.04, p = 0.013, R^2 = 0.009, \text{Cohen's } f^2 = .009$ ) (Figure 4). However, no significant differences in the number of posts and comments, or project completion were found between conditions for Chinese participants.

**Figure 2**

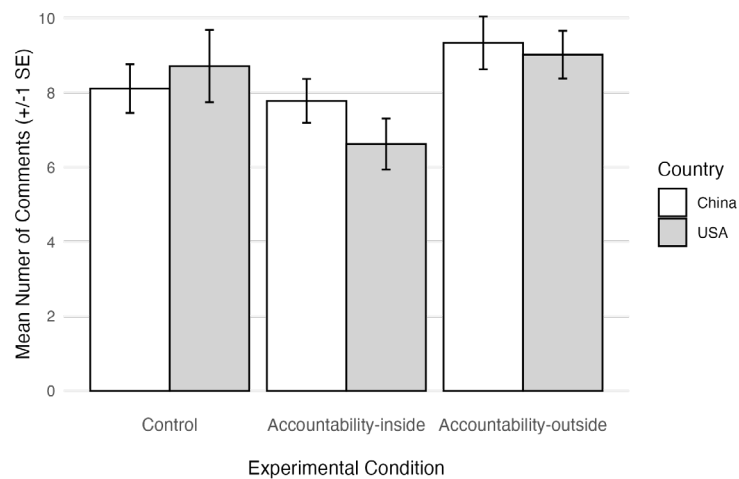
*Mean Number of Posts by Participants in China and the United States by Experimental Condition*



*Note.* Error bars indicate one standard error around the mean.

**Figure 3**

*Mean Number of Comments by Participants in China and the United States by Experimental Condition*

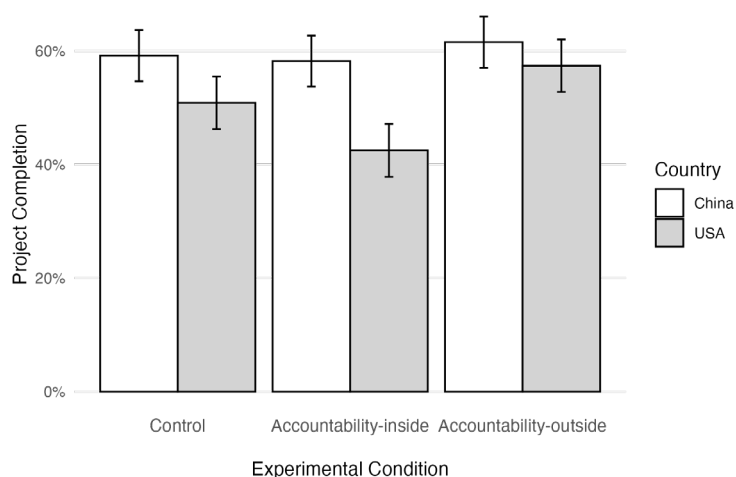


*Note.* Error Bars Indicate One Standard Error Around the Mean.



**Figure 4**

*Project Completion Rates by Participants in China and the United States by Experimental Condition*



*Note.* Error bars indicate one standard error around the mean.

In the course post-survey, participants were asked whether they had spoken with someone inside or outside the course and how these interactions had supported their learning. Among the 1,259 participants, 13% reported contacting both individuals inside and outside the course, 6% reported contacting only people inside the course, and 22% reported contacting only people outside the course. For example, a participant assigned to the accountability-inside condition indicated that she talked with people both inside and outside the course and mentioned: “Talking with others helped me to understand my final project and what I have learned, read, and seen in the course” (female, 43 years old, Argentina). In some cases, however, participants contacted individuals different from those specified in their assigned condition. For example, one participant in the accountability-outside condition mentioned that she had instead contacted a colleague enrolled in the course: “Having a colleague at work doing this course too, much easier to brainstorm” (female, 34 years old, Australia). Another participant assigned to the accountability-inside condition noted in the intervention survey that she found someone on the discussion board who was also in the same state and planned to reach out via email and potentially meet at statewide conferences. However, in the post-survey, she reported only contacting coworkers outside the course: “Talking with my coworkers gave me the input needed for the final project and made the final project a practical and useful item” (female, 59 years old, U.S.).

## Discussion

In sum, the study found that the accountability-inside intervention, which involved contacting people within the course, significantly decreased participants’ comments across all countries. In contrast, the accountability-outside intervention, which involved contacting people outside the course, was more effective for U.S. participants in terms of the number of posts and comments, and project completion when compared to the accountability-inside intervention. These results serve as a caution for designing such interventions to engage learners in online environments and point to important areas for future research and practice.

The potential explanation for fewer comments in the accountability-inside condition could be that participants had alternative communication channels through course-related social media groups, such as Facebook, WhatsApp, and WeChat, which were mentioned in the survey as being easier to use and more interactive compared to the course platform. When encouraged to communicate with peers, participants might have shifted their focus to social media instead of the course discussion board. Previous research has also shown that MOOC participants were more engaged in social media groups than on the course discussion forums (Zheng et al., 2016; Li et al., 2025). Furthermore, Jitpaisarnwattana et al. (2021) found that working in groups and creating a learning plan were important factors associated with course completion, whereas merely interacting with other learners online was not. Another possible explanation is that participants might prefer to interact with people they already knew (Cisel, 2018), such as classmates or friends who were also taking the course together, which was reflected in some responses in the post-course survey. Asking them to reach out to unfamiliar participants might have made them uncomfortable, which discouraged their engagement in the course. On the contrary, participants in the accountability-outside condition were asked to contact people outside of the course. Although they used similar methods for contacting through email and social media, they kept their coursework separate from their social contacts.

Participants in the accountability-inside condition made significantly fewer comments than those in the control condition. Additionally, participants in the accountability-outside condition did not outperform those in the control condition. Participants in the control condition were also exposed to the survey embedded in the course, even though it did not include any accountability activity instructions. Asking them about their friends and colleagues taking the course might have reminded them to check in with people they already knew. In addition, asking them the likelihood of completing the course might have helped them set goals (Handoko et al., 2019; Wong et al., 2021), which could have motivated them to complete the course. These simple questions, while not designed as interventions, may have acted as a self-directed nudge that helped participants reflect on their social connections and goals, potentially offering a low-effort alternative to more prescriptive strategies. Future research could explore the effectiveness of such minimal interventions, particularly in large-scale, low-instructor-contact settings like MOOCs.

The effects of accountability interventions differed between participants in China and the United States. Only the U.S. participants in the accountability-outside condition completed significantly more posts, comments, and projects than those in the accountability-inside condition. This divergence aligns with Hofstede's (2001) cultural dimension of individualism versus collectivism. U.S. culture, characterized by high individualism, tends to emphasize personal autonomy and self-directed achievement, making externally visible forms of accountability more motivating. In contrast, Chinese culture, which leans toward collectivism, places greater emphasis on group harmony and relational obligations, which may reduce the impact of external accountability cues on individual task completion. Consistent with findings from previous studies that self-regulation or social norm interventions were effective for participants in individualist cultures, but not for those in collectivist cultures (Kizilcec & Cohen, 2017; Cho et al., 2021), these results suggest that the effectiveness of interventions can vary significantly depending on cultural value orientations. This cultural sensitivity is also evident in other contexts; for instance, German learners, from a culture that emphasizes boundaries between private and academic life, were hesitant to contact peers outside of class (Grothaus, 2023), further highlighting how cultural norms mediate learners' engagement behaviors. Additionally, more Chinese participants completed

the course compared to the U.S. participants. This may be because Chinese participants were more motivated to complete the course due to a lack of environmental education professional development opportunities, as discussed in a previous study (Cho et al., 2021). This might also explain why Chinese participants were less sensitive to the interventions, indicating they would complete the course regardless of the intervention. Furthermore, Chinese participants received more support through WeChat course group discussions with teaching assistants who helped them overcome barriers (Li et al., 2024). This additional support might have influenced their learning engagement.

The study offers several recommendations for the design and facilitation of MOOCs. First, while peer interaction within online courses can foster participant engagement, instructors should provide structured opportunities and clear guidance to support these interactions (Wei et al., 2023). For example, assigning learners to small groups, rather than expecting them to find independently, can promote more meaningful engagement. When encouraging the use of social media groups, instructors should also remind participants to complete the required assignments on the primary course platform. Instructors can also consider assigning several students with rotating roles to improve discussion quality (Chen & Yeh, 2021) or recruit teaching assistants to serve as facilitators (Li et al., 2024). Second, instructors and designers should be mindful of participants' cultural backgrounds and ensure that the course offers diverse and inclusive learning opportunities (Rizvi et al., 2024). This includes both the content and the modes of engagement, recognizing that learners from different contexts may have varying preferences and constraints (Rizvi et al., 2022a; Parrish & Linder-VanBerschot, 2010). Third, MOOC platforms should consider making course discussion boards more user-friendly and interactive or integrating social media tools directly into the course (Huang et al., 2023; Li et al., 2025). Allowing participants to complete certain assignments via social media platforms could improve accessibility, particularly in regions with limited technological infrastructure. Finally, instructors should recognize that meaningful learning outcomes may extend beyond course completion and assignments. Learner-centered outcomes such as intention fulfillment (Moore et al., 2025; Rabin et al., 2019) offer valuable insights into participants' experience and the broader impact of MOOCs.

## Limitations and Conclusion

This study has several limitations. First, approximately one-third of participants assigned to the treatment groups did not complete the intervention activity, suggesting that many did not receive the intended interventions as designed. Additionally, some participants reported in the post-survey that they contacted individuals different from those specified in their assigned condition, indicating a degree of intervention non-compliance. Furthermore, participants in the control condition were also asked to complete a survey. Although they did not receive any accountability instructions, responding to questions about whether they had friends or colleagues in the course and their likelihood of completing it may have influenced their learning behavior. Future control group designs should be more carefully crafted to avoid introducing potential nudges that could unintentionally affect outcomes. Finally, although the course project reflects a level of practical application, we do not know whether participants implemented the projects beyond the course itself.

This study examined the effectiveness of accountability interventions in an online learning context and offers two key contributions to the literature on engaging diverse participants in MOOCs. First, the study design is innovative in incorporating two different accountability interventions within a MOOC setting, yielding practical insights for course

design and instructional strategies. Second, the study explored how the effects of these interventions differed between Chinese and U.S. participants, advancing our understanding of how accountability strategies may function across cultural contexts. These findings offer implications for tailoring learner support based on cultural background. Future research should further investigate effective forms of accountability interventions and explore additional strategies to promote learner accountability and engagement in online learning environments.

#### ***Disclosure Statement***

No potential conflict of interest was reported by the authors.

#### ***Acknowledgement***

We are grateful to our MOOC participants from the United States, China, and many other countries. We also thank Cornell China Center for supporting our research.

## References

- 2U. (2024). 2023 Transparency & outcomes report. <https://press.edx.org/2023-transparency-outcomes-report>
- Adefila, A., Arrobbio, O., Brown, G., Robinson, Z., Spolander, G., Soliev, I., Willers, B., Morini, L., Padovan, D., & Wimpenny, K. (2021). Ecologized collaborative online international learning: Tackling wicked sustainability problems through education for sustainable development. *Journal of Teacher Education for Sustainability*, 23(1), 41–57. <https://doi.org/10.2478/jtes-2021-0004>
- Ammeter, A. P., Douglas, C., Ferris, G. R., & Goka, H. (2004). A social relationship conceptualization of trust and accountability in organizations. *Human Resource Management Review*, 14(1), 47–65. <https://doi.org/10.1016/j.hrmr.2004.02.003>
- Anderson, A., Huttenlocher, D., Kleinberg, J., & Leskovec, J. (2014). Engaging with massive online courses. *Proceedings of the 23rd International Conference on World Wide Web*, 687–698. <https://doi.org/10.1145/2566486.2568042>
- Arnesen, K. T., Leary, H., Graham, C. R., & McMurry, A. I. (2025). Encouraging self-regulation in an online university course for preservice teachers: An intervention study. *Online Learning*, 29(1), 266–292. <https://doi.org/10.24059/olj.v29i1.4318>
- Askeroth, J. H., & Richardson, J. C. (2019). Instructor perceptions of quality learning in MOOCs they teach. *Online Learning*, 23(4), 135–159. <https://doi.org/10.24059/olj.v23i4.2043>
- Baiocchi, M., & Kizilcec, R. F. (2018). Criteria-based randomization: Explicit and exact control in multi-arm trials. SSRN. <https://doi.org/10.2139/ssrn.3339748>
- Bayeck, R. Y. (2016). Exploratory study of MOOC learners' demographics and motivation: The case of students involved in groups. *Open Praxis*, 8(3), 223–233. <https://doi.org/10.5944/openpraxis.8.3.282>
- Bell, B., & Gilbert, J. (1996). *Teacher development: A model from science education*. Falmer Press, Taylor and Francis, Inc.
- Bipp, T., Kleingeld, A., & Schelp, L. (2021). Achievement goals and goal progress as drivers of work engagement. *Psychological Reports*, 124(5), 2180–2202.
- Blair, G., Cooper, J., Coppock, A., Humphreys, M., & Sonnet, L. (2025). *Estimatr: Fast estimators for design-based inference*. R package (Version 1.0.4) [Computer software]. <https://github.com/declaredesign/estimatr>
- Borrella, I., Caballero-Caballero, S., & Ponce-Cueto, E. (2022). Taking action to reduce dropout in MOOCs: Tested interventions. *Computers & Education*, 179, 104412. <https://doi.org/10.1016/j.compedu.2021.104412>
- Bovens, M. (2005). Public accountability. In E. Ferlie, L. E. Lynn, & C. Pollitt (Eds.), *The Oxford handbook of public management*. Oxford University Press.

- Canals, A., Cobarsí-Morales, J., & Ortoll, E. (2025). Social capital in online environments: Effects of social structure on academic performance in an online university. *Online Learning*, 29(1), 238–265. <https://doi.org/10.24059/olj.v29i1.4388>
- Carnoy, M., & Loeb, S. (2002). Does external accountability affect student outcomes? A cross-state analysis. *Educational Evaluation and Policy Analysis*, 24(4), 305–331. <https://doi.org/10.3102/01623737024004305>
- Castellanos-Reyes, D. (2021). The dynamics of a MOOC's learner-learner interaction over time: A longitudinal network analysis. *Computers in Human Behavior*, 123, 106880. <https://doi.org/10.1016/j.chb.2021.106880>
- Chen, K.-Z., & Yeh, H.-H. (2021). Acting in secret: Interaction, knowledge construction and sequential discussion patterns of partial role-assignment in a MOOC. *Australasian Journal of Educational Technology*, 37(6), 41–60. <https://doi.org/10.14742/ajet.6979>
- Cho, J. Y., Li, Y., Krasny, M. E., Russ, A., & Kizilcec, R. F. (2021). Online learning and social norms: Evidence from a cross-cultural field experiment in a course for a cause. *Computer-based Learning in Context*, 3(1), 18–36. <https://doi.org/10.5281/ZENODO.4781808>
- Cho, J., Li, Y., Krasny, M. E., & Kizilcec, R. F. (2022). Measuring cultural dimensions of learning in online courses. *Proceedings of the ACM Conference on Learning at Scale (L@S)* (pp. 395–399). Association for Computing Machinery. <https://doi.org/10.1145/3491140.3528333>
- Choi, S., & Chun, Y. H. (2021). Accountability and organizational performance in the public sector: Analysis of higher education institutions in Korea. *Public Administration*, 99(2), 353–370. <https://doi.org/10.1111/padm.12683>
- Chu, R. J. (2010). How family support and Internet self-efficacy influence the effects of e-learning among higher aged adults—Analyses of gender and age differences. *Computers & Education*, 55(1), 255–264. <https://doi.org/10.1016/j.compedu.2010.01.011>
- Cisel, M. T. (2018). Interactions in MOOCs: The hidden part of the iceberg. *International Review of Research in Open and Distributed Learning*, 19(5), 80–94. <https://doi.org/10.19173/irrodl.v19i5.3459>
- Coetzee, D., Fox, A., Hearst, M. A., & Hartmann, B. (2014). Should your MOOC forum use a reputation system? *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing*, 1176–1187. <https://doi.org/10.1145/2531602.2531657>
- Cogliano, M., Bernacki, M. L., Hilpert, J. C., & Strong, C. L. (2022). A self-regulated learning analytics prediction-and-intervention design: Detecting and supporting struggling biology students. *Journal of Educational Psychology*, 114(8), 1801–1816. <https://doi.org/10.1037/edu0000745>

- Cummings, L. L., & Anton, R. J. (1990). The logical and appreciative dimensions of accountability. In S. Srivastva & D. L. Cooperrider (Eds.), *Appreciative management and leadership: The power of positive thought and action in organizations* (pp. 257–286). Jossey-Bass/Wiley.
- Darling-Hammond, L. (2004). Standards, accountability, and school reform. *Teachers College Record*, 106(6), 1047–1085. <https://doi.org/10.1111/j.1467-9620.2004.00372.x>
- Davis, D., Jivet, I., Kizilcec, R. F., Chen, G., Hauff, C., & Houben, G.-J. (2017). Follow the successful crowd: Raising MOOC completion rates through social comparison at scale. *Proceedings of the Seventh International Learning Analytics & Knowledge Conference*, 454–463. <https://doi.org/10.1145/3027385.3027411>
- Dewi, R. C., & Riantoputra, C. D. (2019). Felt accountability: The role of personality and organizational factors. *Journal of Management Development*, 38(4), 312–322. <https://doi.org/10.1108/JMD-12-2018-0375>
- DuBois, B., Krasny, M. E., & Russ, A. (2019). Online professional development for environmental educators: Strategies to foster critical thinking and social interactions. *Environmental Education Research*, 25(10), 1479–1494. <https://doi.org/10.1080/13504622.2018.1564247>
- Durišić, M., & Bunijevac, M. (2017). Parental involvement as a important factor for successful education. *Center for Educational Policy Studies Journal*, 7(3), Article 3. <https://doi.org/10.26529/cepsj.291>
- Frink, D. D., Hall, A. T., Perryman, A. A., Ranft, A. L., Hochwarter, W. A., Ferris, G. R., & Royle, M. T. (2008). Meso-level theory of accountability in organizations. In J. J. Martocchio (Ed.), *Research in personnel and human resources management* (vol. 27, pp. 177–245). Emerald Group Publishing Limited. [https://doi.org/10.1016/S0742-7301\(08\)27005-2](https://doi.org/10.1016/S0742-7301(08)27005-2)
- Frink, D. D., & Klimoski, R. J. (1998). Toward a theory of accountability in organizations and human resource management. In G. R. Ferris (Ed.), *Research in personnel and human resources management* (vol. 16, pp. 1–51). Elsevier Science/JAI Press.
- Gao, H., Ou, Y., Zhang, Z., Ni, M., Zhou, X., & Liao, L. (2021). The relationship between family support and e-learning engagement in college students: The mediating role of e-learning normative consciousness and behaviors and self-efficacy. *Frontiers in Psychology*, 12, 573779. <https://doi.org/10.3389/fpsyg.2021.573779>
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education*, 13(1), 5–9. <https://doi.org/10.1016/j.iheduc.2009.10.003>
- Grothaus, C. M. (2023). Engagement in online learning among Thai and German students: The role of classmates, instructors, and technology across country contexts. *Online Learning*, 27(3), 188–208. <https://doi.org/10.24059/olj.v27i3.3413>

- Guntur, M., & Purnomo, Y. W. (2024). A meta-analysis of self-regulated learning interventions: Studies on learning outcomes in online and blended environments. *Online Learning*, 28(3), 563–584. <https://doi.org/10.24059/olj.v28i3.4025>
- Guo, D., Ramos, R., Zhao, Y., & Sun, Q. (2025). Design of interactive spaces for promoting parental involvement: Strategies used by EFL teachers. *Online Learning*, 29(2), 140–167. <https://doi.org/10.24059/olj.v29i2.4683>
- Hall, A. T., Bowen, M. G., Ferris, G. R., Royle, M. T., & Fitzgibbons, D. E. (2007). The accountability lens: A new way to view management issues. *Business Horizons*, 50(5), 405–413. <https://doi.org/10.1016/j.bushor.2007.04.005>
- Hall, A. T., & Ferris, G. R. (2011). Accountability and extra-role behavior. *Employee Responsibilities and Rights Journal*, 23(2), 131–144. <https://doi.org/10.1007/s10672-010-9148-9>
- Hall, A. T., Frink, D. D., & Buckley, M. R. (2017). An accountability account: A review and synthesis of the theoretical and empirical research on felt accountability. *Journal of Organizational Behavior*, 38(2), 204–224. <https://doi.org/10.1002/job.2052>
- Handoko, E., Gronseth, S. L., McNeil, S. G., Bonk, C. J., & Robin, B. R. (2019). Goal setting and MOOC completion: A study on the role of self-regulated learning in student performance in Massive Open Online Courses. *The International Review of Research in Open and Distributed Learning*, 20(3), 40–58. <https://doi.org/10.19173/irrodl.v20i4.4270>
- Hansen, J. D., & Reich, J. (2015). Democratizing education? Examining access and usage patterns in massive open online courses. *Science*, 350(6265), 1245–1248. <https://doi.org/10.1126/science.aab3782>
- Henderikx, M. A., Kreijns, K., & Kalz, M. (2017). Refining success and dropout in massive open online courses based on the intention–behavior gap. *Distance Education*, 38(3), 353–368. <https://doi.org/10.1080/01587919.2017.1369006>
- Henderikx, M. A., Kreijns, K., & Kalz, M. (2018). A classification of barriers that influence intention achievement in MOOCs. In V. Pammer-Schindler, M. Pérez-Sanagustín, H. Drachsler, R. Elferink, & M. Scheffel (Eds.), *Lifelong Technology-Enhanced Learning* (pp. 3–15). Springer International Publishing. [https://doi.org/10.1007/978-3-319-98572-5\\_1](https://doi.org/10.1007/978-3-319-98572-5_1)
- Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. *Educational Research Review*, 12, 45–58. <https://doi.org/10.1016/j.edurev.2014.05.001>
- Hoch, E., Scheiter, K., & Schüler, A. (2020). Implementation intentions related to self-regulatory processes do not enhance learning in a multimedia environment. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00046>



- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. SAGE Publications Inc. <https://us.sagepub.com/en-us/nam/cultures-consequences/book9710>
- Hone, K. S., & El Said, G. R. (2016). Exploring the factors affecting MOOC retention: A survey study. *Computers & Education*, 98, 157–168. <https://doi.org/10.1016/j.compedu.2016.03.016>
- Huang, L., Wang, K., Li, S., & Guo, J. (2023). Using WeChat as an educational tool in MOOC-based flipped classroom: What can we learn from students' learning experience? *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.1098585>
- Huber, S. G., & Skedsmo, G. (2016). Teacher evaluation—Accountability and improving teaching practices. *Educational Assessment, Evaluation and Accountability*, 28(2), 105–109. <https://doi.org/10.1007/s11092-016-9241-1>
- Jekabsone, I., & Gudele, I. (2023). Online adult education for sustainable development: The analysis of the consequences of the COVID-19 pandemic in Latvia. *Journal of Teacher Education for Sustainability*, 25(1), 155–167. <https://doi.org/10.2478/jtes-2023-0010>
- Jitpaisarnwattana, N., Reinders, H., & Darasawang, P. (2021). Understanding the roles of personalization and social learning in a language MOOC through learning analytics. *Online Learning*, 25(4), 324–343. <https://doi.org/10.24059/olj.v25i4.2509>
- Kellogg, S., Booth, S., & Oliver, K. (2014). A social network perspective on peer supported learning in MOOCs for educators. *The International Review of Research in Open and Distributed Learning*, 15(5). <https://doi.org/10.19173/irrodl.v15i5.1852>
- Kizilcec, R. F., & Cohen, G. L. (2017). Eight-minute self-regulation intervention raises educational attainment at scale in individualist but not collectivist cultures. *Proceedings of the National Academy of Sciences*, 114(17), 4348–4353. <https://doi.org/10.1073/pnas.1611898114>
- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Computers & Education*, 104, 18–33. <https://doi.org/10.1016/j.compedu.2016.10.001>
- Kizilcec, R. F., Reich, J., Yeomans, M., Dann, C., Brunskill, E., Lopez, G., Turkay, S., Williams, J. J., & Tingley, D. (2020). Scaling up behavioral science interventions in online education. *Proceedings of the National Academy of Sciences*, 117(26), 14900–14905. <https://doi.org/10.1073/pnas.1921417117>
- Krasny, M., DuBois, B., Adameit, M., Atiogbe, R., Baih, L., Bold-erdene, T., Golshani, Z., González-González, R., Kimirei, I., Leung, Y., Shian-yun, L., & Yao, Y. (2018). Small groups in a social learning MOOC (slMOOC): Strategies for fostering learning and knowledge creation. *Online Learning*, 22(2), 119–140. <https://doi.org/10.24059/olj.v22i2.1339>

- Kucuk, S., & Richardson, J. C. (2019). A structural equation model of predictors of online learners' engagement and satisfaction. *Online Learning*, 23(2), 196–216. <https://doi.org/10.24059/olj.v23i2.1455>
- Lerís, D., Sein-Echaluce, M. L., Hernández, M., & Bueno, C. (2017). Validation of indicators for implementing an adaptive platform for MOOCs. *Computers in Human Behavior*, 72, 783–795. <https://doi.org/10.1016/j.chb.2016.07.054>
- Levin, H. M. (1974). A conceptual framework for accountability in education. *The School Review*, 82(3), 363–391.
- Levitt, R., Janta, B., & Wegrich, K. (2008). *Accountability of teachers: Literature review*. RAND Corporation. [https://www.rand.org/pubs/technical\\_reports/TR606.html](https://www.rand.org/pubs/technical_reports/TR606.html)
- Li, S., Du, J., & Yu, X. (2025). Dynamics of cMOOC learner interactions in different social media: A longitudinal network analysis. *Interactive Learning Environments*, 33(3), 2460–2478. <https://doi.org/10.1080/10494820.2024.2412058>
- Li, Y., Armstrong, A. K. & Krasny, M. E. (2024). MOOC teaching assistants' global engaged-learning in the United States and China. *Online Learning*, 28(4), 147–171. <https://doi.org/10.24059/olj.v28i4.4567>
- Li, Y., Krasny, M. E., & Russ, A. (2016). Interactive learning in an urban environmental education online course. *Environmental Education Research*, 22(1), 111–128. <https://doi.org/10.1080/13504622.2014.989961>
- Limbu, Y. (2025). Factors associated with student engagement in online learning during COVID-19 pandemic: A systematic review. *Online Learning*, 29(1), 293–325. <https://doi.org/10.24059/olj.v29i1.4221>
- Liu, Z., Zhang, N., Peng, X., Liu, S., Yang, Z., Peng, J., Su, Z., & Chen, J. (2022). Exploring the relationship between social interaction, cognitive processing and learning achievements in a MOOC discussion forum. *Journal of Educational Computing Research*, 60(1), 132–169. <https://doi.org/10.1177/07356331211027300>
- Loh, H. S., Martins van Jaarsveld, G., Mesutoglu, C., & Baars, M. (2024). Supporting social interactions to improve MOOC participants' learning outcomes: A literature review. *Frontiers in Education*, 9. <https://doi.org/10.3389/feduc.2024.1345205>
- Moore, R. L., & Wang, C. (2021). Influence of learner motivational dispositions on MOOC completion. *Journal of Computing in Higher Education*, 33(1), 121–134. <https://doi.org/10.1007/s12528-020-09258-8>
- Moore, R. L., Wang, C., Liu, L., & Lee, S. S. (2025). The knowledge quest: Navigating the Learner-Intention Continuum from curiosity to achievement. *Education and Information Technologies*, 30(9), 12991–13009. <https://doi.org/10.1007/s10639-025-13327-9>

- Normore, A. H. (2004). The edge of chaos: School administrators and accountability. *Journal of Educational Administration*, 42(1), 55–77. <https://doi.org/10.1108/09578230410517477>
- Parrish, P., & Linder-VanBerschot, J. A. (2010). Cultural dimensions of learning: Addressing the challenges of multicultural instruction. *International Review of Research in Open and Distance Learning*, 11(2), 1–19. <https://doi.org/10.19173/irrodl.v11i2.809>
- Rabin, E., Kalman, Y. M., & Kalz, M. (2019). An empirical investigation of the antecedents of learner-centered outcome measures in MOOCs. *International Journal of Educational Technology in Higher Education*, 16(1), 14. <https://doi.org/10.1186/s41239-019-0144-3>
- Rahimi, A. R. (2024). A tri-phenomenon perspective to mitigate MOOCs' high dropout rates: The role of technical, pedagogical, and contextual factors on language learners' L2 motivational selves, and learning approaches to MOOC. *Smart Learning Environments*, 11(1), 11. <https://doi.org/10.1186/s40561-024-00297-7>
- Rahmatollahi, M., & Mohamadi Zenouzagh, Z. (2021). Designing and validating an evaluation inventory for assessing teachers' professional accountability. *Language Testing in Asia*, 11(1), 11. <https://doi.org/10.1186/s40468-021-00128-3>
- Redmond, P., Alexsen, M., Maloney, S., Turner, J., Brown, A., Basson, M., Galligan, L., Lawrence, J., & Henderson, R. (2023). Student perceptions of online engagement. *Online Learning*, 27(1), 383–403. <https://doi.org/10.24059/olj.v27i1.3320>
- Rizvi, S., Rienties, B., Jekaterina Rogaten, & Kizilcec, R. F. (2024). Are MOOC learning designs culturally inclusive (enough)? *Journal of Computer Assisted Learning*, 40(6), 2496–2512.
- Rizvi, S., Rienties, B., Rogaten, J., & Kizilcec, R. F. (2022a). Culturally adaptive learning design: A mixed-methods study of cross-cultural learning design preferences in MOOCs. In Rienties, B., Hampel, R., Scanlon, E., & Whitelock, D. (Eds.), *Open World Learning* (pp. 103–115). Routledge.
- Rizvi, S., Rienties, B., Rogaten, J., & Kizilcec, R. F. (2022b). Beyond one-size-fits-all in MOOCs: Variation in learning design and persistence of learners in different cultural and socioeconomic contexts. *Computers in Human Behavior*, 126, 106973. <https://doi.org/10.1016/j.chb.2021.106973>
- Ruipérez-Valiente, J. A., Jenner, M., Staubitz, T., Li, X., Rohloff, T., Halawa, S., Turro, C., Cheng, Y., Zhang, J., Despujol, I., & Reich, J. (2020). Macro MOOC learning analytics: Exploring trends across global and regional providers. *Proceedings of the Tenth International Conference on Learning Analytics & Knowledge*, 518–523. <https://doi.org/10.1145/3375462.3375482>
- Sanz-Martínez, L., Martínez-Monés, A., Bote-Lorenzo, M. L., Muñoz-Cristóbal, J. A., & Dimitriadis, Y. (2017). Automatic group formation in a MOOC based on students' activity criteria. In É. Lavoué, H. Drachsler, K. Verbert, J. Broisin, & M. Pérez-

- Sanagustín (Eds.), *Data driven approaches in digital education* (pp. 179–193). Springer International Publishing. [https://doi.org/10.1007/978-3-319-66610-5\\_14](https://doi.org/10.1007/978-3-319-66610-5_14)
- Schlenker, B. R., Britt, T. W., Pennington, J., Murphy, R., & Doherty, K. (1994). The triangle model of responsibility. *Psychological Review*, 101(4), 632–652. <https://doi.org/10.1037/0033-295X.101.4.632>
- Schlenker, B. R., Weigold, M. F., & Doherty, K. (1991). Coping with accountability: Self-identification and evaluative reckonings. In C. R. Snyder & D. R. Forsyth (Eds.), *Handbook of social and clinical psychology: The health perspective* (pp. 96–115). Pergamon Press.
- Schwartz, S. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture*, 2(1). <https://doi.org/10.9707/2307-0919.1116>
- Semenova, T. (2022). Not only the intention to complete: The role of action-oriented intentions in MOOC completion. *Technology, Knowledge and Learning*, 27(3), 707–719. <https://doi.org/10.1007/s10758-021-09534-1>
- Singh, A., & Ishrat, A. (2025). The role of social support in enhancing self-efficacy and learning satisfaction in online education among secondary school students. *On the Horizon: The International Journal of Learning Futures*, 3(33), 320–337. <https://doi.org/10.1108/OTH-03-2025-0033>
- Sitzmann, T., & Ely, K. (2010). Sometimes you need a reminder: The effects of prompting self-regulation on regulatory processes, learning, and attrition. *Journal of Applied Psychology*, 95(1), 132–144. <https://doi.org/10.1037/a0018080>
- Sitzmann, T., & Johnson, S. K. (2012). The best laid plans: Examining the conditions under which a planning intervention improves learning and reduces attrition. *Journal of Applied Psychology*, 97(5), 967–981. <https://doi.org/10.1037/a0027977>
- Sonnenberg, C., & Bannert, M. (2019). Using Process Mining to examine the sustainability of instructional support: How stable are the effects of metacognitive prompting on self-regulatory behavior? *Computers in Human Behavior*, 96, 259–272. <https://doi.org/10.1016/j.chb.2018.06.003>
- Sparke, M. (2017). Situated cyborg knowledge in not so borderless online global education: Mapping the geosocial landscape of a MOOC. *Geopolitics*, 22(1), 51–72. <https://doi.org/10.1080/14650045.2016.1204601>
- Stein, R. E., Colyer, C. J., & Manning, J. (2016). Student accountability in team-based learning classes. *Teaching Sociology*, 44(1), 28–38. <https://doi.org/10.1177/0092055X15603429>
- Tang, Y., Tseng, H., Kuo, Y.-C., Yeh, H.-T., & Liu, J. (2025). Setting the stage for success: Readiness and connectedness as antecedents of learning continuance intention in online learning. *Online Learning*, 29(1), 214–237. <https://doi.org/10.24059/olj.v29i1.4402>

- Tetlock, P. E. (1992). The impact of accountability on judgment and choice: Toward a social contingency model. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (vol. 25, pp. 331–376). Academic Press. [https://doi.org/10.1016/S0065-2601\(08\)60287-7](https://doi.org/10.1016/S0065-2601(08)60287-7)
- Viberg, O., Kizilcec, R. F., Jivet, I., Martínez Monés, A., Oh, A., Mutimukwe, C., Hrastinski, S., & Scheffel, M. (2024). Cultural differences in students' privacy concerns in learning analytics across Germany, South Korea, Spain, Sweden, and the United States. *Computers in Human Behavior Reports*, 14, 100416. <https://doi.org/10.1016/j.chbr.2024.100416>
- von Hippel, P. (2017). When can you fit a linear probability model? More often than you think. *Statistical Horizons*. <https://statisticalhorizons.com/when-can-you-fit/>
- Wei, W., Liu, J., Xu, X., Kolletar-Zhu, K., & Zhang, Y. (2023). Effective interactive engagement strategies for MOOC forum discussion: A self-efficacy perspective. *PLOS ONE*, 18(11), e0293668. <https://doi.org/10.1371/journal.pone.0293668>
- Winrotte, S. (Director). (2022). Student accountability in online environments [Video recording]. <https://onlineteachinghub.education.purdue.edu/student-accountability-in-online-environments/>
- Wong, J., Baars, M., He, M., de Koning, B. B., & Paas, F. (2021). Facilitating goal setting and planning to enhance online self-regulation of learning. *Computers in Human Behavior*, 124, 106913. <https://doi.org/10.1016/j.chb.2021.106913>
- Xiang, M., Zhang, J., & Li, Y. (2025). Examining the dynamics of knowledge convergence in online learning context: A network perspective. *Computers & Education*, 227, 105222. <https://doi.org/10.1016/j.compedu.2024.105222>
- Xu, Q., & Richardson, J. (2024). The impact of social media and gamification of a mobile vocabulary learning app: Self-regulation and learning persistence. *Online Learning*, 28(4), 4–32. <https://doi.org/10.24059/olj.v28i4.4592>
- Yang, B., & He, H. (2022). Learning alone yet together: Enhancing between-learner social connectivity at scale. *Proceedings of the Ninth ACM Conference on Learning @ Scale*, 374–378. <https://doi.org/10.1145/3491140.3528294>
- Zellars, K. L., Hochwarter, W. A., Lanivich, S. E., Perrewé, P. L., & Ferris, G. R. (2011). Accountability for others, perceived resources, and well being: Convergent restricted non-linear results in two samples. *Journal of Occupational and Organizational Psychology*, 84(1), 95–115. <https://doi.org/10.1348/2044-8325.002004>
- Zhang, J., Skryabin, M., & Song, X. (2016). Understanding the dynamics of MOOC discussion forums with simulation investigation for empirical network analysis (SIENA). *Distance Education*, 37(3), 270–286. <https://doi.org/10.1080/01587919.2016.1226230>
- Zheng, S., Han, K., Rosson, M. B., & Carroll, J. M. (2016). The role of social media in MOOCs: How to use social media to enhance student retention. *Proceedings of the*

*Third (2016) ACM Conference on Learning @ Scale*, 419–428.  
<https://doi.org/10.1145/2876034.2876047>

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice*, 41(2), 64–70. [https://doi.org/10.1207/s15430421tip4102\\_2](https://doi.org/10.1207/s15430421tip4102_2)

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# A Tale of Two Platforms: Decoding the Digital Footprints of High School Students in Bilingual Scaffolded MOOCs

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## Abstract

While Massive Open Online Courses (MOOCs) are widely used in higher education, their application and effectiveness for high school students, especially English as a Foreign Language (EFL) learners grappling with language barriers in English-Medium Instruction environments, remain underexplored. There is a recognized gap in understanding how high school students' attitudes toward English, self-regulated learning motivation, online behaviors, and perceptions of course design within bilingual scaffolded MOOCs (courses providing linguistic and instructional support in both students' native language and English) influence course completion outcomes. A mixed-methods design was employed, involving 115 high school students from Northern Taiwan. Data were collected throughout an eight-week intervention. Results show: (1) those perceiving English as practical demonstrated higher self-regulated learning (SRL) motivation and learning satisfaction; (2) discussion participation was a significant predictor of course completion, while reading materials and watching videos were not significant predictors; (3) students primarily valued content knowledge, learning strategies, and language knowledge, and suggested improvements related to information accessibility and course design, including more explicit instructor guidance. The results suggest that MOOC designers and online educators should foster a positive attitude and belief toward English as a Lingua Franca, increase SRL, and design online lessons featuring easy-to-access materials and interactive activities. This study contributes to the broader discourse on inclusive and accessible online learning for global high school students.

**Keywords:** English as a lingua franca (ELF); Self-regulated learning; English MOOCs, Bilingual policy

Hsiao, J. C., Chang, C. F., & Chen, K. Z. (2025). A tale of two platforms: Decoding the digital footprints of high school students in bilingual scaffolded MOOCs. *Online Learning*, 29(4), 52-73. <https://doi.org/10.24059/olj.v29i4.5183>



## Introduction

As English continues dominating international communication, the rise of English as a lingua franca (ELF) has transformed language education, necessitating innovative approaches to meet learners' evolving needs. In Taiwan, the government has launched the Bilingual 2030 policy to enhance English proficiency among citizens and boost international competitiveness (National Development Council, 2021). Successful implementation of this policy requires effective strategies to develop students' intercultural communication competencies, which, though urgently needed, remain underexplored.

Among the strategies for expanding access to language learning, Massive Open Online Courses (MOOCs) have emerged as a promising platform for large-scale support (Yousef & Sumner, 2021). While MOOCs have been widely adopted in higher education, their application in high school settings remains relatively underexplored (Koutsakas et al., 2020). This limited research highlights a critical gap, especially considering that high school students, particularly those learning English as a Foreign Language (EFL), often encounter significant challenges when participating in English-medium instruction (EMI) MOOCs. These language barriers may hinder comprehension, reduce student engagement, and contribute to low course completion rates (Lin et al., 2021; Tien, 2023).

Faced with the challenge of relying solely on immersive English classrooms as a strategy for high school students to develop the language skills and attitudes needed to fulfill the bilingual policy, we propose the use of bilingual scaffolded MOOCs (courses that provide instructional support in both students' native language and English; Ertugruloglu et al., 2023) and examine how students perceive the course design and learn in this innovative environment. These bilingual-scaffolded MOOCs are well-supported by the literature introducing effective multilingual strategies that address language barriers. For example, the dual-language facilitation pairing English-medium instructional content with facilitators who catered to different language communities successfully boosted active participation and peer tutoring in the first week (Colas et al., 2016). Moreover, multilingual teaching assistants have been shown to bridge linguistic gaps and enhance intercultural communication in global MOOCs (Li et al., 2024). Collectively, these interventions provide a strong rationale for the design of our bilingual scaffolded MOOCs.

By integrating bilingual practices directly into the MOOC environment, we aim to reduce comprehension barriers students may encounter, enhance their learning engagement, and support more equitable access to course content. This linguistic scaffolding empowers EFL learners to participate in globally available MOOCs, such as those offered on platforms like Coursera, MIT OpenCourseWare, and FutureLearn, without being excluded from the global online learning ecosystem due to language limitations (Nguyen, 2022; Phan, 2018).

## Literature Review

This section provides the theoretical and empirical foundation for this study. It first situates the growing prominence of ELF and the rise of EMI MOOCs in K–12 education. It then synthesizes research on the psychological, attitudinal, and behavioral factors that predict success in MOOC learning.



### *English as a Lingua Franca and K–12 MOOCs*

English has flourished as a global language spoken by many non-native speakers (NNSs) with diverse backgrounds. This global situation paves the way for viewing English as a means of practical communication under various terms, such as English as a Lingua Franca (ELF), Global Englishes, English as an International Language, and World Englishes (Rose et al., 2020).

So far, researchers have conceptualized ELF in several ways. For example, three typical components of attitude toward ELF are the cognitive component (beliefs/perceptions about ELF), the affective component (feelings about ELF), and the behavioral component (actions related to ELF) (Rose et al., 2020). Another example includes awareness of language and language use (being aware of how ELF differs from “standard” English and the reasons leading to the differences), awareness of instructional practice (being aware of how teachers teach English and their interpretation of the practices), and awareness of learning (being aware of how using English as a lingua franca influences learning) (Sifakis, 2017). Studies have also documented positive impacts of ELF on student attitudes, knowledge acquisition, and confidence in using English (Rose et al., 2020).

Most study participants were university or postgraduate students (Rose et al., 2020). Little is known about how younger learners, such as high school students, perceive ELF. Besides, the relationship between learner conditions, such as prior English proficiency and attitude and belief toward ELF, is rarely discussed. To measure learners’ language proficiency, Kirkpatrick (2012) argued that it is necessary to add a sociocultural perspective to the evaluation by considering the settings relevant to learners instead of evaluating whether they acquire native-like proficiency and norms. That is, locally based measurement seems more suitable than international standardized tests.

In response to the growing prominence of ELF, researchers have advocated for a pedagogical shift in English Language Teaching (Galloway & Rose, 2018; Rose et al., 2020). Among the practices, the design of MOOCs appears to hold promise for several reasons. First, the predominant English-based MOOCs create a natural communication space for global learners with diverse native languages. Notably, instructors may also be NNSs of English. Within this inherently multilingual learning environment, English is an international lingua franca, facilitating communication between interlocutors from disparate first-language backgrounds. It has been suggested that a genuine learning environment where ELF is used naturally is ideal for investigating its role (Seidlhofer, 2005). MOOCs are a perfect scenario where learners encounter diverse English input (e.g., videos and reading materials) and use English for knowledge transmission and construction. This experience holds value for EFL learners, who often have limited access to English as a communicative tool in daily life (Kirkpatrick, 2012).

Following the initial launch in 2008 for adult and university learners, MOOCs experienced a surge in K–12 student enrollment in 2013 (Koutsakas et al., 2020; Yin et al., 2015). While research on MOOCs in K–12 education remains comparatively nascent compared to adult and university learners, a growing body of literature highlights their positive impact, including enhancing learning opportunities, personalizing learning experiences, and achieving learning gains (Guggemos et al., 2022). Given the distinct learning needs of K–12 students (e.g., a greater reliance on modeling and scaffolding), researchers have advocated for a reevaluation of MOOC design and implementation (Guggemos et al., 2022; Koutsakas et al., 2020; Yin et al., 2015). A comprehensive review by

Koutsakas et al. (2020) revealed a significant trend: K–12 MOOCs primarily function as supplementary resources within the existing curriculum rather than extracurricular projects beyond the compulsory courses. This finding implies that most K–12 students' access to MOOCs occurs in formal learning settings (Yousef & Sumner, 2021), which creates a niche to explore students' informal learning experience on MOOCs. This autonomous learning aligns with the core value of MOOCs: the flexible and self-directed pursuit of knowledge (Koutsakas et al., 2020; Yousef & Sumner, 2021; Zhu & Bonk, 2019). Further research is necessary to elucidate the intricate relationships between autonomous motivation and relevant variables, such as learning satisfaction and engagement (Guggemos et al., 2022; Yousef & Sumner, 2021).

### ***Psychological, Attitudinal, and Behavioral Factors Predicting Course Completion***

Due to the multifaceted nature of learning in MOOCs for high school students within the innovative bilingual scaffolded MOOCs framework, we explored various internal and observable factors repeatedly linked to successful course completion. These factors can be broadly categorized into psychological, attitudinal, and behavioral factors. For the psychological factor, we narrowed the focus to self-regulated learning (SRL) motivation. As for the attitudinal factors, emphasis was placed on learning satisfaction and engagement. Finally, behavioral factors encompassed observable online activities that demonstrated learner engagement. We aim to extend prior research by exploring the effects of these factors on learning outcomes in the underexplored context of bilingual scaffolded MOOCs for high school students.

SRL refers to learners' ability to manage and monitor their learning processes independently—including goal-setting, progress-tracking, and strategic learning application. It has emerged as a consistently strong predictor of successful course completion in both face-to-face and online environments (Tang & Bao, 2022; Yousef & Sumner, 2021). In a review by Yousef and Sumner (2021), they identified a surprising gap in the MOOC literature: there is a need to investigate SRL motivation within MOOC environments. Barnard et al. (2009) developed reliable and valid questionnaires measuring SRL. These instruments have been successfully employed in various studies, establishing the connection between SRL and academic achievement (Kucuk & Richardson, 2019; Nortvig et al., 2018; Wei et al., 2023). However, to broaden the current understanding of learning success within MOOC environments, the consideration of additional outcome factors that go beyond the past scope of review appears necessary, such as learning satisfaction, engagement, and even ELF (Wesely, 2012; Zulfikar et al., 2019).

Despite the promise of MOOCs, high dropout rates remain a concern. Researchers have identified learning satisfaction and engagement as key factors influencing course persistence (Koutsakas et al., 2020; Moore & Blackmon, 2022). Course assessment, content, and delivery—rather than mere support—significantly shape satisfaction, with assessment mediating the relationship between content and learner experience (Kumar & Kumar, 2020). Similarly, course quality strongly predicts satisfaction and continued engagement (Pozón-López et al., 2021).

Moore's (1990) theory of distance education offers a relevant framework, emphasizing learner autonomy, dialogue, and structure. Dialogue—such as that enabled through discussion forums—plays a vital role in sustaining engagement and reducing isolation, particularly for K–12 learners (Lan & Hew, 2020; Guggemos et al., 2022). In bilingual scaffolded MOOCs, this interaction becomes both linguistic and cognitive

scaffolding, supporting learners' participation in English while allowing native-language reinforcement (Ertugruloglu et al., 2023).

Higher levels of self-regulated learning (SRL) are consistently associated with greater satisfaction and engagement (Moore & Blackmon, 2022), and SRL also mediates the link between engagement and perceived learning gains (Wei et al., 2023). Engagement, in turn, predicts course completion and differentiates completers from non-completers (Lan & Hew, 2020). Given its multidimensional nature—encompassing behavioral, emotional, social, and cognitive elements—engagement warrants further study in K–12 MOOC contexts (Deng et al., 2020; Ogunyemi et al., 2022).

Aside from using questionnaires to measure learning engagement, a group of researchers specifically focused on learner behaviors in MOOCs, collecting, analyzing, and comparing various learner footprints (Emanuel & Lamb, 2017). A systematic review of 78 published studies on language MOOCs (Sallam et al., 2022) demonstrates that learner behaviors such as early engagement, social participation, self-regulated strategy use, and active interaction with instructors and peers are strongly linked to persistence and course completion. These findings reinforce the importance of designing MOOCs with features that facilitate authentic communication and sustained behavioral involvement. Among the empirical studies, two that studied students in Taiwan drew our attention. Chiu et al. (2018) used learning activity data from OpenEdu, a Taiwanese MOOC platform, to predict student performance. Thirteen features, including video views, forum participation, and exercise completion, were analyzed using linear and logistic regression models. The models identified answering questions, watching videos, and participating in forum discussions as significant predictors of course completion. Hsueh et al. (2022) also collected data from OpenEdu. Employing PLS-SEM to examine the effects of online time, video watching, and document reading on self-assessment and final grades, they found that video watching and self-assessment significantly predicted grades, while document reading is less impactful. Besides, it was through self-assessment that online time impacted final grades. Drawing from this body of literature, watching videos, reading materials, and participating in forum discussions emerge as critical behavioral indicators of student performance and grades. In the present study, we similarly rely on these specific indicators to predict the course completion outcomes of MOOCs for high school students.

### ***Research Questions***

This study explores using bilingual scaffolded MOOCs to promote self-directed online learning among high school students. We addressed three research questions:

1. What are the relationships among high school students' attitudes/beliefs toward ELF, self-regulated learning motivation, English proficiency, learning engagement, and learning satisfaction in the learning context of bilingual scaffolded MOOCs?
2. Which learning behaviors (i.e., watching videos, reading materials, and participating in forum discussions), as captured through learning analytics, predict course completion in bilingual scaffolded MOOCs for high school students?
3. What do students find most valuable in the learning experiences with bilingual scaffolded MOOCs, and what suggestions do they have for course improvement?

## Mixed-Methods Research Design

### *Methodological Approach*

This study employed a convergent mixed-methods design, integrating quantitative learning analytics and survey data with qualitative thematic analysis (Creswell & Creswell, 2018). The quantitative strand addresses Research Questions 1 and 2 using correlational and logistic regression analyses, while the qualitative strand addresses Research Question 3 through thematic exploration of open-ended responses.

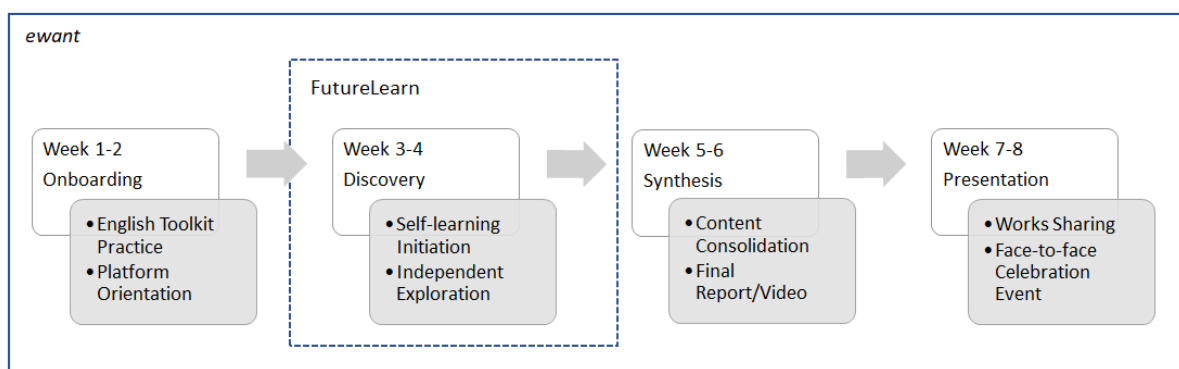
### *Program Design and Context*

The bilingual scaffolded MOOCs in the present study were built upon two MOOC platforms. The first platform is FutureLearn (FL; futurelearn.com), the third largest English-speaking MOOC platform serving global learners. The other platform, *ewant* (ewant.org), is a local and popular MOOC platform in Taiwan. The lecturers on *ewant* shared the same native language and cultural background as the participants, and they were skillful at applying scaffolding strategies.

Figure 1 presents the program structure. During the onboarding phase (Week 1-2), under the guidance of local instructors, students practiced English toolkits. They underwent bilingual platform orientation to familiarize themselves with the online learning environments (both *ewant* and FL). This phase ensured that students were well-prepared for the self-directed learning journey ahead. The Discovery phase (Week 3-4) focused on initiating self-learning and encouraging independent exploration. Students actively engaged with the course materials on FL and interacted with international peers and instructors in English. In the Synthesis phase (Week 5-6), students consolidated their learning by compiling a final report or creating a video showcasing their learning gains. Local instructors helped students synthesize the knowledge and skills they had acquired and prepared them for the final presentation. Finally, the Presentation phase (Week 7-8) involved uploading and sharing works and reflection, followed by a physical meeting for celebration. This phase provided an opportunity for students to present their achievements and have real-life interaction with local peers and instructors. We *ewant* maintained detailed records of students' online learning "footprints," including time spent on the platform, views of videos and materials, and interactions in discussion forums. The threshold of course completion was defined as achieving 60 out of 100 points, with rubrics designed by the local instructors.

**Figure 1**

### *Program Structure*



This study involved routine educational practices delivered through the *ewant* platform and qualified for IRB exemption under local institutional guidelines (Ministry of Health, Taiwan, 2012). Informed consent was obtained from all participating students before data collection, and participants were informed of their right to withdraw at any time. According to the *ewant* platform's End-User License Agreement, analyzing student learning records was permitted for educational and research purposes. All data were anonymized, aggregated, and reported in group form without disclosing personally identifiable information. The procedures adhered to Taiwan's Personal Data Protection Act and international standards of research ethics, including the Declaration of Helsinki.

### ***Participants***

Two cohorts of high school students (aged 15 to 17) from Northern Taiwan participated in the bilingual scaffolded MOOCs during the summers of 2022 and 2023. These students were recruited through a city-wide initiative in Taoyuan, where public high schools allowed students to earn self-learning course credits by enrolling in online courses offered on the *ewant* MOOC platform. Students freely selected courses aligned with their interests and submitted individual learning plans to their teachers for approval and supervision. Participation in the MOOC was thus both voluntary and self-directed, reflecting authentic engagement in informal, interest-driven learning environments.

Over the two years, 115 students enrolled in the study. Table 1 presents their distribution by course and completion rate. Specifically, 36 students enrolled in two courses during 2022, with a 50% completion rate. In 2023, 79 students participated in eight courses, with a completion rate of 35%. In addition to behavioral data drawn from the *ewant* system, survey data were collected from students who provided informed consent. Of the 79 students in the 2nd cohort, 45 (56.96%) responded to the pre-program survey, and 17 (21.52%) completed the post-program survey. A summary flow chart (Figure 2) has been added to illustrate each cohort's program structure and participant recruitment separately.

**Table 1**

*Distribution of Participants Concerning Course Topics, Enrollment, and Course Completion*

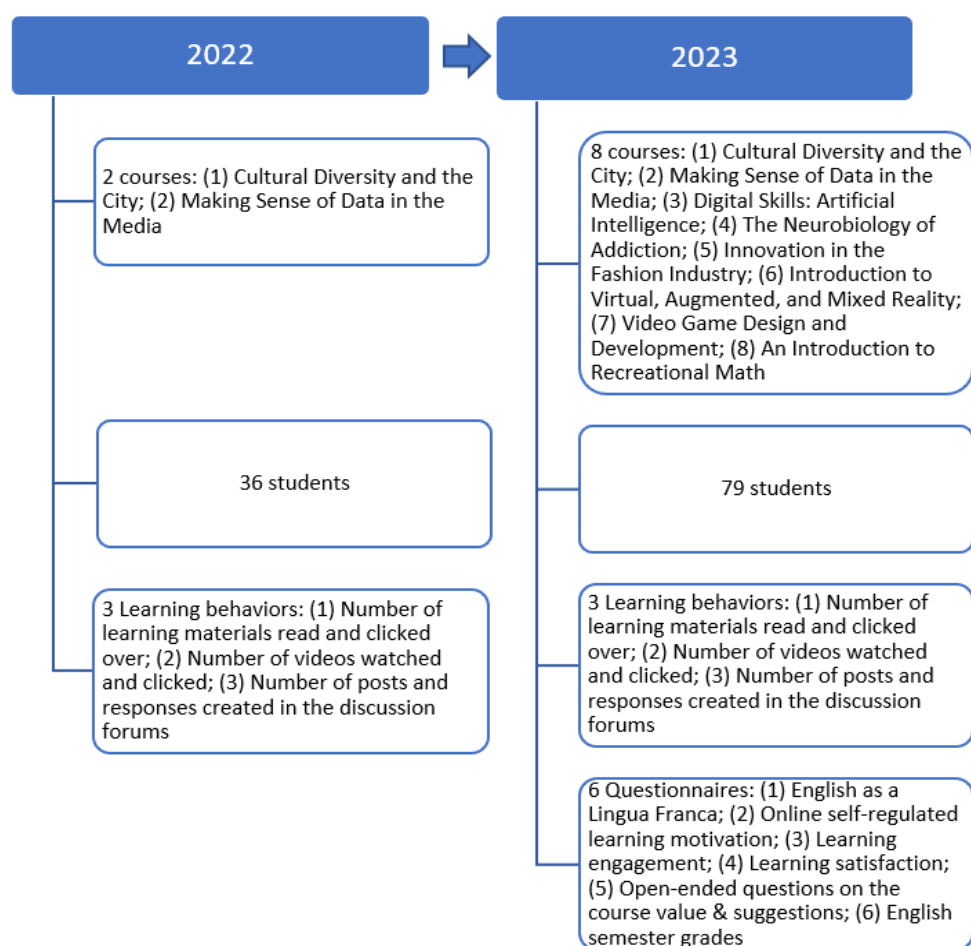
| Courses     | # of enrollment | Course completion on <i>ewant</i> (%) |
|-------------|-----------------|---------------------------------------|
| <b>2022</b> |                 |                                       |
| CD          | 19              | 10 (53)                               |
| DM          | 17              | 8 (47)                                |
| Total       | 36              | 18 (50)                               |
| <b>2023</b> |                 |                                       |
| CD          | 9               | 0 (0)                                 |
| DM          | 6               | 3 (50)                                |
| AI          | 16              | 5 (31)                                |
| NA          | 23              | 8 (35)                                |
| FI          | 5               | 2 (40)                                |

|       |    |         |
|-------|----|---------|
| VRMR  | 9  | 6 (67)  |
| VGD   | 9  | 2 (22)  |
| RM    | 2  | 2 (100) |
| Total | 79 | 28 (35) |

*Note.* CD = Cultural Diversity and the City, DM = Making Sense of Data in the Media, AI = Digital Skills: Artificial Intelligence, NA = The Neurobiology of Addiction, FI = Innovation in the Fashion Industry, VRMR = Introduction to Virtual, Augmented, and Mixed Reality, VGD = Video Game Design and Development, RM = An Introduction to Recreational Math.

**Figure 2**

*Program Overview and Participant Recruitment Across Two Independent Cohorts [CCI] (2022 and 2023)*



### ***Survey Instruments***

#### **English as a Lingua Franca (ELF)**

This questionnaire assessed participants' attitudes and beliefs regarding English learning, pronunciation, and competency, using translated scales developed by De Meerleer (2012) Following an exploratory factor analysis of the seven original subdomains (excluding

the emotional and general learning subdomains), three subscales emerged and were renamed to improve conceptual clarity in the high school context: (1) Adaptivity to Global Englishes (10 items, e.g., “I feel at ease when I have to speak English”), (2) Preference for standard English (5 items, e.g., “It is important to speak English with excellent pronunciation”), and (3) Practicality of English (6 items, e.g., “To me, English is more important than my mother tongue”). Four items with low or cross-factor loadings were removed, reducing the total from 25 to 21 items across the three factors. Each item was rated on a 5-point Likert scale. The Cronbach’s  $\alpha$  values of each subscale were .85, .68, and .77, respectively.

### Online Self-Regulated Learning Questionnaire (OSLQ)

This study adopted the Chinese version of the OSLQ developed by Wu et al. (2013), based on Barnard et al. (2009), to assess students’ self-regulation in online learning. The 24-item scale covers six dimensions—goal-setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation—and was used without modification. All items were rated on a 5-point Likert scale (e.g., “I set goals for my learning performance in this online course”; “I took notes while studying online”). The composite scale demonstrated high internal consistency (Cronbach’s  $\alpha = .93$ ).

### Learning Engagement

The learning engagement questionnaire, initially developed by Fredricks et al. (2005), was adapted to contextualize the items for online course settings in the bilingual MOOC environment. Specifically, terms related to general classroom experiences were revised to refer to online learning (e.g., “I like taking online courses”; “I feel excited about online course activities”). The final version comprised 15 items measuring behavioral, emotional, and cognitive engagement. All items were rated on a 5-point Likert scale. The composite scale demonstrated strong internal consistency, with a Cronbach’s  $\alpha$  coefficient of .91.

### Learning Satisfaction, English Semester Grades, and Open-Ended Questions

The learning satisfaction questionnaire, developed by the research team to reflect the bilingual MOOC context, consisted of nine items (e.g., “I am willing to recommend others to use *ewant* for learning.”). All items were rated on a 5-point Likert scale and demonstrated high internal consistency (Cronbach’s  $\alpha = .87$ ). Additionally, students were asked to report their English semester grades from the previous term, scored on a 0–100 scale, as an indicator of their general English proficiency and academic engagement. Finally, two open-ended questions were administered to explore students’ learning experiences and feedback for improvement: (1) The most valuable thing I learned from this course was... and (2) Any suggestions for improving this course?

### ***Learning Behavior Indicators***

#### Data Extraction

The data of learning behaviors were extracted from *ewant*’s backend system, which operates on a relational database system (e.g., MySQL or PostgreSQL) with three primary databases (user information, course information, and management) and tracks log repository. Since our focus was participants’ online learning behaviors, we collected the tracking log data, a detailed record of course user activities. This data encompassed views and clicks on learning materials, videos, and posts in discussion forums. In addition, the course database

supplied final course scores and completion records.

We selected behavioral indicators for the 2022 data pool based on the user tracking log repository. These indicators were aligned with the suggestions proposed by Chiu et al. (2018). Specifically, we extracted the following indicators:

- (1) Number of learning materials read and clicked.
- (2) Number of videos watched and clicked.
- (3) Number of posts and responses created in the discussion forums.

### Data Standardization

Given the high intercorrelations among several behavioral indicators (see Table 2), a standardization process identified three meaningful variables, resulting in the formulation of variables used for the 2023 dataset. First, the weekly reading completion rate was retained for reading behaviors, with each week's reading completion rate averaged. Similarly, the weekly video completion rate was calculated to represent students' video-watching behaviors. Finally, students' discussion behaviors were quantified and converted into percentages, resulting in the discussion contribution rate. Table 3 illustrates the calculation of these variables.

**Table 2**

*Properties and Zero-order Correlations Among 2022 Learning Behavioral Indicators*

| Property  | CC     | L1n     | L2n    | V1n     | V2n    | Lc     | Vc     | D1n    | D2n    |
|-----------|--------|---------|--------|---------|--------|--------|--------|--------|--------|
| <i>n</i>  | 36     | 36      | 36     | 36      | 36     | 36     | 36     | 36     | 36     |
| <i>M</i>  | —      | .96     | 4.80   | .85     | 7.64   | 1.29   | 1.38   | 7.08   | 130.44 |
| <i>SD</i> | —      | .62     | 3.11   | .52     | 4.78   | 1.08   | 1.25   | 6.15   | 120.78 |
| Min/Max   | 0/1    | 0/1.60  | 0/8    | 0/1.33  | 0/12   | 0/3.38 | 0/4.47 | 0/17   | 0/437  |
| CC        | —      |         |        |         |        |        |        |        |        |
| L1n       | .875** | —       |        |         |        |        |        |        |        |
| L2n       | .875** | 1.000** | —      |         |        |        |        |        |        |
| V1n       | .846** | .959**  | .959** | —       |        |        |        |        |        |
| V2n       | .846** | .959**  | .959** | 1.000** | —      |        |        |        |        |
| Lc        | .746** | .895**  | .895** | .844**  | .844** | —      |        |        |        |
| Vc        | .790** | .791**  | .791** | .782**  | .782** | .813** | —      |        |        |
| D1n       | .913** | .931**  | .931** | .925**  | .925** | .873** | .839** | —      |        |
| D2n       | .804** | .866**  | .866** | .845**  | .845** | .905** | .925** | .900** | —      |

*Note.* \*\* $p < .01$ . CC = Course completion, 1 = Pass, 0 = Fail. L1n = Number of learning materials read per week, L2n = Total number of learning materials read, V1n = Number of videos watched per week, V2n = Total number of videos watched, Lc = Average clicks per learning material, Vc = Average clicks per video, D1n = Total discussion interactions (posts + responses), D2n = Number of discussion forums browsed/clicked.



**Table 3***Standardization of Behavioral Indicators*

| Behavioral Indicator       | Calculation                                                                                              | Explanation                                                                                                                                                                 |
|----------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading completion rate    | $\frac{\text{Week1}(\frac{1}{9} = 11\%) + \text{Week2}(\frac{3}{4} = 75\%)}{2 \text{ Weeks}}$ $= 48.5\%$ | <ul style="list-style-type: none"> <li>• Week 1: 1 material completed out of 9 total materials</li> <li>• Week 2: 3 materials completed out of 4 total materials</li> </ul> |
| Video completion rate      | $\frac{\text{Week1}(\frac{1}{2} = 50\%) + \text{Week2}(\frac{1}{1} = 100\%)}{2 \text{ Weeks}}$ $= 75\%$  | <ul style="list-style-type: none"> <li>• Week 1: 1 video was completed out of 2 total videos</li> <li>• Week 2: 1 video completed out of 1 total video</li> </ul>           |
| Discussion completion rate | $\frac{15}{22} = 68\%$                                                                                   | <ul style="list-style-type: none"> <li>• 15 posts and responses, with 22 being the highest value in this category</li> </ul>                                                |

**Data Analysis**

A convergent mixed-methods approach was adopted to address the three research questions (Creswell & Creswell, 2018). For RQ1, descriptive and correlational analyses were conducted using post-program questionnaire data from the 2023 cohort to examine the relationships among learners' attitudes toward Global Englishes, self-regulated learning motivation, English proficiency, and learning satisfaction. For RQ2, behavioral indicators—reading rate, video watching rate, and discussion contribution rate—were extracted from the *ewant* platform across the 2022 and 2023 cohorts and entered into logistic regression analysis to predict course completion ( $p < .05$ ), evaluated using Nagelkerke  $R^2$  and classification accuracy. No covariates were included, as only 17 students self-reported prior English semester grades. For RQ3, thematic analysis was applied to open-ended responses from the same 17 students using Braun and Clarke's (2006) framework to identify perceived learning gains and course improvement suggestions. As coding was conducted by a single researcher on a small dataset, this constitutes a limitation and is acknowledged in the conclusion to support a cautious interpretation of the qualitative findings.

**Results*****English Practicality Plays an Essential Role***

Correlation analyses were conducted using IBM SPSS Statistics 24 to examine the relationships among key variables related to students' English attitudes, learning motivation, engagement, and satisfaction. Table 4 summarizes descriptive statistics, while Table 5 presents the correlation matrix. As shown in Table 5, several significant relationships emerged. Before the program, students who demonstrated greater adaptivity to Global Englishes exhibited higher self-reported English proficiency ( $r = .54, p < .001$ ). Moreover, students who valued the practicality of English tended to affirm the importance of standard

English ( $r = .43, p = .004$ ) and reported stronger self-regulated learning motivation ( $r = .39, p = .008$ ).

Post-program responses revealed that students who scored higher on English practicality also reported elevated learning engagement ( $r = .73, p = .001$ ) and satisfaction ( $r = .62, p = .008$ ). These findings suggest that students with a stronger belief in the practical utility of English were more engaged and satisfied with the bilingual scaffolded MOOC experience. Finally, a strong positive correlation was found between learning engagement and learning satisfaction ( $r = .81, p < .001$ ), highlighting the close alignment between affective and behavioral responses to the course.

**Table 4**

*Properties of Variables for the Cohort 2023*

|                       | <i>N</i> | <i>M</i> | <i>SD</i> | $\alpha$ | Range     | Skewness | <i>SE</i> | Kurtosis | <i>SE</i> |
|-----------------------|----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| <b>Pre-program</b>    |          |          |           |          |           |          |           |          |           |
| Global Englishes      | 45       | 3.33     | 0.64      | .85      | 2.2~4.8   | 0.14     | 0.35      | -0.61    | 0.70      |
| Standard English      | 45       | 3.57     | 0.61      | .68      | 2.2~4.8   | -0.20    | 0.35      | 0.04     | 0.70      |
| English Practicality  | 45       | 3.63     | 0.60      | .77      | 2~5       | -0.05    | 0.35      | 0.47     | 0.70      |
| SRL Motivation        | 45       | 3.45     | 0.58      | .93      | 1.2~4.83  | -0.89    | 0.35      | 4.80     | 0.70      |
| English Proficiency   | 45       | 84.71    | 10.25     | N/A      | 60~99     | -0.57    | 0.35      | -0.81    | 0.70      |
| <b>Post-program</b>   |          |          |           |          |           |          |           |          |           |
| Global Englishes      | 17       | 3.33     | 0.63      | .84      | 2.2~4.6   | 0.15     | 0.55      | -0.09    | 1.06      |
| Standard English      | 17       | 3.28     | 0.42      | .31      | 2.4~4     | -0.04    | 0.55      | -0.12    | 1.06      |
| English Practicality  | 17       | 3.32     | 0.81      | .86      | 1.33~4.67 | -0.58    | 0.55      | 0.94     | 1.06      |
| Learning Engagement   | 17       | 3.71     | 0.61      | .91      | 2~5       | -0.50    | 0.55      | -0.37    | 1.06      |
| Learning Satisfaction | 17       | 3.65     | 0.67      | .87      | 3~5       | -0.14    | 0.55      | -1.04    | 1.06      |

*Note.* SRL = Self-Regulated Learning; N/A = Not applicable.

**Table 5**

*Correlations among Variables in Pre- and Post-program Surveys*

|                         | 1     | 2     | 3     | 4    | 5 | 6 | 7 |
|-------------------------|-------|-------|-------|------|---|---|---|
| <b>Pre-program</b>      |       |       |       |      |   |   |   |
| 1. Global Englishes     | —     |       |       |      |   |   |   |
| 2. Standard English     | .13   | —     |       |      |   |   |   |
| 3. English Practicality | .22   | .43** | —     |      |   |   |   |
| 4. SRL motivation       | -.06  | .11   | .39** | —    |   |   |   |
| 5. English proficiency  | .54** | .19   | .21   | -.17 | — |   |   |
| <b>Post-program</b>     |       |       |       |      |   |   |   |
| 1. Global Englishes     | —     |       |       |      |   |   |   |
| 2. Standard English     | .33   | —     |       |      |   |   |   |

|                          |     |     |       |   |   |       |
|--------------------------|-----|-----|-------|---|---|-------|
| 3. English Practicality  | .20 | .38 | —     |   |   |       |
| 6. Learning Engagement   | .20 | .40 | .73** | — | — | —     |
| 7. Learning Satisfaction | .34 | .34 | .62** | — | — | .81** |

Note. \*\* $p < .01$ .

### Discussion Participation Predicts Course Completion

After we screened the 2023 data, 11 cases were removed due to low participation (i.e., only viewing materials before courses started), leaving 68 valid cases for logistic regression analysis. Descriptive and correlational statistics were first examined to gauge data spread and potential collinearity (Table 6).

**Table 6**

*Descriptive and Correlational Statistics for Learning Behavioral Indicators*

|               | CC     | RC     | VC     | DC    |
|---------------|--------|--------|--------|-------|
| <i>n</i>      | 68     | 68     | 68     | 68    |
| <i>M</i> (%)  | —      | 46.15  | 60.35  | 30.08 |
| <i>SD</i> (%) | —      | 35.94  | 38.79  | 27.23 |
| Min (%)       | 0      | 0      | 0      | 0     |
| Max (%)       | 1      | 93.06  | 100    | 100   |
| CC            | —      |        |        |       |
| RC            | .633** | —      |        |       |
| VC            | .639** | .838** | —      |       |
| DC            | .814** | .741** | .779** | —     |

Note. \*\* $p < .01$ . CC = Course completion: 1 = Pass, 0 = Fail. RC = Reading completion rate; VC = Video completion rate; DC = Discussion contribution rate.

Next, the logistic regression analysis examined the effects of reading rate, watching rate, and discussion contribution rate on course completion. The dependent variable, course completion, was binary, indicating whether a student completed the course (1) or not (0). The results are shown in Table 7. As Table 7 indicates, discussion contribution significantly predicted course completion. The odds ratio for discussion contribution was 1.28, implying that for each 1% increase in discussion contribution, the odds of course completion increased by 1.28 times.

**Table 7**

*Logistic Regression Results for Course Completion*

|                              | <i>B</i> | <i>SE</i> | Wald  | <i>df</i> | <i>p</i> | Odds Ratio |
|------------------------------|----------|-----------|-------|-----------|----------|------------|
| Reading Completion Rate      | .029     | .031      | .844  | 1         | .358     | 1.029      |
| Watching Completion Rate     | .054     | .046      | 1.389 | 1         | .239     | 1.056      |
| Discussion Contribution Rate | .247     | .093      | 7.002 | 1         | .008     | 1.280      |

Interestingly, the reading and watching completion rates were not significant predictors when combined with the discussion contribution rate, revealing that the discussion contribution rate was the most decisive predictor of course completion. The model fit was assessed using the Hosmer-Lemeshow goodness-of-fit test, which indicated that the model adequately fit the data:  $\chi^2(7) = 4.436$ ,  $p = .728$ . The Nagelkerke  $R^2$  value was .90, suggesting

that the model explained approximately 90% of the variance in course completion, with the model accuracy up to 92.6%.

### Students Value Both Content and Scaffolding in Bilingual MOOCs

Table 8 presents the five meaningful codes extracted from the open-ended question concerning the most valuable aspect of the program. Table 8 shows that content knowledge is the most prominent value, followed by learning strategy, language knowledge, critical thinking, and motivation. In other words, students placed the highest emphasis on mastering subject-specific content (e.g., the fashion industry and artificial intelligence) while also recognizing the importance of effective learning strategies (e.g., taking notes and utilizing online English learning tools) and language knowledge (e.g., vocabulary words and expressions). Critical thinking and motivation are also worth attention, though not as prominent as the other three codes. These findings suggest a multifaceted approach to scaffolded learning on bilingual MOOCs, where cognitive skills and motivational factors contribute to students' overall online learning experience.

**Table 8**

*Examples and Percentage of Extracted Codes*

| Code               | Example                                                                                                | %     |
|--------------------|--------------------------------------------------------------------------------------------------------|-------|
| Content knowledge  | I gained knowledge about artificial intelligence.                                                      | 38.89 |
| Critical thinking  | When I see data, I want to know how it was collected instead of accepting it without a second thought. | .56   |
| Language knowledge | I learned new vocabulary related to technology.                                                        | 16.67 |
| Learning strategy  | I learned how to take notes.                                                                           | 27.78 |
| Motivation         | I was motivated to learn.                                                                              | 5.56  |
| N/A                | Everything.                                                                                            | 5.56  |

*Note.* N/A = Not applicable.

Regarding suggestions for course improvement, “Accessibility of information” (50%) and “Course design” (50%) were extracted. “Accessibility of information” is relevant to platform design. One student said, “I was confused using the platform because I could not find the information I needed.” Another student replied, “When I had questions, I did not get prompt responses.” These comments highlight the importance of user-friendly platform design. When learners struggle to navigate the platform or access timely support, their emotions, motivation, and engagement could be negatively impacted.

On the other hand, “Course design” pertains to the structure and organization of the course content. Students expressed concerns about teachers' guidance and the pacing of the lessons, with one student commenting, “Teachers' directions were not clear enough.” Another student suggested, “I hope more sessions were saved for learning on FutureLearn.” These comments indicate that students value clear instructor guidance and opportunities for deeper engagement with the content knowledge.

## Discussion

The present study contributes to online learning research by exploring a less-explored context: scaffolded, bilingual MOOCs for high school students. Using a convergent mixed-methods design, we investigated (1) how learners' beliefs about English and self-regulated motivation relate to their engagement and satisfaction; (2) which types of behavioral engagement predict course completion; and (3) what learning experiences students find most

valuable. The study offers practical insights into designing inclusive online environments for linguistically diverse adolescents worldwide by examining these cognitive, behavioral, and experiential dimensions. Three significant findings are elaborated below.

First, positive correlations were found between various variables. Notably, a correlation between adaptivity to Global Englishes and English proficiency emerged. Such a finding offers insight into learners' openness to diverse English varieties as a global medium. It may enable them to navigate bilingual MOOC environments more effectively, aligning with Jenkins et al.'s (2011) affirmation that positive attitudes toward English as a global language enhance learning outcomes. The relationship highlights the potential impact of self-assurance in linguistic versatility on academic success. Furthermore, students who emphasized the practicality of English reported higher levels of self-regulated learning motivation and post-program learning satisfaction. This group also exhibited greater post-program engagement, suggesting that valuing the functional utility of English may foster more substantial involvement in online learning. These positive links resonate with existing literature, particularly studies emphasizing the positive effects of task value on motivation (Wigfield & Eccles, 1992). When students recognize English's real-world applicability, they are more likely to engage in self-regulated learning strategies, which enhances their learning satisfaction. The connection between attitudinal and motivational factors and post-program satisfaction underscores the interconnectedness of student attitude/belief, motivation, and overall program feedback.

Second, the logistic regression analysis identified discussion contribution as a significant predictor of course completion, while reading materials and watching videos were not. This finding underscores the critical role of active engagement and interaction in online learning environments, which aligns with Moore's (1990) Theory of Distance Education and empirical evidence (Emanuel & Lamb, 2017; Jitpaisarnwattana et al., 2021). Unlike adult learners—whose completion may be equally influenced by passive and active behaviors (Bonafini et al., 2017; Chiu et al., 2018; Peng & Xu, 2020)—adolescents may require dialogic and peer-based learning experiences to sustain motivation and accountability. Discussion activities may therefore play a developmental role by fostering a sense of relatedness and cognitive engagement, which are essential to adolescent persistence. This aligns with findings in middle school learners, where peer and instructor–learner interactions predicted learning efficiency via increased social presence and engagement (Gao et al., 2024). It is also consistent with MOOC research showing social presence contributes significantly to student engagement, mediated by autonomous motivation (Chi, 2023). Together, these results highlight the relevance of socially driven learning mechanisms in designing online courses for younger learners.

Finally, students considered content knowledge the most valuable gain. This indicates that the international instructors effectively provided substantive knowledge that students deemed relevant and useful. However, as the content knowledge was presented in English, a foreign language for the participants, they needed learning strategies/tools and knowledge of English to support the self-regulated learning journey (Barnard et al., 2009; Phan, 2018; Yousef & Sumner, 2021). Therefore, they also valued “Learning strategy” and “Language knowledge,” which the local instructors offered as scaffolds. With this instructional support in place, students were better able to absorb and make sense of the subject-matter content (Ertugruloglu et al., 2023; Rai & Chunrao, 2016). Echoing findings from global MOOC learners, these high school students also expressed a clear need for cognitive and linguistic scaffolding, suggesting a universal requirement for integrated support in MOOC-based

learning (Zhu et al., 2022). Although the participants of the current study focused on high school learners in Taiwan, the challenges of sustaining engagement, comprehending English content, and needing scaffolded support are shared by global adolescents who engage in online learning (e.g., Koutsakas et al., 2020; Pozón-López et al., 2021). These findings provide insights for designing scaffolded MOOCs and other online learning environments for linguistically diverse students across different cultural and educational settings.

The bilingual scaffolded MOOCs examined in this study offer a promising response to the challenges outlined by Li et al. (2024), who emphasized adolescent learners' need for language, content, technological, and emotional support in online learning environments. By addressing these needs through targeted scaffolding course design, our study contributes to global efforts to make online learning more accessible and practical for diverse learners. Our findings underscore the importance of using English for real-world content learning, particularly when learners are supported by instructors who share their linguistic and cultural backgrounds, thereby enhancing comprehension and engagement.

## Conclusion

The present study explored bilingual scaffolded MOOCs as an innovative initiative to address adolescent EFL learners' linguistic and motivational needs, engaging with English-language online content. The bilingual design aimed to reduce language barriers and promote equitable access to English-Medium Instruction (EMI) by combining global MOOC content with local scaffolding strategies.

Findings from this convergent mixed-methods study yield several practical implications. First, students who endorsed the practical value of English reported higher levels of self-regulated learning motivation, engagement, and satisfaction, underscoring the pedagogical value of designing online content that is contextually meaningful and applicable to real-world scenarios. Second, behavioral data revealed that discussion forum participation was the strongest predictor of course completion, while passive behaviors such as video watching and material reading were not significant. This finding highlights the salience of dialogic and interactive learning components in fostering engagement and social presence among adolescent learners. Third, the scaffolded structure of the MOOCs—featuring culturally resonant instructors and bilingual materials—was perceived as valuable in supporting comprehension and sustaining interest.

These findings suggest that when thoughtfully designed with practical content, self-regulated learning supports, and interactive elements, bilingual MOOCs can enhance adolescent engagement and learning persistence in online settings. Educators and course designers are encouraged to incorporate strategies such as goal-setting, time management scaffolds, and structured peer interaction opportunities to support autonomous learning among high school students. Furthermore, bilingual scaffolded MOOCs may be a promising model for facilitating EFL learners' transition to English-medium instruction through supportive and context-sensitive online environments.

Despite the study's contributions, several limitations warrant consideration. First, the sample was limited to high school students in Northern Taiwan who enrolled in specific MOOCs, which may constrain the generalizability of the findings. Future research could include more diverse and representative samples. Second, only immediate learning outcomes were assessed. Longitudinal designs are needed to examine the sustained impact of bilingual MOOCs on learners' academic trajectories and language development. Third, the absence of

pre- and post-intervention surveys precluded the assessment of developmental gains. Future work should incorporate such assessments to enable within-subject comparisons. Finally, the qualitative component was limited by the small sample size and single-coder analysis, potentially constraining analytic depth and trustworthiness. Expanding qualitative data collection and employing multiple coders could improve the credibility and robustness of future analyses.

Future research should extend our work to broader populations, including adolescents or younger learners in other regions, fresh university learners transitioning to EMI, and adult EFL learners in continuing education. Comparative studies could examine how cultural background, language proficiency, and educational systems mediate the effectiveness of online bilingual scaffolding. By situating the present findings in broader contexts, researchers may advance a more global understanding of designing inclusive MOOCs for linguistically diverse learner groups.

## Declarations

### *Ethics*

This study was conducted per the ethical standards of institutional and national research committees in Taiwan and the 1964 Helsinki Declaration and its later amendments. The research involved regular teaching activities and voluntary student participation through the *ewant* platform, so it was exempt from formal IRB review. Informed consent was obtained from all students via a web form before accessing the learning content. Data were collected and used in accordance with *ewant*'s Terms of Service and Taiwan's Personal Data Protection Act, ensuring that no personally identifiable information was disclosed.

### *Conflicts of Interest*

The authors declared no potential conflicts of interest concerning this article's research, authorship, and/or publication.

### *Acknowledgments*

We acknowledge the support of The Research Center of Higher Educational Resource for Openness at National Yang Ming Chiao Tung University for providing access to the valuable course platform and backstage data used in this study. We also thank all the students who participated in the online courses, making this research possible.

## References

- Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S.-L. (2009). Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education*, 12, 1–6. <https://doi.org/10.1016/j.iheduc.2008.10.005>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bonafini, F. C., Chae, C., Park, E., & Jablokow, K. W. (2017). How much does student engagement with videos and forums in a MOOC affect their achievement? *Online Learning*, 21(4), 223–240. <https://doi.org/10.24059/olj.v21i4.1270>
- Chi, X. (2023). The influence of presence types on learning engagement in a MOOC: The role of autonomous motivation and grit. *Psychology Research and Behavior Management*, 5169–5181. <https://doi.org/10.2147/PRBM.S442794>
- Chiu, Y. C., Hsu, H. J., Wu, J., & Yang, D. L. (2018). Predicting student performance in MOOCs using learning activity data. *Journal of Information Science and Engineering*, 34(5), 1223–1235. [https://doi.org/10.6688/JISE.201809\\_34\(5\).0007](https://doi.org/10.6688/JISE.201809_34(5).0007)
- Colas, J. F., Sloep, P. B., & Garreta-Domingo, M. (2016). The effect of multilingual facilitation on active participation in MOOCs. *International Review of Research in Open and Distributed Learning*, 17(4), 280–314. <https://doi.org/10.19173/irrodl.v17i4.2470>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.
- De Meerleer, M. (2012). *Beliefs and attitudes towards English as a lingua franca: Native and non-native pronunciation*. [Unpublished master's thesis]. Ghent University Faculty of Art and Philosophy, Netherlands.
- Deng, R., Benckendorff, P., & Gannaway, D. (2020). Linking learner factors, teaching context, and engagement patterns with MOOC learning outcomes. *Journal of Computer Assisted Learning*, 36(5), 688–708. <https://doi.org/10.1111/jcal.12437>
- Emanuel, J. P., & Lamb, A. (2017). Open, online, and blended: Transactional interactions with MOOC content by learners in three different course formats. *Online Learning*, 21(2), 1–25. <https://doi.org/10.24059/olj.v21i2.845>
- Ertugruloglu, E., Mearns, T., & Admiraal, W. (2023). Scaffolding what, why and how? A critical thematic review study of descriptions, goals, and means of language scaffolding in bilingual education contexts. *Educational Research Review*, 40, 100550. <https://doi.org/10.1016/j.edurev.2023.100550>
- Fredricks, J. A., Blumenfeld, P., Friedel, J., & Paris, A. (2005). School engagement. In K. A. Moore & L. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development* (pp. 305–321). Springer.



- Galloway, N., & Rose, H. (2018). Incorporating global Englishes into the ELT classroom. *ELT Journal*, 72(1), 3–14. <https://doi.org/10.1093/elt/ccx010>
- Guggemos, J., Moser, L., & Seufert, S. (2022). Learners don't know best: Shedding light on the phenomenon of the K–12 MOOC in the context of information literacy. *Computers & Education*, 188, 104552. <https://doi.org/10.1016/j.compedu.2022.104552>
- Hsueh, N. L., Daramsenge, B., & Lai, L. C. (2022). Exploring the influence of students' modes of behavioral engagement in an online programming course using the partial least squares structural equation modeling approach. *Journal of Information Technology Education: Research*, 21, 403–423. <https://doi.org/10.28945/5010>
- Jenkins, J., Cogo, A., & Dewey, M. (2011). Review of developments in research into English as a lingua franca. *Language Teaching*, 44, 281–315. <https://doi.org/10.1017/S0261444811000115>
- Jitpaisarnwattana, N., Reinders, H., & Darasawang, P. (2021). Understanding the roles of personalization and social learning in a language MOOC through learning analytics. *Online Learning Journal*, 25(4), 324–343. <https://doi.org/10.24059/olj.v25i4.2509>
- Kirkpatrick, A. (2012). English as an international language in Asia: Implications for language education. In A. Kirkpatrick & R. Sussex (Eds.), *English as an international language in Asia: Implications for language education* (pp. 29–44). Springer.
- Koutsakas, P., Choroizidis, G., Karamatsouki, A., & Karagiannidis, C. (2020). Research trends in K–12 MOOCs: A review of the published literature. *International Review of Research in Open and Distributed Learning*, 21(3), 285–303. <https://doi.org/10.19173/irrodl.v21i3.4650>
- Kucuk, S., & Richardson, J. C. (2019). A structural equation model of predictors of online learners' engagement and satisfaction. *Online Learning*, 23, 196–216. <https://doi.org/10.24059/olj.v23i2.1455>
- Kumar, P., & Kumar, N. (2020). A study of learner's satisfaction from MOOCs through a mediation model. *Procedia Computer Science*, 173, 354–363. <https://doi.org/10.1016/j.procs.2020.06.041>
- Lan, M., & Hew, K. F. (2020). Examining learning engagement in MOOCs: A self-determination theoretical perspective using mixed method. *International Journal of Educational Technology in Higher Education*, 17(7), 1–24. <https://doi.org/10.1186/s41239-020-0179-5>
- Li, Y., Armstrong, A. K., & Krasny, M. E. (2024). MOOC teaching assistants' global engaged-learning in the United States and China. *Online Learning*, 28(4), 147–171. <https://doi.org/10.24059/olj.v28i4.4567>
- Li, Z., Bonk, C. J., & Zhu, M. (2024). Community in the open: Supports, challenges, and impacts of local learning communities of K-12 adolescent MOOC learners from Nepal. *Online Learning*, 28(3), 497–523. <https://doi.org/10.24059/olj.v28i3.3463>

- Lin, S. L., Wen, T. H., Ching, G. S., & Huang, Y. C. (2021). Experiences and challenges of an English as a medium of instruction course in Taiwan during COVID-19. *International Journal of Environmental Research and Public Health*, 18(24), 12920. <https://doi.org/10.3390/ijerph182412920>
- Ministry of Health (Taiwan). (2012). *Research protocol within the scope of exemption categories for IRB Review*. <https://law.moj.gov.tw>
- Moore, M. (1990). Recent contributions to the theory of distance education. *Open Learning*, 5(3), 10–15. <https://doi.org/10.1080/0268051900050303>
- Moore, R. L., & Blackmon, S. J. (2022). From the learner's perspective: A systematic review of MOOC learner experiences (2008–2021). *Computers & Education*, 190, 104596. <https://doi.org/10.1016/j.compedu.2022.104596>
- National Development Council, Ministry of Education Directorate-General of Personnel Administration, Ministry of Examination Civil Service Protection, & Training Commission. (2021). *Bilingual 2023*. <https://ws.ndc.gov.tw/Download.ashx?u=LzAwMS9hZG1pbmlzdHJhdG9yLzExL3JlbGZpbGUvMC8xNDUzNC9hODg1MTBkMC04YmQxLTQxZGEtYTgzZC1jOTg0NDM5Y2U3ZmMucGRm&n=QmlsaW5ndWFsIDlwMzAucGRm&icon=.pdf>
- Nguyen, Q. N. (2022). Teachers' scaffolding strategies in internet-based ELT classes. *TESL-EJ*, 26(1), Article n1. <https://doi.org/10.55593/ej.26101a1>
- Nortvig, A. M., Petersen, A. K., & Balle, S. H. (2018). A literature review of the factors influencing e-learning and blended learning in relation to learning outcome, student satisfaction and engagement. *Electronic Journal of E-learning*, 16(1), 46–55.
- Ogunyemi, A. A., Quaicoe, J. S., & Bauters, M. (2022). Indicators for enhancing learners' engagement in massive open online courses: A systematic review. *Computers and Education Open*, 3, 100088. <https://doi.org/10.1016/j.caeo.2022.100088>
- Park, J. S. Y., & Wee, L. (2015). English as a Lingua Franca: Lessons for language and mobility. In C. Stroud & M. Prinsloo (Eds.), *Language, literacy and diversity* (pp. 55–71). Routledge.
- Peng, X., & Xu, Q. (2020). Investigating learners' behaviors and discourse content in MOOC course reviews. *Computers & Education*, 143, 103673. <https://doi.org/10.1016/j.compedu.2019.103673>
- Phan, T. (2018). Instructional strategies that respond to global learners' needs in massive open online courses. *Online Learning*, 22(2), 95–118. <https://doi.org/10.24059/olj.v22i2.1160>
- Pozón-López, I., Higuera-Castillo, E., Muñoz-Leiva, F., & Liébana-Cabanillas, F. J. (2021). Perceived user satisfaction and intention to use massive open online courses (MOOCs). *Journal of Computing in Higher Education*, 33(1), 85–120. <https://doi.org/10.1007/s12528-020-09257-9>

- Rai, L., & Chunrao, D. (2016). Influencing factors of success and failure in MOOC and general analysis of learner behavior. *International Journal of Information and Education Technology*, 6(4), 262–268. <https://doi.org/10.7763/IJiet.2016.V6.697>
- Rose, H., McKinley, J., & Galloway, N. (2020). Global Englishes and language teaching: A review of pedagogical research. *Language Teaching*, 1–43. <https://doi.org/10.1017/S0261444820000518>
- Sallam, M. H., Martín-Monje, E., & Li, Y. (2020). Research trends in language MOOC studies: A systematic review of the published literature (2012–2018). *Computer Assisted Language Learning*, 35(4), 764–791. <https://doi.org/10.1080/09588221.2020.1744668>
- Seidlhofer, B. (2005). English as a lingua franca. *ELT Journal*, 59(4), 339–341. <https://doi.org/10.1093/elt/cci064>
- Sifakis, N. (2017). ELF awareness in English language teaching: Principles and processes. *Applied Linguistics*, 40. <https://doi.org/10.1093/applin/amx034>
- Tang, H., & Bao, Y. (2022). Self-regulated learner profiles in MOOCs: A cluster analysis based on the item response theory. *Interactive Learning Environments*, 32(5), 1877–1893. <https://doi.org/10.1080/10494820.2022.2129394>
- Tien, C. Y. (2023). To investigate the benefits and challenges of English-medium instruction (EMI) in higher education in Taiwan. *European Journal of Research in Social Sciences*, 11(1), 12–20.
- Wei, X., Saab, N., & Admiraal, W. (2023). Do learners share the same perceived learning outcomes in MOOCs? Identifying the role of motivation, perceived learning support, learning engagement, and self-regulated learning strategies. *The Internet and Higher Education*, 56, 100880. <https://doi.org/10.1016/j.iheduc.2022.100880>
- Wesely, P. M. (2012). Learner attitudes, perceptions, and beliefs in language learning. *Foreign Language Annals*, 45(s1), 98–117. <https://doi.org/10.1111/j.1944-9720.2012.01181.x>
- Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental Review*, 12(3), 265–310. [https://doi.org/10.1016/0273-2297\(92\)90011-P](https://doi.org/10.1016/0273-2297(92)90011-P)
- Wu, Y.-T., Sun, J. C.-Y., & Lee, W.-I. (2013). A scale for measuring students' self-regulation in higher education online environment with the use of OpenCourseWare. *Journal of Liberal Arts and Social Sciences*, 9(3), 189–208. <https://tpl.ncl.edu.tw/NclService/JournalContentDetail?SysId=A13025585>
- Yin, Y., Adams, C., Goble, E., & Francisco Vargas Madriz, L. (2015). A classroom at home: Children and the lived world of MOOCs. *Educational Media International*, 52(2), 88–99. <https://doi.org/10.1080/09523987.2015.1053287>
- Yousef, A. M. F., & Sumner, T. (2021). Reflections on the last decade of MOOC research. *Computer Applications in Engineering Education*, 29(4), 648–665. <https://doi.org/10.1002/cae.22334>

- Zulfikar, T., Dahliana, S., & Sari, R. A. (2019). An exploration of English students' attitude towards English learning. *English Language Teaching Educational Journal*, 2(1), 1–12. <https://doi.org/10.12928/eltej.v2i1.947>
- Zhu, M., & Bonk, C. J. (2019). Designing MOOCs to facilitate participant self-monitoring for self-directed learning. *Online Learning*, 23(4), 106–134. <https://doi.org/10.24059/olj.v23i4.2037>
- Zhu, M., Bonk, C. J., & Berri, S. (2022). Fostering self-directed learning in MOOCs: Motivation, learning strategies, and instruction. *Online Learning*, 26(1), 153–173. <https://doi.org/10.24059/olj.v26i1.2629>

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# Investigating Non-Traditional Graduate Students' Social Presence in Online Collaborative Activities: A Case Study

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## Abstract

This case study explores the perceived social presence of 15 non-traditional graduate students engaged in a collaborative activity within a practice-oriented online course. Grounded in the Community of Inquiry framework and principles of collaborative learning, the activity was intentionally designed to include instructor facilitation, structured task design, group formation, and technology integration to support peer regulation. By analyzing multiple datasets, such as students' reflection papers and instructor-interview transcripts, the findings revealed that non-traditional students' self-regulation and team leaders' guidance led to the improvement of team dynamics and accountability. A majority of the team members held each other responsible in the group project. However, task complexity and time management remained challenges for the students. Notably, fewer than half of the students reported difficulty with specific sub-tasks of the group project, which was attributed to their insufficient foundational knowledge. Nevertheless, the findings emphasized the crucial role of instructor's support in team success and in addressing the students' knowledge gaps and misconceptions. The instructor provided constructive feedback on their formative assessments, encouraged them to leverage rubrics throughout the collaborative activity, and modelled best practices to support students during the collaborative activity. Moreover, team leadership emerged as an important factor that contributed to better team dynamics and purposeful interactions. This study offers practical and theoretical implications for instructional designers and course instructors seeking to create effective online collaborative learning environments for non-traditional graduate students.

*Keywords:* Non-traditional graduate students, social presence, collaborative learning, design elements, online course, case study

Mercado, F. M. S., and Shin, S. (2025). Investigating non-traditional graduate students' social presence in online collaborative activities: A case study. *Online Learning*, 29(4), 74-108. <https://doi.org/10.24059/olj.v29i4.5169>

## Introduction

Integrating collaborative learning into online courses supports both academic learning and the development of professional skills (Bessette & Burton, 2014; Jung et al., 2023; Marutschke et al., 2019). Collaboration is a highly valued skill in the workplace as it fosters accountability and helps build interpersonal relationships (Goulart et al., 2022; Luengo-Aravena et al., 2024). Developing collaboration skills is particularly relevant for non-traditional graduate students, who often manage multiple responsibilities and bring diverse life and work experiences to their academic studies (Bauer et al., 2023). Online collaborative learning can help students develop soft skills, such as project management, communication, and adaptability, while also cultivating a sense of community (Jung et al., 2023). Soft skills or competencies such as these are not only academically beneficial but are also directly transferable to real-world professional environments, which makes collaborative activities a useful mechanism for enhancing both academic success and career readiness.

Central to effective collaborative online learning is the development of social presence, defined as the ability of learners to project themselves as real participants in an online environment (Garrison et al., 2000; Laal & Laal, 2012). In online settings, where physical cues are absent, social presence can help sustain student engagement and help build meaningful connections among and between students and teachers (Doo & Bonk, 2020; Miao & Ma, 2022; Molinillo et al., 2018). Simply put, student participation in online learning does not happen automatically, and as such, students and teachers must work toward the development of their own social presence to help themselves be seen by others in online learning environments (Zhao et al., 2014). For social presence to emerge, teachers and students in online environments must intentionally foster open communication, emotional expression, and group cohesion (Garrison et al., 2000). These elements are important for creating a collegial and supportive learning environment, which in turn can help facilitate more effective collaboration (Aragon, 2003; Zhao et al., 2014).

Despite the potential benefits of collaborative learning, students frequently encounter significant challenges (Boud & Bearman, 2024; Matee & Nkiwane, 2021; Zygouris-Coe, 2019). Common challenges include time management difficulties, technical issues, poor communication, unequal participation, and imbalanced workload distribution, especially in group projects, a prevalent online collaborative format (Nungu et al., 2023; Oyarzun & Martin, 2023; Zhu & Zhang, 2022). Unaddressed, these challenges create negative social and emotional experiences that directly undermine the development of a strong social presence. For example, poor communication and imbalanced workloads can breed resentment, causing students to feel frustrated and isolated from their peers rather than part of a cohesive group (D'Errico et al., 2016; Gonzales et al., 2023; Oyarzun & Martin, 2023; Sung & Mayer, 2012). This erosion of social presence can lead students to feel negative emotional experiences, such as lack of connectedness and engagement. One of the student groups that experience these challenges are the non-traditional graduate students. These are learners who are enrolled in their full- or part-time studies while managing their personal and professional commitments (Carreira & Lopes, 2021; Strutkel et al., 2023). Although many studies have explored the social presence of non-traditional graduate students in collaborative online learning environments (Chen et al., 2018; Jiang & Koo, 2020; Nungu et al., 2023), our study aims to build upon this foundation by specifically investigating how their perception of social presence is shaped by the intentional integration of collaborative design elements.

## Review of the Literature

### *Collaborative Learning*

Collaborative learning is an educational approach in which students work together in groups to solve problems, complete tasks, or construct knowledge through shared inquiry (Davidson & Major, 2014; Laal & Laal, 2012). This approach is particularly beneficial in courses that incorporate ill-structured, problem-based learning activities, where solutions are not predetermined and require critical thinking and negotiation among peers (Loyens et al., 2012; Kokotsaki, 2016). It encourages students to engage in open-ended dialogue and independent thinking as they work toward a common goal (Olivares, 2008; Yang, 2023). Thus, collaborative learning promotes knowledge-building communities where supportive teachers and peers help create and maintain an environment dedicated to the development and improvement of ideas (Scardamalia & Bereiter, 2010; Yang, 2023). Learning occurs as students immerse themselves in a context-specific process, exchanging ideas, negotiating meaning, and co-constructing understanding with their peers (Dillenbourg, 1999). This active exchange of knowledge not only deepens content comprehension (Erkens & Bodemer, 2019) but also fosters essential skills such as communication, perspective-taking, and problem-solving skills (Dowell et al., 2020; Järvelä & Häkkinen, 2002) that are necessary in both academic and professional settings (Dickerson et al., 2016; Dowell et al., 2020; Lin-Stephens et al., 2019).

### Conditions that Enforce Collaborative Learning

Collaborative learning depends on five interrelated conditions: (a) positive interdependence, (b) promotive interaction, (c) individual accountability, (d) interpersonal and group skills, and (e) group processing (Kreijns et al., 2003; Laal & Ghodsi, 2012; Scager et al., 2017). These five interrelated elements have the potential to foster productive group dynamics and may help prevent issues like free-riding and social loafing. For instance, free-riding occurs when students in online groups reduce their effort because they feel that their individual contribution is unnecessary for the group's success (Kreijns et al., 2003). On the other hand, social loafing happens when students reduced their effort due to a decreased sense of personal impact on the group's outcomes (Kreijns et al., 2003). By intentionally integrating the five interrelated conditions of collaborative learning, instructors could possibly increase productivity and minimize disengagement behaviors such as free-riding and social loafing (Kreijns et al., 2003).

First of all, positive interdependence motivates students to contribute meaningfully, recognizing that individual success is tied to group outcomes (Johnson & Johnson, 2008; Scager et al., 2016). This, in turn, supports promotive interaction, where peers encourage and assist one another (Cecchini et al., 2021). Collaborative learning also requires individual accountability to ensure each member is responsible for both learning and contributing (Brush, 1998; Herrera-Pavo, 2021). Then, interpersonal and group skills, such as communication and conflict resolution, are equally important in collaborative learning settings to enable favorable team dynamics (Vance & Smith, 2019). Finally, group processing further strengthens collaboration by prompting reflection on group performance and strategies for improvement (Kreijns et al., 2003). Together, these conditions create a structured yet adaptable framework that promotes meaningful, goal-oriented learning and deeper engagement.

### ***Community of Inquiry Framework***

This study is grounded in the Community of Inquiry (CoI) framework, with a particular emphasis on social presence. Garrison et al. (2000) developed the CoI framework, which provides a theoretical foundation for designing and understanding online learning environments. It comprises three interdependent elements: social, cognitive, and teaching presences, which together create the conditions necessary for meaningful and sustained learning (Caskurlu et al., 2021).

Social presence is central to this study, as it enables students to connect personally with their peers and is considered as an essential condition for successful collaboration (Akyol & Garrison, 2010; Garrison, 2006; Lowenthal et al., 2017). Social presence is demonstrated by teachers and students through emotional expression, open communication, and group cohesion, all of which may help a sense of belonging and trust form within an online learning community. When studying social presence, researchers use these three social presence constructs (i.e., emotional expression, open communication, and group cohesion) as predefined coding categories or indicators of social presence. These indicators of social presence are foundational for collaborative engagement (Garrison, 2015; Lowenthal, 2009; Swan et al., 2017).

The other two elements of the CoI further support the collaborative process. Cognitive presence refers to the extent to which learners can construct and confirm meaning through sustained reflection and discourse (Richardson et al., 2012). High level of instructor engagement should be present to promote deep learning and reflection, such as providing various learning opportunities for testing students' knowledge and providing them with feedback (Fiock, 2020). Then, teaching presence involves the design, facilitation, and direction of both cognitive and social processes to support meaningful learning (Garrison et al., 2000). Under this dimension, instructors can support both social and cognitive presences by establishing social climate for group communication that cultivate co-construction of knowledge and learning experiences (Fiock, 2020). Together, these elements establish a robust framework for analyzing online learning communities that promote connection, collaboration, and shared academic goals.

Established in the early 2000s, the CoI framework has seen continuous growth and refinement over the years, including proposals to incorporate additional conceptual elements such as learning presence (e.g., ElSayad, 2023; Shea et al., 2012, Shea et al., 2022; Wertz, 2022). Several studies have shown that learning presence (LP), which represents self-regulation, strongly correlates with the other three CoI elements (El Sayad, 2023; Honig & Salmon, 2022; Shea et al., 2012). Shea and his colleagues (2012) proposed a revised CoI model that integrates learning presence. Through quantitative content analysis of online student discourse, their study identified instances of "learning presence," characterized by forethought/planning, monitoring, and strategy use, particularly in collaborative activities. Their research found that learning presence strongly correlates with course grades. It also suggested learning presence's importance in online learning success. This study was supported by Wertz (2022) conducted a four-factor model by adding Learning Presence, which represents student self-regulation, to the existing CoI framework elements. Through confirmatory factor analyses (CFA) of survey data from 256 graduate students, the key highlighted that Learning Presence is the strongest predictor of Cognitive Presence, which emphasized the crucial role of learner self-regulation in online learning. ElSayad (2023) also performed CFA to examine the statistical structure of the extended CoI and the structural path



between the four presences. It revealed that learning presence significantly influences students' social and cognitive presences.

These developments demonstrate the dynamic interconnections among the four elements within the extended CoI framework. Understanding these relationships can help enhance our insight into how CoI components influence collaborative learning environments for adult learners and help develop strategies aimed at more effectively promoting social presence. As the CoI framework continues to evolve, our study offers a comprehensive analysis of specific design components that support adult learners. Our findings seek to contribute insights into how these elements impact the development of the extended CoI, with an emphasis on strengthening social presence.

### ***Collaborative Learning Design Elements***

Collaborative learning involves the co-construction of knowledge through interaction, dialogue, and problem-solving (Davidson & Major, 2014; Dillenbourg, 1999; Qureshi et al., 2021). Simply placing students in groups is not enough; meaningful collaboration requires intentional design and facilitation (Kreijns et al., 2003).

Social presence in online collaborative learning is strengthened through intentional instructional design. This begins with structured, manageable tasks that gradually evolve into more complex, interdependent challenges, encouraging shared responsibility, co-regulation, and collaborative problem-solving (Dillenbourg, 1999; Kirschner et al., 2004; Saariaho et al., 2016). Formative scaffolds, such as checklists, rubrics, and structured feedback, help guide group processes and keep students aligned with shared goals (Allal, 2020; Hadwin et al., 2017; Hadwin & Oshige, 2011). Peer-supported strategies, including peer tutoring, further promote co-regulation by enabling students to support one another and navigate challenges (Miller & Hadwin, 2015; Hadwin et al., 2017).

Equally important is the integration of technology that supports communication, resource sharing, and collaborative discussion (Jeong & Hmelo-Silver, 2016). A robust digital infrastructure allows instructors to monitor progress and provide timely feedback (Allal, 2020). In sum, enhancing social presence in online learning requires a blend of pedagogical strategy and technological support. By aligning the CoI framework with collaborative learning principles, instructors can foster meaningful interaction, support group regulation, and facilitate progressive knowledge-building.

### ***Non-Traditional Graduate Students' Experiences of Social Presence in Online Collaboration***

For the purposes of this study, we adopt the definition of non-traditional graduate students proposed by Strutkel et al. (2023) and Tesone et al. (2003), which characterizes these students as adult learners enrolled either full- or part-time, who may have taken gap years between degrees or come from diverse backgrounds. Most importantly, our study concentrates on students who manage their online graduate education alongside personal and professional commitments.

Online education offers a flexible and convenient learning modality that supports non-traditional graduate students by fostering social presence and helping them more connected to instructors and peers (Ajamy, 2023; Akyol & Garrison, 2009; Picciano, 2002; Van Doorn et

al., 2014). Given the unique characteristics of non-traditional graduate students, it is beneficial for online course educators to be attentive to their specific physical and psychological learning needs (Diep, 2019). This consideration is especially relevant since non-traditional graduate students often have diverse backgrounds, may have taken gap years, and might require additional time and support (Chuang, 2021). Thus, by thoughtfully considering the unique needs and characteristics of the non-traditional students, collaborative online activities can foster social presence and contribute their positive learning experience (Chuang, 2021; Laal & Laal, 2012).

Many scholars have explored how collaborative online activities can strengthen social presence among adult learners (Diep et al., 2019; Jung et al., 2023; Nungu et al., 2023). For instance, Diep et al. (2019) found that adult learners who actively facilitated group work and engaged in online interactions reported a stronger sense of social connectedness. Similarly, Jung et al. (2023) noted that non-traditional students appreciated online collaboration for helping them gain skills in managing projects, feel more connected to peers, and benefit from flexible participation. Nungu et al. (2023), using a mixed-methods approach, showed that small group discussions in online settings can foster knowledge co-construction and higher-order thinking in STEM fields. These findings suggest that giving learners opportunities to lead discussions can strengthen connections and build a sense of community.

Although collaborative learning environments for non-traditional graduate students are gaining recognition (Connell, 2025; Jiang & Koo, 2020; Rosales-Asensio et al., 2021), concerns remain about social presence in these settings (Nungu et al., 2023; Parrish et al., 2021; Zhu & Zhang, 2023). For example, Nungu et al. (2023) found that small group discussions among postgraduate STEM students fostered knowledge co-construction and higher-order thinking, but inactive participation reduced interaction and collaboration. Similarly, Parrish et al. (2021) found that while some secondary teacher graduate students valued teamwork, many struggled to balance meetings with full-time jobs and wanted more direct instruction to clarify concepts. Zhu and Zhang (2023) showed that group contracts and peer evaluations supported teamwork in an online course but challenges with group formation and collaborative tools remained. Together, these studies highlight that inactive participation, group dynamics, and technology issues can hinder collaboration for non-traditional graduate students, pointing to the need for thoughtful design and support to strengthen the conditions for which social presence might emerge.

### ***Purpose of the Study and Research Question***

This study integrates key design elements (i.e., task structure, group formation, instructor facilitation, and technology integration) that foster social presence in a group project within a fully online course. Building on this foundation, the study has two primary aims: (1) to explore how non-traditional graduate students perceive social presence during a collaborative activity in a fully online course, and (2) to identify the design elements of the collaborative activity that contribute to their sense of social presence. This study is guided by the following research questions:

- How do graduate students perceive their social presence with their peers during an online collaborative activity?
- What design elements of the online collaborative learning activity contribute to students' sense of social presence?

## Methods

### *Instrumental Case Study*

This study employed an instrumental case study design to explore how integrated design elements might foster social presence in a fully online collaborative learning environment for non-traditional graduate students. Rather than merely examining students' perceptions, the study aimed to generate deeper insights that could inform both theory and practice. Instrumental case studies are used to understand a specific case and to refine broader theoretical frameworks (Baxter & Jack, 2008; Johnson & Christensen, 2017; Stake, 1995).

In the study's context, four key design elements were intentionally embedded in the instruction to support social presence in the online group activity. By focusing on a distinct group of learners engaged in online collaborative activities, the study seeks to illustrate how thoughtful design can enhance the conditions for social presence to emerge, which aligns well with the goals of an instrumental case study.

### *Positionality*

As researchers with backgrounds in instructional design, we bring both personal and professional perspectives to this study of online collaborative learning activities. Our interest in this topic stems from our experiences as educators and learners navigating the complexities of collaboration and the development of social presence in online environments, particularly for adult learners.

We acknowledge that our experiences in online teaching and learning may influence how we interpret participants' data. To address this, we maintained analytical memos to critically reflect on our coding decisions throughout the research process. Additionally, as researchers embedded in the same academic environment as some of the study participants, we took deliberate steps to uphold objectivity and ensure confidentiality. This means we remained aware of how our own experiences could influence the analysis, which allowed us to approach the data with greater care and neutrality. To support this, we engaged in reflective discussions throughout the process to critically examine our perspectives and maintain analytical rigor.

### *Settings and Participants*

This study was conducted at a four-year public university located in the southwestern United States that offers a fully online graduate program in Instructional Technology. The course had an initial enrollment of 16 students in spring 2024. The inclusion criteria for selecting participants were as follows: (a) students enrolled in EDUC 5007, a fully instructional design online program for graduate students, (b) who are at least 25 years of age, and (c) employed full-time or part-time. On the other hand, the exclusion criteria for the study were students who were not employed or were under the age of 25. All participants were confirmed to be non-traditional graduate students based on a learner profile they completed at the beginning of the semester. The learner profile also inquired students about their strengths and areas for improvement as future instructional designers. Moreover, all students were employed either part-time or full-time while taking the course. The instructor grouped the class into four teams of three members and two teams of two members.

However, one student from a pair withdrew from the course midway through the semester, resulting in a total of 15 participants across five teams.

### ***Instructional Context***

The study was embedded in an online instructional technology course designed to help students gain a foundational understanding of instructional design, where they engaged in collaborative projects to apply what they learned. The course EDUC 5007 (a pseudonym) includes an eight-week group project in which students collaborate to design instruction that teaches a specific task. The project offers students an opportunity to cultivate social presence—that is, to present themselves authentically and engage meaningfully with peers. The class was divided into smaller groups that provided an ideal context for observing social presence in online collaborative activity (Akcaoglu & Lee, 2016; Rovai, 2002). Thus, in this study, four teams had three members, and there were two pairs.

### ***Designing for Social Presence in Online Collaboration***

Four key design elements were embedded into the collaborative activity with the aim of fostering conditions that support the emergence of social presence. First, the course content was sequenced from simple to complex. During the first six weeks, students built foundational knowledge of instructional design through individual assessments that trained them to analyze learner needs and contextual factors. These tasks also helped students align learning experiences with their target audience. From weeks seven to fifteen, students transitioned into a collaborative group project, applying their knowledge in a structured, real-world context to deepen learning through practice.

The second and third elements focused on strategic group formation and instructor's active facilitation of collaboration. Students were grouped into pairs and triads based on the strengths of their performance, which the instructor had assessed through individual activities completed during the first seven weeks of the semester. Then, each group had a temporary leader appointed to guide initial coordination, but they had the flexibility to select a new leader by mutual agreement. Upon receiving their team assignments, students were encouraged to meet regularly to plan, delegate, and support one another. As challenges emerged, particularly for students with limited design experience, as indicated in their learner profile, the instructor provided ongoing feedback and formative assessments, such as draft reviews, to guide progress and reinforce learning. The fourth element was the integration of a team goal tracker, which allowed students to log tasks, monitor progress, upload shared documents, and link relevant resources. This technology tool enhanced coordination and supported the development of accountability and shared responsibility.

### ***Facilitation of the Online Collaborative Activity***

To help encourage the conditions for social presence to emerge in this online collaborative learning activity, the course instructor disseminated weekly reminders via the learning management system or through general email announcements. These communications outlined the expectations for students as active and responsible group members. Additionally, the emails included supportive messages encouraging students to seek clarification and assistance when course content was unclear. The instructor also used the email system to share relevant academic resources, including references pertinent to the

group project, and to provide detailed guidance on project submission procedures, particularly regarding the use of assessment rubrics.

### ***Case Selection***

We used purposive sampling following the principles established by Miles and Huberman (1994) to select a fully online course that incorporated the CoI framework, as this provided a context for exploring social presence in collaborative learning. The case was bounded by a group of non-traditional graduate students enrolled in the course. This instrumental case study was not undertaken to evaluate the course itself, but to use the course as a context through which to investigate broader questions about how social presence is fostered in online collaborative learning.

### ***Data Sources and Collection Methods***

We adopted a qualitative approach to explore graduate students' perceptions of their social presence during a collaborative activity. Data were collected from multiple sources, including peer feedback, reflection papers, observation notes from the presentation day, open-ended survey responses, instructor's weekly email announcement, and a transcript of the instructor's interview. All participant names were anonymized using pseudonyms to ensure confidentiality.

In the peer feedback process, students evaluated each group member and provided overall comments on team dynamics. In their reflection papers, students discussed their experiences, including successes, challenges, and lessons learned from the collaborative activity. On presentation day, one of the researchers took on the role of a full observer during the presentations to capture the quality of interaction and how the instructor facilitated the group presentations. The instructor also sent weekly announcements to provide students with general feedback about their activities and to share her real-world experiences in instructional design. To gain further insights into the facilitation of online collaboration, the same researcher conducted a semi-structured interview with the course instructor, following a protocol developed based on the CoI framework.

### ***Data Analysis***

We employed two qualitative analysis methods in this study: thematic analysis and summative content analysis.

#### **Thematic Analysis**

We conducted a theoretical thematic analysis using Braun and Clarke's (2006) six-phase process to address the first research question, "How do graduate students perceive their social presence with their peers during the online collaborative activity?" We used thematic analysis because it allowed us to identify repeated meanings across datasets and to analyze and report patterns that were relevant to our research question (Braun & Clarke, 2006; Castleberry & Nolen, 2018; Xu & Zammit, 2020).

First, we began by transcribing and organizing the data, reading through it to gain familiarity, and noting initial ideas and patterns. Second, we developed a provisional "start list" of codes based on our conceptual framework (Miles et al., 2014), defining each code with references to existing literature and examples from the data. These codes were grouped

into categories, where terms with the same ideas were clustered into a codebook (see Appendix). We also refined our codes to ensure alignment with both the framework and the dataset.

An instructional strategy expert, who was external to the research team, reviewed the codebook and provided feedback on identifying meaningful units of analysis. To ensure interrater reliability, two additional researchers independently coded a sample dataset, and discrepancies were resolved through discussion (Campbell et al., 2013). This process helped refine the final codes and their definitions.

In the third and fourth steps, we used Dedoose, a qualitative research software, to systematically segment our data into meaningful units and applied descriptive codes to these segments. Throughout the analysis process, we documented our decision-making and rationale through analytical memos. When new concepts arose that did not align with existing codes, we developed emergent codes to accurately represent them (Elliot, 2018; Stuckey, 2015). In the fifth phase, we defined and refined each identified theme, ensuring that each one accurately represented the data that contributed to its formation. Finally, in the sixth phase, we compiled the report, presenting a coherent, and logical narrative that effectively conveys the story told by the data. This report also includes excerpts from my online graduate student participants about their experience in collaborative learning.

### Summative Content Analysis

In addition to thematic analysis, we applied a summative content analysis (Hsieh & Shannon, 2005), counting the frequency of terms related to design elements. While frequency alone does not determine importance, it provided a useful descriptive indication of salience, which we then interpreted in relation to context and meaning.

To address our second research question—“What design elements of the online collaborative learning activity contribute to students’ social presence?”—systematically identified and counted specific words and phrases to uncover patterns in their usage and underlying meanings (Hsieh & Shannon, 2005). For instance, the term “leader” appeared 14 times across students’ reflection papers and peer review activities. A closer examination of these excerpts revealed that leadership was a recurring pattern that contributed to social presence by facilitating team coordination and goal alignment. In this process, we used Dedoose software to track term frequency and link occurrences to their respective data sources, which streamlined our analysis and enhanced traceability.

## **Results**

Using Braun and Clarke’s (2006) thematic analysis, we identified four themes that capture how students experienced social presence in collaborative online learning. Two themes highlight the role of peers: self-regulation and leadership as drivers of social presence, and task demands and management issues as barriers. The other two emphasize the instructor’s role: providing constructive feedback and modeling best practices to reduce task complexity. Within these themes, sub-themes emerged around individual versus group regulation, and the instructor’s dual role as facilitator and guide. Together, these themes illustrate both the affordances and challenges shaping graduate students’ perceptions of social presence in an online course.

### ***Theme 1: Self-Regulation and Leadership as Catalysts of Social Presence***

Graduate students participating in the online group activity reported a positive perception of social presence, which they attributed to their peers' self-regulation abilities, and their leaders' guidance.

#### ***Self-Regulation***

Each team initiated their project by breaking down their tasks into smaller, manageable tasks, assigning individual responsibilities, and establishing clear deadlines. Majority of the team members exhibited self-regulation skills by independently managing their tasks to meet deadlines and assisting in the quality assurance of their work. Furthermore, the assigned team leaders demonstrated proactive leadership by coordinating tasks, ensuring project expectations and deadlines were met, and supporting their peers despite their own personal and professional commitments. These factors fostered positive interdependence and individual accountability that contributed to the students' social presence.

Self-regulation was evident in the teams' structured approach, with nine students setting individual goals and managing their time and resources (Shea et al., 2012; Zimmerman, 1989). This structure demonstrated how team members willingly leveraged their strengths and expertise to complete individual academic tasks, directly contributing to overall team goals. For example, the peer review of Sara (all names are pseudonyms), one of the team leaders, expressed how one of her teammates, Diane, showed attentiveness and collaboration within the group. Sara described Dianne's contribution:

She paid attention to small details that I may have missed on my portion of the project and did so with a respectful manner. She was also very knowledgeable on ways to improve the overall document and felt she was an asset to my group.

Sara's peer review highlighted Diane's attentiveness to details and expertise in designing documents, which contributed the group's success. Thus, the success of each team can be credited to the strong self-regulation demonstrated by its members. The structured approach to task division has reinforced their self-regulation skills, enabling them to take responsibility, focus on their strengths, and pay close attention to details, which ultimately enhances the overall quality of their work. Consequently, these skills have contributed to the development of a cohesive environment where team members respect one another and collaborate toward shared objectives.

#### ***Leadership***

Team leadership also emerged as another factor that shaped the team dynamics and led to purposeful interactions (Mehall, 2020). The course instructor Dr. Williams's intentional team formation was based on strengthening collaboration and ensuring interactivity that laid the groundwork for positive leadership. Her strategy of assigning initial leaders, with the option for teams to adjust, empowered capable individuals who demonstrated initiative, quality work, and punctuality.

The group leaders, Elsa, Charlie, Loraine, Sam, and Tristan, demonstrated exceptional self-regulation and proactive leadership, directly cultivating a supportive environment for their teams. Seven team members consistently lauded their leaders' initiative, organizational

skills, and ability to coordinate tasks. They ensured that project expectations were not just met but exceeded. Leaders were praised for their guidance, communication, and skills in balancing coursework with personal and professional responsibilities. Elsa, Group 3's team leader, reflected on her leadership that "My leadership qualities were an asset on the project. I communicated well, encouraged accountability, and led by example by completing tasks early and with consideration for my teammates' time." This commitment to leading by example was among team leaders. One of the Group 5 members, Samira, described how their leader took care of the team, "Our team lead did an exceptional job, taking the lead with formatting the project before submission and initiating emails to our professor for further clarifications." Loraine, Group 4's leader, emphasized the power of decisive action, explaining, "Given the different schedules, it was sometimes necessary to make executive decisions about meeting times, formatting, or communication." Sara, Group 5's leader, described her deliberate approach: "I always made sure to check in with them and that the project was divided out equally. I also wanted to make sure that any Zoom calls that happened were prepared in advance to give everyone time to plan." Charlie, Group 1's leader, further detailed his leadership: "I was the group leader for my group... I communicated with my group frequently over email... checked in on how others were progressing... and lead Zoom meetings."

At the same time, certain students who were not designated as leaders have used their expertise to support their peers learning, irrespective of formal roles. For instance, in Group 2, instructional designer Candice proactively contributed her time and knowledge, noting:

As the only practicing instructional designer in our group, I have more experience in project management, so I contributed by initiating meetings, setting up shared documents, assigning responsibilities and defining deadlines for each stage of the project. With more experience in visual design, I also created 80% of the visual presentation...

Similarly, in Group 6, mutual quality checks fostered strong support. Charleston stated, "In our document we have endeavored to be resourceful, collectively critique each of our input and refine the justified inclusion." This interaction led Tristan, Group 6 team lead, to appreciate their team's positive dynamics, stating, "I feel lucky to be part of a team where each other's opinion is valued. Had one of us wanted to control the situation, we would not have created that great of a document." In these instances, supporting each other enhanced the team's ability to achieve shared objectives. Eventually, these positive team dynamics among team members had cultivated an environment where open communication, empathy, and mutual understanding became bedrock of the collaboration.

## ***Theme 2: Task Demands and Management Issues Are Barriers to Social Presence***

While positive social presence emerged from self-regulation and leadership within teams, negative experiences often stemmed from task complexity of the course project and management issues related to time and uneven workload distribution. These challenges led some team members to diminished social presence and feel frustration.

### ***Task Complexity***

Six students reported that they found complex nature of the group project, which required online graduate students to design a learning experience within their specific



contexts, challenging. Some of these challenges arise from difficulties in applying foundational instructional design concept. For instance, Tristan, noted, “There are so many things to think about when designing a lesson... as we progressed through the analysis, this drastically changed.

His peer, Charleston, added that their initial enthusiasm waned upon receiving feedback that their topic “lacked the depth necessary for an hour-long learning procedure,” necessitating further instructor guidance. Similarly, Dianne, from Group 5, found writing learning objectives “took more effort than [we] they thought.” This sentiment was echoed by her leader, Sara, who struggled with aligning activities and assessments. These experiences highlight that instructional design, regardless of prior teaching background or initial ideas, is challenging due to the need for cohesive alignment across all components and structured and sustained instructional support.

### ***Time Management and Uneven Workload***

We also found that time management was a major challenge for non-traditional graduate students, especially those balancing personal, professional, and academic responsibilities across different time zones (Fung, 2004; Kara et al., 2019; Oyarzun & Martin, 2023). Seven out of fifteen students reported this issue. Angel, for instance, noted that the time difference between her and her teammates’ respective locations limited her participation, preventing her from attending project presentations despite engaging in Zoom meetings and email correspondence. Brianna faced similar time zone inconveniences. Loraine, Group 2’s leader, acknowledged the difficulties of coordinating schedules among professional peers. Despite agreeing that most coursework would be completed on weekends, and setting deadlines after work hours, Loraine stated, “The most difficult aspect was scheduling and leveling out our expectations... it was difficult to work at the same pace, but we managed.” Her colleague, Camille, reinforced this, citing a demanding semester with state testing that highlighted the need for improved time management to support peers. These accounts underscore how professional commitments significantly limit online graduate students’ availability for collaboration, impacting both their contributions and their ability to support teammates.

Uneven workload distribution was a prominent theme in student reflections and peer feedback. It was primarily driven by poor communication and lack of accountability. Charlie, Team 1’s leader, experienced significant stress when a teammate failed to complete their portion due to a last-minute “emergency,” forcing Charlie and another member to finish the evaluation. Despite initial task agreements, the lack of timely communication also led to frustration. Charlie learned the importance of “communicating clear deadlines to prevent any last-minute stress.” Even with instructor mediation efforts, the issue in Team 1 persisted, as Dr. Williams noted the member “dropped the ball.” Similarly, Candice from Team 2 reported that one member “stalled the progress by not contributing sufficient input... as well as always being the last person to finish their designated responsibility,” which “hampered the progress and affected the project’s cohesion.” Furthermore, one student’s leader dropped the course mid-semester, leaving the remaining student to independently gather feedback and assume additional responsibilities. This incident, confirmed by Dr. Williams, highlighted the challenge of monitoring every member despite trusting their ownership and professionalism.

### ***Theme 3: Instructor Scaffolding and Constructive Feedback Influences Perceptions of Social Presence***

The analysis of the students' reflection paper, observation notes, and interview transcripts revealed that the instructor's constructive feedback helped students manage their challenges they had in the group project. To assist the students in areas for academic growth due to task complexity, the instructor shared her experience of how she provided instructional scaffolding to the formative assessments. In my interview with Dr. Williams, the instructor, she explained how she applied various strategies to support students in learning instructional design. A key approach was providing both individualized feedback on task analyses and general comments for most teams. She primarily offered written, rubric-oriented feedback on assignments, consistently reminding students to refer to the rubrics while preparing their work. Additionally, she emphasized the importance of writing quality, encouraging students to follow APA guidelines correctly. Through constructive feedback and structured guidance, Dr. Williams helped students navigate the complexities of instructional design.

Additionally, we used an open-ended survey question to ask students about their perception of their course instructor during the group project. One of the students described how the instructor supported their group. She mentioned, "Our interaction with our course instructor during the group project was helpful. Her suggestions were foundation and the bricks for our project." Another student also commented, "The instructor provided valuable feedback, though the instruction details can be more organized." Four out of six survey respondents described the instructor's presence as "professional and accessible," clear in directions, willing to offer virtual meetings if needed to discuss the project, and "helpful and engaging." These statements illustrated how the instructor reinforced her role in fostering student engagement and helping her students understand the course content.

#### ***Theme 4: Instructor Modeling Best Practices Provides Clarity and Reduces Complexity***

Beyond feedback, Dr. Williams actively reinforced key instructional design concepts by modeling best practices and providing examples to clarify alignment. She noticed that students often confused assessment with evaluation, so she frequently sent announcements featuring real-life cases from her experience as both an instructor and an instructional designer. Furthermore, the course incorporated instructional videos in the early weeks of the semester. When students struggled with aligning learning elements, Dr. Williams encouraged them to revisit these videos for additional support (see Figure 1). Therefore, through a combination of individualized feedback, real-world examples, and instructional resources, Dr. Williams productively guided her students in mastering instructional design.

## Figure 1

### *Screenshot of a Weekly Announcement*

- I encourage everyone to **review the video on alignment in Module 1**. Most of the issues stemmed from not aligning the goal to the objective to the learning activities to the assessment. Objectives describe the summative assessment. What can the students do at the end of the lesson?
- Most of you had multiple objectives for a 1-hour lesson. That's not wrong per se, especially if some of the objectives are enabling and one is the **terminal objective**. In my context, we most likely would only have a single objective for a 1-hour lesson. And again, that terminal objective describes the testing situation.
- The template I provided you with led some of you to conflate **assessment** (measurement of learning) with **evaluation** (judgement of the design). The rubric would have helped you with differentiating between the two concepts: "Assessment for student learning" versus "Evaluation...to inform future instructional design."

The students' reflection papers revealed how the instructor's guidance shaped her learning experiences. For instance, Emma described both her challenges and the lessons she gained from the course instructor:

The professor's criticism on the first topic was essential, and we learnt to adjust quickly. However, time management may have been improved. We wasted precious time because of the first topic change. One area for improvement is task analysis. We'd prefer to go farther into breaking down difficult activities into easy chunks for young students. We also learnt there is always space for improvement in presentations. Better cooperation throughout the planning phase would have led to a better presentation. Apart from those weaknesses what I learn is procedure learning and this project gave more value on clear communication and collaboration.

Emma's reflection illustrated how the instructor's guidance helped her team adapt, reflect critically on their work, and recognize key skills, such as communication, collaboration, and instructional design strategies, which can improve their abilities as future instructional designers.

**Table 1***Analytical Framework for Synthesized Thematic Analysis Addressing Research Questions*

| Research Question                                                                                                | Theme                                       | Sub-Themes/Illustrative Factors                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RQ1: How do graduate students perceive their social presence with peers during an online collaborative activity? | Self-Regulation and Leadership as Catalysts | Individual self-regulation (goal setting, time/task management)<br>Group-level leadership (coordination, accountability, support)                                         |
|                                                                                                                  | Barriers to Social Presence                 | Task complexity (difficulty applying instructional design concepts)<br><br>Time and workload management issues (uneven contributions, scheduling conflicts)               |
| RQ2: What design elements of the online collaborative learning activity contribute to students' social presence? | Instructor Facilitation                     | Constructive feedback and scaffolding (rubric-based, formative guidance)<br>Modeling best practices (real-world examples, instructional videos, clarifying announcements) |

***Discussion***

This study revealed that non-traditional graduate students' perceptions of social presence in online collaborative learning varied. Team members or peers' self-regulation strategies and the guidance of their team leaders contributed to positive perceptions of social presence. This is most likely because students who engage in self-regulation proactively acquire academic skills by setting goals, selecting and deploying learning strategies, and monitoring their progress (Zimmerman, 2008). Furthermore, these proactive learner qualities require social forms of learning, such as seeking help from instructors and peers (Zimmerman, 2008). Consequently, this opened an opportunity for team members to communicate openly, wherein they acknowledged each other's contributions and provided and received encouragement (Garrison et al., 2000). These interactions potentially lead to better group cohesion, positive interdependence, and individual accountability, all of which are important factors for establishing collaborative learning (Laal et al., 2013; Sasson et al., 2022; Xie et al., 2017).

Moreover, the proactive guidance of team leaders provided better direction to team members, which reflects the Col's teaching presence, while simultaneously engaging with students' learning presence (Anderson et al., 2001; Garrison et al., 2000; Honig & Salmon, 2021; Luo et al., 2022; Shea et al., 2012). In a Community of Inquiry, instructors share the role of facilitating discussions with students, who, in turn, contribute ideas and guide their peers throughout the learning process (Garrison et al., 2000). In this study, teaching presence became manifested as team leaders and other students who assumed leadership roles, based on their expertise, had fostered a supportive collaborative learning environment. These individuals demonstrated a greater use of their self-regulation skills (Shea et al., 2012; Xie et

al., 2017) and metacognitive abilities (Järvelä et al., 2021), which enabled them to complete tasks, meet deadlines, and support peers, particularly those with less experience in instructional design. Therefore, the leaders functioned as facilitators, helping their peers reach higher levels of cognitive presence (Honig & Salmon, 2021).

The actions of student leaders in facilitating group work also exemplified *learning presence*, defined as a student's ability to actively manage their cognitive, emotional, and motivational resources to sustain learning (Shea et al., 2022). This was evident from the beginning of the project, as each team collectively established goals, coordinated tasks, and delegated responsibilities to specific members. They also demonstrated this by adapting their learning strategies in response to feedback from their instructor. For instance, some students even led the final quality check of their projects by using course rubrics. These examples of self-regulation, the management of one's own learning processes and behaviors, were then translated into a more collaborative practice known as co-regulation. This co-regulation involved leaders sharing their regulatory skills with their peers, helping the entire group stay on track and achieve its goals. According to Hadwin and Oshige (2011), co-regulation occurs when a "capable other" supports novice learners. Both self-regulation and co-regulation stemmed from the student leaders' metacognitive awareness (Järvelä et al., 2021). These leaders adapted their cognitive strategies, motivation, and behaviors at both individual and group levels, which is indicative of metacognition. In other words, their understanding of the tasks and the strategies needed to accomplish them reflects metacognitive competence. For instance, some students used rubrics to evaluate their peers' work and ensure overall project alignment, which was an example of metacognitive strategy in action. Overall, this study highlights how teaching presence and learning presence among student leaders in collaborative learning contexts are closely tied to team management and the collective sharing of contributions and professional expertise to achieve a common goal. This study showed that students' teaching and learning presences were instrumental to support the development of adult learners' social presence in collaborative online activities.

On the other hand, challenges such as task complexity and time management led to non-traditional students' negative perceptions of social presence. Although task complexity is necessary to encourage the co-construction of knowledge (Saariaho et al., 2016) in online group projects, it can overwhelm students who lack foundational knowledge, which could potentially impede both their performance and engagement (Chang & Kang, 2016; Chen et al., 2023; Donelan & Kear, 2023). Nonetheless, this study found that teaching presence, particularly through the instructor's constructive feedback and modeling best practices, can enhance students' understanding of complex course concepts. These instructional interventions help create a supportive learning environment that scaffolds students' cognitive processes and deepens their understanding of the lessons. The instructor's feedback and modelling served as scaffolding strategies that temporarily reduced students' cognitive load, allowing them to practice and apply the targeted skills during the group project (Ambrose et al., 2010; Brindley et al., 2009; Zuo et al., 2023). One possible explanation was that the instructor identified specific learning needs (Knowles, 1977) within each group, and used scaffolding, through feedback and modeling, to help students better understand how to implement particular skills. Since many of the participants were still developing instructional design competencies, these scaffolds are beneficial in teaching specific skills.

In their recent meta-analysis, Zuo et al. (2023) found that scaffolding positively impacts online learning, across all disciplines studied, including chemistry, mathematics, and educational technology. Notably, they discovered that scaffolding has more substantial impact

on collaborative online learning. One explanation was that scaffolding helps team set goals and supports behaviors and learning performance in collaborative activities (Ambrose et al., 2010; Zuo et al., 2023). Furthermore, the instructor's feedback aimed at improving students' conceptual understanding of the instructional design knowledge, referred to as conceptual scaffolding, was found to have a large effect size compare with other types of scaffolding (i.e., meta-cognitive and procedural scaffolding) (Zuo et al., 2023). This is likely due to some non-traditional graduate students needing to connect prior knowledge with new concepts to construct meaningful understanding and apply it in collaborative activities (Diep et al., 2019). This study emphasizes the importance of recognizing that some non-traditional graduate students begin online coursework without a solid foundation in the subject area, thus, how the instructor provide feedback, and guidance can play a crucial role adapt and achieve the desired learning outcomes, especially in collaborative online activities.

### ***Contribution to the Community of Inquiry Framework***

This study contributes to the development of the extended CoI framework by exploring how the unique skills, expertise, and self-regulation abilities of non-traditional graduate students can influence the proposed component of "learning presence." Our findings reiterate the importance of self-regulation at both individual and collective levels in adult online learning (Järvelä et al., 2018; Shea et al., 2022), a concept particularly relevant to Hadwin and Oshige's (2011) theory on the social aspects of self-regulated learning.

Self-regulation involves a student's ability to manage their metacognitive skills, behaviors, and motivation to achieve their learning goals (DiDonato, 2013; Hadwin & Oshige, 2011; Järvelä et al., 2018). Our study reaffirms that non-traditional graduate students often bring a wealth of professional expertise and organizational and communication skills (Diep et al., 2019; Kapur, 2015). In a collaborative setting, these skills help their teams achieve desired learning outcomes (Hadwin & Oshige, 2011; Järvelä et al., 2021). Our findings suggest that the unique abilities of non-traditional students (e.g., time management, motivation, knowledge and skills) are necessary prerequisites for building conditions under which social presence can flourish. Collaborative learning is fundamentally about the co-construction of knowledge, and these students' professional experiences and skills help them, and their peers, better understand and solve complex problems in group projects.

Finally, our study suggests that the proactive leadership abilities of students who take the initiative on complex group projects are a clear manifestation of learning presence. Without this initiative and unique character, collaboration would likely not succeed. We suggest that these proactive learner qualities are a social form of learning, often requiring students to actively seek help from both instructors and peers (Zimmerman, 2008).

### ***Implications for Practice and Theory***

This study offers practical implications for instructional designers and course instructors seeking to create effective online collaborative learning environments for non-traditional graduate students. An initial key consideration is the strategic grouping of students and the establishment of leadership roles. Our process of assigning students to groups based on their diverse skills and strengths can be beneficial, aligning with previous research (Kwiatkowska & Wiśniewska-Nogaj, 2022; Majid, 2010; Read et al., 2022; Van Heuvelen et al., 2020). Furthermore, we believe that designating a temporary team leader can influence the development of social presence as they can initiate communication among team members,

aligning with previous research (Fittipaldi, 2020; Gressick & Derry, 2008). By initiating communication and organizing tasks, these team leads help to establish a structured and proactive collaborative environment, which in turn can help foster a sense of accountability and positive interdependence.

Additionally, the development of self-regulation skills, a core component of learning presence, is often a challenge for non-traditional learners balancing multiple commitments (Oyarzun & Martin, 2023). Our findings suggest that instructors should provide instructional scaffolding to help in this process, aligning with previous research (Brindley et al., 2009; Zuo et al., 2023). For instance, providing weekly reminders and offering general feedback on group progress can guide students to identify areas for improvement and develop a more proactive approach to their collaborative work. This practice not only improves the quality of group projects but also strengthens students' metacognitive awareness and self-regulatory habits (Garrison, 2022).

### ***Limitations of the Study***

This instrumental case study has limitations. While the use of multiple data sources, such as reflection papers, team member evaluations, and instructor interviews, provided a valuable opportunity for in-depth exploration of non-traditional graduate students' perceptions of social presence during collaborative activities, the findings are primarily applicable to a small, specific sample and context. Consequently, they should be interpreted with caution and are not broadly generalizable. Qualitative research is not intended to establish direct cause and effect relationships. We also employed summative content analysis (Hsieh & Shannon, 2005) in our analysis of collaborative learning design elements. Counting frequencies provided an additional descriptive layer that highlighted which design elements were most salient to participants, before deeper qualitative interpretation. An additional methodological limitation was the absence of individual student interviews. Due to ethical considerations and logistical constraints, most of the qualitative data relied solely on self-reported reflection papers, team member evaluations, and a single instructor interview. This meant that direct, in-depth probing of individual student experiences, motivations, and specific instances of social presence was not feasible, potentially limiting the richness of certain insights.

## **Conclusion**

Using instrumental case study, we explored how integrating design elements (i.e., task structure, group formation, instructor's facilitation, and technology integration) can foster social presence in a fully online collaborative activity for non-traditional graduate students. Our findings revealed that peers' self-regulation abilities (e.g., goal setting, time/task management) and group-level leadership (e.g., coordination, accountability, support) had shaped non-traditional graduate students' positive perceptions of social presence in collaborative activities. However, task complexity (e.g., difficulty applying instructional design concepts) and time and workload management issues (e.g., uneven contributions, scheduling conflicts) were reported to be barriers to social presence. Instructor's facilitation through constructive feedback, scaffolding (e.g., rubric-based, formative guidance) and modeling best practices (e.g., real-world examples, instructional videos, clarifying announcements) was identified as a key contributor to enhancing social presence. This study offers practical instructional design strategies for educators and instructional designers aiming to create collaborative online learning environments that support social presence among non-traditional graduate students.

## **Declarations**

### ***Conflicts of Interest***

The authors declare no conflicts of interest.

### ***Ethics Approval***

Ethical approval was gained from Texas Tech University's Institutional Review Board, with approval numbers IRB 2023-115 (April 11, 2024) and IRB 2024-372 (April 23, 2024).



## References

- Adams, J., & Corbett, A. (2010). Experiences of traditional and non-traditional college students. *Perspectives*, 2(1), 2–29. <https://scholars.unh.edu/perspectives/vol2/iss1/2>
- Ajamy, L. (2023). *The effectiveness of online learning on nontraditional students' experiences in online modalities* (Publication No. 30693267) [Doctoral dissertation, Tennessee State University] ProQuest Dissertations & Theses. <https://www.proquest.com/dissertations-theses/effectiveness-online-learning-on-nontraditional/docview/2910041112/se-2?accountid=7100>
- Akcaoglu, M., & Lee, E. (2016). Increasing social presence in online learning through small group discussions. *The International Review of Research in Open and Distributed Learning*, 17(3). <https://doi.org/10.19173/irrodl.v17i3.2293>
- Akyol, Z., & Garrison, D. R. (2010). Community of inquiry in adult online learning: Collaborative-constructivist approaches. In *Web-based education: Concepts, methodologies, tools and applications* (pp. 474–489). IGI Global Scientific Publishing. <https://doi.org/10.4018/978-1-61520-963-7.ch033>
- Allal, L. (2020). Assessment and the co-regulation of learning in the classroom. *Assessment in Education: Principles, Policy & Practice*, 27(4), 332–349. <https://doi.org/10.1080/0969594X.2019.1609411>
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. John Wiley & Sons.
- Anderson, T., Liam, R., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1. <https://doi.org/10.24059/olj.v5i2.1875>
- Aragon, S. R. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education*, 2003(100), 57–68. <https://doi.org/10.1002/ace.119>
- Bauer, L., Burtis, E., Howard, O., & Wang, S. Y. (2023, December 7). *Which nontraditional students are also in the labor force?* Hamilton. <https://www.hamiltonproject.org/publication/post/which-nontraditional-students-are-also-in-the-labor-force/>
- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544–559. <https://doi.org/10.46743/2160-3715/2008.1573>
- Bessette, D., & Burton, S. L. (2014). Academic career development for non-traditional higher education environments. *Journal of Applied Learning Technology*, 4(4), 19–22.
- Boud, D., & Bearman, M. (2024). The assessment challenge of social and collaborative learning in higher education. *Educational Philosophy and Theory*, 56(5), 459–468. <https://doi.org/10.1080/00131857.2022.2114346>

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Brindley, J. E., Blaschke, L. M., & Walti, C. (2009). Creating effective collaborative learning groups in an online environment. *International Review of Research in Open and Distributed Learning*, 10(3). <https://doi.org/10.19173/irrodl.v10i3.675>
- Brozina, C., Johri, A., & Chew, A. (2024). A systematic review of research on nontraditional students reveals inconsistent definitions and a need for clarity: Focus on U.S. based studies. *Frontiers in Education (Lausanne)*, 9. <https://doi.org/10.3389/feduc.2024.1434494>
- Brush, T. A. (1998). Embedding cooperative learning into the design of integrated learning systems: Rationale and guidelines. *Educational Technology Research and Development*, 46(3), 5–18. <https://doi.org/10.1007/bf02299758>
- Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research*, 42(3), 294–320. <https://doi.org/10.1177/0049124113500475>
- Carreira, P., & Lopes, A. S. (2021). Drivers of academic pathways in higher education: Traditional vs. non-traditional students. *Studies in Higher Education*, 46(7), 1340–1355. <https://doi.org/10.1080/03075079.2019.1675621>
- Caskurlu, S., Richardson, J. C., Maeda, Y., & Kozan, K. (2021). The qualitative evidence behind the factors impacting online learning experiences as informed by the community of inquiry framework: A thematic synthesis. *Computers & Education*, 165. 104111. <https://doi.org/10.1016/j.compedu.2020.104111>
- Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, 10(6), 807–815. <https://doi.org/10.1016/j.cptl.2018.03.019>
- Cecchini, J. A., Fernandez-Rio, J., Mendez-Gimenez, A., Gonzalez, C., Sanchez-Martínez, B., & Carriedo, A. (2021). High versus low-structured cooperative learning. Effects on prospective teachers' regulation dominance, motivation, content knowledge and responsibility. *European Journal of Teacher Education*, 44(4), 486–501. <https://doi.org/10.1080/02619768.2020.1774548>
- Chang, B., & Kang, H. (2016). Challenges facing group work online. *Distance Education*, 37(1), 73–88. <https://doi.org/10.1080/01587919.2016.1154781>
- Chen, O., Paas, F., & Sweller, J. (2023). A cognitive load theory approach to defining and measuring task complexity through element interactivity. *Educational Psychology Review*, 35(2), 63. <https://doi.org/10.1007/s10648-023-09782-w>

- Chen, C., Jones, K. T., & Xu, S. (2018). The association between students' style of learning preferences, social presence, collaborative learning and learning outcomes. *Journal of Educators Online*, 15(1), n1. <https://doi.org/10.9743/jeo2018.15.1.3>
- Chuang, S. (2021). The applications of constructivist learning theory and social learning theory on adult continuous development. *Performance Improvement*, 60(3), 6–14. <https://doi.org/10.1002/pfi.21963>
- Connell, L. N. (2025). *Understanding collaborative learning environments for adult learners: A qualitative study* (Publication No. 31842919) [Doctoral dissertation, Capella University]. ProQuest Dissertations & Theses. <https://www.proquest.com/dissertations-theses/understanding-collaborative-learning-environments/docview/3173546592/se-2?accountid=7100>
- Davidson, N., & Major, C. H. (2014). Boundary crossings: Cooperative learning, collaborative learning, and problem-based learning. *Journal on Excellence in College Teaching*, 25(3&4), 7–55.
- de Medeiros, F. P. A., & Gomes, A. S. (2022). An approach based on social network analysis to enhance social presence in a collaborative learning environment. *IEEE Transactions on Education*, 65(4), 608–616. <https://doi.org/10.1109/te.2022.3154935>
- D'Errico, F., Paciello, M., & Cerniglia, L. (2016). When emotions enhance students' engagement in e-learning processes. *Journal of e-Learning and Knowledge Society*, 12(4), 10–23. <https://doi.org/10.20368/1971-8829/1144>
- Dickerson, C., Jarvis, J., & Stockwell, L. (2016). Staff–student collaboration: student learning from working together to enhance educational practice in higher education. *Teaching in Higher Education*, 21(3), 249–265. <https://doi.org/10.1080/13562517.2015.1136279>
- DiDonato, N. C. (2013). Effective self- and co-regulation in collaborative learning groups: An analysis of how students regulate problem solving of authentic interdisciplinary tasks. *Instructional Science*, 41(1), 25–47. <https://doi.org/10.1007/s11251-012-9206-9>
- Dillenbourg, P. (1999). What do you mean by collaborative learning? In P. Dillenbourg (Ed.), *Collaborative learning: Cognitive and computational approaches* (pp. 1–19). Elsevier. <https://hal.science/hal-00190240/en/>
- Donelan, H., & Kear, K. (2024). Online group projects in higher education: persistent challenges and implications for practice. *Journal of Computing in Higher Education*, 36(2), 435–468. <https://doi.org/10.1007/s12528-023-09360-7>
- Doo, M. Y., & Bonk, C. J. (2020). The effects of self-efficacy, self-regulation and social presence on learning engagement in a large university class using flipped Learning. *Journal of Computer Assisted Learning*, 36(6), 997–1010. <https://doi.org/10.1111/jcal.12455>
- Dowell, N. M., Lin, Y., Godfrey, A., & Brooks, C. (2020). Exploring the relationship between emergent sociocognitive roles, collaborative problem-solving skills, and

- outcomes: A group communication analysis. *Journal of Learning Analytics*, 7(1), 38–57. <https://doi.org/10.18608/jla.2020.71.4>
- Elliott, V. (2018). Thinking about the coding process in qualitative data analysis. *The Qualitative Report*, 23(11), 2850–2861. <https://doi.org/10.46743/2160-3715/2018.3560>
- Erkens, M., & Bodemer, D. (2019). Improving collaborative learning: Guiding knowledge exchange through the provision of information about learning partners and learning contents. *Computers & Education*, 128, 452–472. <https://doi.org/10.1016/j.compedu.2018.10.009>
- ElSayad, G. (2023). Can learning presence be the fourth community of inquiry presence? Examining the extended community of inquiry framework in blended learning using confirmatory factor analysis. *Education and Information Technologies*, 28(6), 7291–7316. <https://doi.org/10.1007/s10639-022-11480-z>
- Fiock, H. (2020). Designing a community of inquiry in online courses. *The International Review of Research in Open and Distributed Learning*, 21(1), 135–153. <https://doi.org/10.19173/irrodl.v20i5.3985>
- Garrison, D. R. (2006). Online collaboration principles. *Journal of Asynchronous Learning Networks*, 10(1), 25–34. <https://doi.org/10.24059/olj.v10i1.1768>
- Garrison, D. R. (2015). *Thinking collaboratively: Learning in a community of inquiry*. Routledge. <https://doi.org/10.4324/9781315740751>
- Garrison, D. R. (2022). Shared metacognition in a community of inquiry. *Online Learning*, 26(1), 6–18. <https://doi.org/10.24059/olj.v26i1.3023>
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2–3), 87–105. [https://doi.org/10.1016/s1096-7516\(00\)00016-6](https://doi.org/10.1016/s1096-7516(00)00016-6)
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education*, 13(1–2), 5–9. <https://doi.org/10.1016/j.iheduc.2009.10.003>
- Gonzales, G. H. A., Despe, K. B., Iway, L. J., Genon, R. J. S., Intano, J. O., & Sanchez, J. M. P. (2023). Online collaborative learning platforms in science: Their influence on attitude, achievement, and experiences. *Journal of Educational Technology and Instruction*, 2(2), 1–16. <https://doi.org/10.70290/jeti.v2i2.55>
- Goulart, V. G., Liboni, L. B., & Cezarino, L. O. (2022). Balancing skills in the digital transformation era: The future of jobs and the role of higher education. *Industry and Higher Education*, 36(2), 118–127. <https://doi.org/10.1177/09504222211029796>
- Gressick, J., & Derry, S. (2008). Leadership in small online collaborative learning groups: A distributed perspective. In G. Kanselaar, V. Jonker, P. A. Kirschner, & F. J. Prins (Eds.), *International Perspectives in the Learning Sciences: Creating a learning world*

- (pp. 305-312). International Society of the Learning Sciences.  
<https://repository.isls.org/handle/1/3109>
- Hadwin, A., Järvelä, S., & Miller, M. (2017). Self-regulation, co-regulation, and shared regulation in collaborative learning environments. In *Handbook of self-regulation of learning and performance* (pp. 83–106). Routledge.  
<https://doi.org/10.4324/9781315697048-6>
- Hadwin, A., & Oshige, M. (2011). Self-regulation, coregulation, and socially shared regulation: Exploring perspectives of social in self-regulated learning theory. *Teachers College Record*, 113(2), 240–264.  
<https://doi.org/10.1177/016146811111300204>
- Herrera-Pavo, M. Á. (2021). Collaborative learning for virtual higher education. *Learning, Culture and Social Interaction*, 28, 100437.  
<https://doi.org/10.1016/j.lcsi.2020.100437>
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288.  
<https://doi.org/10.1177/1049732305276687>
- Järvelä, S., Hadwin, A., Malmberg, J., & Miller, M. (2018). Contemporary perspectives of regulated learning in collaboration. In *International handbook of the learning sciences* (pp. 127–136). Routledge. <https://doi.org/10.4324/9781315617572-13>
- Jiang, M., & Koo, K. (2020). Emotional presence in building an online learning community among non-traditional graduate students. *Online Learning*, 24(4), 93–111.  
<https://doi.org/10.24059/olj.v24i4.2307>
- Johnson, R. B., & Christensen, L. B. (2017). *Educational research: Quantitative, qualitative, and mixed approaches*. Sage Publications.
- Jung, S., Shin, H. W., Gohary, A., & Chan, E. Y. (2023). Benefits and challenges of online collaborative learning from the perspectives of non-traditional event management students: a comparison between asynchronous and synchronous learning. *Journal of Teaching in Travel & Tourism*, 23(2), 109–129.  
<https://doi.org/10.1080/15313220.2022.2109553>
- Järvelä, S., & Häkkinen, P. (2002). Web-based cases in teaching and learning—the quality of discussions and a stage of perspective taking in asynchronous communication. *Interactive learning environments*, 10(1), 1–22.  
<https://doi.org/10.1076/ilee.10.1.1.3613>
- Järvelä, S., Hadwin, A., Malmberg, J., & Miller, M. (2018). Contemporary perspectives of regulated learning in collaboration. In *International handbook of the learning sciences* (pp. 127–136). Routledge. <https://doi.org/10.4324/9781315617572-13>
- Järvelä, S., Malmberg, J., Sobocinski, M., & Kirschner, P. A. (2021). Metacognition in collaborative learning. In *International handbook of computer-supported*

- collaborative learning* (pp. 281–294). Springer International Publishing.  
[https://doi.org/10.1007/978-3-030-65291-3\\_15](https://doi.org/10.1007/978-3-030-65291-3_15)
- Jeong, H., & Hmelo-Silver, C. E. (2016). Seven affordances of computer-supported collaborative learning: How to support collaborative learning? How can technologies help? *Educational Psychologist*, 51(2), 247–265.  
<https://doi.org/10.1080/00461520.2016.1158654>
- Jiang, M., & Koo, K. (2020). Emotional presence in building an online learning community among non-traditional graduate students. *Online Learning*, 24(4), 93.  
<https://doi.org/10.24059/olj.v24i4.2307>
- Johnson, D. W., & Johnson, R. T. (2008). Social interdependence theory and cooperative learning: The teacher's role. In *The teacher's role in implementing cooperative learning in the classroom* (pp. 9–37). Springer. [https://doi.org/10.1007/978-0-387-70892-8\\_1](https://doi.org/10.1007/978-0-387-70892-8_1)
- Jung, S., Shin, H. W., Gohary, A., & Chan, E. Y. (2023). Benefits and challenges of online collaborative learning from the perspectives of non-traditional event management students: a comparison between asynchronous and synchronous learning. *Journal of Teaching in Travel & Tourism*, 23(2), 109–129.  
<https://doi.org/10.1080/15313220.2022.2109553>
- Kapur, S. (2015). Understanding the characteristics of an adult learner. *Jamia Journal of Education*, 2(1), 111–121.
- Kirschner, P., Strijbos, J. W., Kreijns, K., & Beers, P. J. (2004). Designing electronic collaborative learning environments. *Educational Technology Research and Development*, 52(3), 47–66. <https://doi.org/10.1007/BF02504675>
- Knowles, M. (1977). Adult learning processes: Pedagogy and andragogy. *Religious Education*, 72(2), 202–211. <https://doi.org/10.1080/0034408770720210>
- Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267–277.  
<https://doi.org/10.1177/1365480216659733>
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behavior*, 19(3), 335–353.  
[https://doi.org/10.1016/s0747-5632\(02\)00057-2](https://doi.org/10.1016/s0747-5632(02)00057-2)
- Kwiatkowska, W., & Wiśniewska-Nogaj, L. (2022). Digital skills and online collaborative learning: The study report. *Electronic Journal of E-learning*, 20(5), 510–522.  
<https://doi.org/10.34190/ejel.20.5.2412>
- Laal, M., & Ghodsi, S. M. (2012). Benefits of collaborative learning. *Procedia-social and Behavioral Sciences*, 31, 486–490. <https://doi.org/10.1016/j.sbspro.2011.12.091>



- Laal, M., & Laal, M. (2012). Collaborative learning: what is it? *Procedia-Social and Behavioral Sciences*, 31, 491–495. <https://doi.org/10.1016/j.sbspro.2011.12.092>
- Laal, M., Geranpaye, L., & Daemi, M. (2013). Individual accountability in collaborative learning. *Procedia-Social and Behavioral Sciences*, 93, 286–289. <https://doi.org/10.1016/j.sbspro.2013.09.191>
- Lin-Stephens, S., Kubicki, J. M., Jones, F., Whiting, M. J., Uesi, J., & Bulbert, M. W. (2019). Building student employability through interdisciplinary collaboration: an Australian case study. *College & Undergraduate Libraries*, 26(3), 234–251. <https://doi.org/10.1080/10691316.2019.1674027>
- Loyens, S. M., Van Meerten, J. E., Schaap, L., & Wijnia, L. (2023). Situating higher-order, critical, and critical-analytic thinking in problem-and project-based learning environments: A systematic review. *Educational Psychology Review*, 35(2), 39. <https://doi.org/10.1007/s10648-023-09757-x>
- Lowenthal, P. R. (2009). Social presence. In *Encyclopedia of Distance Learning, Second Edition* (pp. 1900–1906). IGI Global Scientific Publishing. <https://doi.org/10.4018/978-1-60566-198-8.ch280>
- Lowenthal, P. R., & Snelson, C. (2020). In search of a better understanding of social presence: An investigation into how researchers define social presence. In *Social presence and identity in online learning* (pp. 5–23). Routledge. <https://doi.org/10.4324/9780429294235-2>
- Luengo-Aravena, D., Cabello, P., & Bachino, B. R. M. (2024). Online collaborative problem-solving as a tangible outcome of digital skills in technical and vocational higher education. *Computers & Education*, 218, 105079. <https://doi.org/10.1016/j.compedu.2024.105079>
- Luo, H., Han, X., Chen, Y., & Nie, Y. (2022). Should you become a leader in online collaborative learning? Impact of assigned leadership on learning behaviors, outcomes, and perceptions. *PLOS One*, 17(4), e0266653. <https://doi.org/10.1371/journal.pone.0266653>
- Marutschke, D. M., Kryssanov, V., Chaminda, H. T., & Brockmann, P. (2019). Smart education in an interconnected world: Virtual, collaborative, project-based courses to teach global software engineering. In *Smart Education and e-Learning 2019* (pp. 39–49). Springer Singapore. [https://doi.org/10.1007/978-981-13-8260-4\\_4](https://doi.org/10.1007/978-981-13-8260-4_4)
- Matee, G. L., Motlohi, N., & Nkiwane, P. (2023). Emerging perspectives and challenges for virtual collaborative learning in an institution of higher education: a case of Lesotho. *Interactive Technology and Smart Education*, 20(1), 73–88. <https://doi.org/10.1108/itse-06-2021-0110>
- Mehall, S. (2020). Purposeful interpersonal interaction in online learning: What is it and how is it measured? *Online Learning*, 24(1), 182–204. <https://doi.org/10.24059/olj.v24i1.2002>

- Miao, J., & Ma, L. (2022). Students' online interaction, self-regulation, and learning engagement in higher education: The importance of social presence to online learning. *Frontiers in Psychology, 13*, 815220–815220. <https://doi.org/10.3389/fpsyg.2022.815220>
- Miles, M. B., & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage Publications.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage Publications.
- Miller, M., & Hadwin, A. (2015). Scripting and awareness tools for regulating collaborative learning: Changing the landscape of support in CSCL. *Computers in Human Behavior, 52*, 573–588. <https://doi.org/10.1016/j.chb.2015.01.050>
- Molinillo, S., Aguilar-Illescas, R., Anaya-Sánchez, R., & Vallespín-Arán, M. (2018). Exploring the impacts of interactions, social presence and emotional engagement on active collaborative learning in a social web-based environment. *Computers & Education, 123*, 41–52. <https://doi.org/10.1016/j.compedu.2018.04.012>
- Nungu, L., Mukama, E., & Nsabayezi, E. (2023). Online collaborative learning and cognitive presence in mathematics and science education. Case study of university of Rwanda, college of education. *Education and Information Technologies, 28*(9), 10865–10884. <https://doi.org/10.1007/s10639-023-11607-w>
- Olivares, O. J. (2008). Collaborative vs. cooperative learning: The instructor's role in computer supported collaborative learning. In *Computer-supported collaborative learning: Best practices and principles for instructors* (pp. 20–39). IGI global. <https://doi.org/10.4018/978-1-59904-753-9.ch002>
- Oyarzun, B., & Martin, F. (2023). A systematic review of research on online learner collaboration from 2012–21: Collaboration technologies, design, facilitation, and outcomes. *Online Learning, 27*(1), 71–106. <https://doi.org/10.24059/olj.v27i1.3407>
- Parrish, C. W., Guffey, S. K., Williams, D. S., Estis, J. M., & Lewis, D. (2021). Fostering cognitive presence, social presence and teaching presence with integrated online—Team-based learning. *TechTrends, 65*, 473–484. <https://doi.org/10.1007/s11528-021-00598-5>
- Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and limitations of qualitative and quantitative research methods. *European Journal of Education Studies, 3*(9), 369–387. <https://doi.org/10.5281/zenodo.887089>
- Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2021). Factors affecting students' learning performance through collaborative learning and engagement. *Interactive Learning Environments, 31*(4), 2371–2391. <https://doi.org/10.1080/10494820.2021.1884886>
- Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2023). Factors affecting students' learning performance through collaborative learning and



- engagement. *Interactive Learning Environments*, 31(4), 2371–2391.  
<https://doi.org/10.1080/10494820.2021.1884886>
- Read, D., Barnes, S. M., Hughes, O., Ivanova, I., Sessions, A., & Wilson, P. J. (2022). Supporting student collaboration in online breakout rooms through interactive group activities. *New Directions in the Teaching of Physical Sciences*, 17(1), n1.  
<https://doi.org/10.29311/ndtps.v0i17.3946>
- Richardson, J. C., Arbaugh, J. B., Cleveland-Innes, M., Ice, P., Swan, K. P., & Garrison, D. R. (2012). Using the community of inquiry framework to inform effective instructional design. In L. Moller, & J. Huett (Eds.), *The next generation of distance education: Unconstrained learning* (pp. 97–125). Springer.  
[https://doi.org/10.1007/978-1-4614-1785-9\\_7](https://doi.org/10.1007/978-1-4614-1785-9_7)
- Rosales-Asensio, E., Sierra, C., Pérez-Molina, C., Romero-Mayoral, J., & Colmenar-Santos, A. (2021). Teaching using collaborative research projects: Experiences with adult learners in distance education. *Sustainability*, 13(18), 10437.  
<https://doi.org/10.3390/su131810437>
- Rovai, A. P. (2002). Building sense of community at a distance. *International Review of Research in Open and Distributed Learning*, 3(1), 1–16.  
<https://doi.org/10.19173/irrodl.v3i1.79>
- Saadati, F., & Reyes, C. (2019). Collaborative learning to improve problem-solving skills: A relation affecting through attitude toward mathematics. In *Problem solving in mathematics instruction and teacher professional development* (pp. 187–202). Springer International Publishing.
- Saariaho, E., Pyhältö, K., Toom, A., Pietarinen, J., & Soini, T. (2016). Student teachers' self- and co-regulation of learning during teacher education. *Learning: Research and Practice*, 2(1), 44–63. <https://doi.org/10.1080/23735082.2015.1081395>
- Sasson, I., Malkinson, N., & Oria, T. (2022). A constructivist redesigning of the learning space: The development of a sense of class cohesion. *Learning Environments Research*, 25(1), 183–197. <https://doi.org/10.1007/s10984-021-09356-z>
- Scager, K., Boonstra, J., Peeters, T., Vulperhorst, J., & Wiegant, F. (2016). Collaborative learning in higher education: Evoking positive interdependence. *CBE Life Sciences Education*, 15(4), ar69. <https://doi.org/10.1187/cbe.16-07-0219>
- Scardamalia, M., & Bereiter, C. (2010). A brief history of knowledge building. *Canadian Journal of Learning and Technology/La revue canadienne de l'apprentissage et de la technologie*, 36(1). <https://doi.org/10.21432/t2859m>
- Shea, P., Hayes, S., Smith, S. U., Vickers, J., Bidjerano, T., Pickett, A., ... & Jian, S. (2012). Learning presence: Additional research on a new conceptual element within the Community of Inquiry (CoI) framework. *The Internet and Higher Education*, 15(2), 89–95. <https://doi.org/10.1016/j.iheduc.2011.08.002>

- Shea, P., Richardson, J., & Swan, K. (2022). Building bridges to advance the community of inquiry framework for online learning. *Educational Psychologist*, 57(3), 148–161. <https://doi.org/10.1080/00461520.2022.2089989>
- Sung, E., & Mayer, R. E. (2012). Five facets of social presence in online distance education. *Computers in Human Behavior*, 28(5), 1738–1747. <https://doi.org/10.1016/j.chb.2012.04.014>
- Swan, K., Richardson, J. C., Dikkers, A. G., & Whiteside, A. L. (2017). Social presence and the Community of Inquiry framework. In *Social Presence in Online Learning* (1st ed., pp. 64–76). Routledge. <https://doi.org/10.4324/9781003447023-10>
- Shea, P., Richardson, J., & Swan, K. (2022). Building bridges to advance the community of inquiry framework for online learning. *Educational Psychologist*, 57(3), 148–161. <https://doi.org/10.1080/00461520.2022.2089989>
- Stake, R. (1995). *Case study research*. Springer.
- Strauß, S., & Rummel, N. (2020). Promoting interaction in online distance education: Designing, implementing and supporting collaborative learning. *Information and Learning Science*, 121(5/6), 251–260. <https://doi.org/10.1108/ILS-04-2020-0090>
- Strukel, D., White, L., & Alhabash, S. (2023). The good, the bad, the ugly: Predictors of positive and negative experiences of traditional and nontraditional graduate students. *Journal of Adult and Continuing Education*, 29(2), 464–484. <https://doi.org/10.1177/14779714231151836>
- Stuckey, H. L. (2015). The second step in data analysis: Coding qualitative research data. *Journal of Social Health and Diabetes*, 3(01), 7–10. <https://doi.org/10.4103/2321-0656.140875>
- Tesone, D. V., Alexakis, G., & Platt, A. (2003). Distance learning programs for non-traditional and traditional students in the business disciplines. *Online Journal of Distance Learning Administration*, 6(4), 9–20.
- Vance, E. A., & Smith, H. S. (2019). The ASCCR frame for learning essential collaboration skills. *Journal of Statistics Education*, 27(3), 265–274. <https://doi.org/10.1080/10691898.2019.1687370>
- Van Doorn, J. R., & Van Doorn, J. D. (2014). The quest for knowledge transfer efficacy: Blended teaching, online and in-class, with consideration of learning typologies for non-traditional and traditional students. *Frontiers in Psychology*, 5, 324. <https://doi.org/10.3389/fpsyg.2014.00324>
- Van Heuvelen, K. M., Daub, G. W., & Ryswyk, H. V. (2020). Emergency remote instruction during the COVID-19 pandemic reshapes collaborative learning in general chemistry. *Journal of Chemical Education*, 97(9), 2884–2888. <https://doi.org/10.1021/acs.jchemed.0c00691>

- Wertz, R. E. (2022). Learning presence within the Community of Inquiry framework: An alternative measurement survey for a four-factor model. *The Internet and Higher Education*, 52, 100832. <https://doi.org/10.1016/j.iheduc.2021.100832>
- Xie, K., Hensley, L. C., Law, V., & Sun, Z. (2019). Self-regulation as a function of perceived leadership and cohesion in small group online collaborative learning. *British Journal of Educational Technology*, 50(1), 456–468. <https://doi.org/10.1111/bjet.12594>
- Xu, W., & Zammit, K. (2020). Applying thematic analysis to education: A hybrid approach to interpreting data in practitioner research. *International Journal of Qualitative Methods*, 19. <https://doi.org/10.1177/1609406920918810>
- Yang, X. (2023). A historical review of collaborative learning and cooperative learning. *TechTrends*, 67(4), 718–728. <https://doi.org/10.1007/s11528-022-00823-9>
- Zhao, H., Sullivan, K. P., & Mellenius, I. (2014). Participation, interaction and social presence: An exploratory study of collaboration in online peer review groups. *British Journal of Educational Technology*, 45(5), 807–819. <https://doi.org/10.1111/bjet.12094>
- Zhu, M., & Zhang, K. (2023). Promote collaborations in online problem-based learning in a user experience design course: Educational design research. *Education and Information Technologies*, 28(6), 7631–7649. <https://doi.org/10.1007/s10639-022-11495-6>
- Zuo, M., Kong, S., Ma, Y., Hu, Y., & Xiao, M. (2023). The effects of using scaffolding in online learning: A meta-analysis. *Education Sciences*, 13(7), 705. <https://doi.org/10.3390/educsci13070705>
- Zygouris-Coe, V. I. (2019). Benefits and challenges of collaborative learning in online teacher education. In *Handbook of research on emerging practices and methods for K–12 online and blended learning* (pp. 33–56). IGI Global. <https://doi.org/10.4018/978-1-5225-8009-6.ch002>

## Appendix

### Codebook for Social Presence in Collaborative Learning

| Category                                | Code Name                                              | Definition                                                                                                                                                                                                              |
|-----------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regulatory Behaviors Among Team Members | Taking individual accountability                       | All team members are held accountable for doing their share of the work and for mastery of all of the material to be learned (An et al., 2008; Wang, 2009)                                                              |
|                                         | Demonstrating a willingness to contribute to the group | Team members demonstrate specific skills (e.g., leadership, speaking up) needed to actively contribute to the group's success (Kukulska-Hulme, 2005)                                                                    |
|                                         | Difficulty in addressing individual differences        | A team member faces obstacles in managing conflicts that arise from the unique characteristics, perspectives, or differences among team members (Brindley et al., 2009; Oyarzun & Martin, 2023; Verstegen et al., 2018) |
|                                         | Establishing positive interdependence                  | A team member provides support to their colleagues, ensuring that everyone's success is linked and depends on one another (Brush, 1998; Wang, 2009)                                                                     |
|                                         | Leadership (emergent)                                  | Presence of a leader who can play both functional and social / emotional leadership roles (An et al., 2008; Hotte & Pierre, 2002)                                                                                       |
|                                         | Seeking help or information from others                | Team members request or offer assistance or information related to learning materials, activities, tasks or goals (Ching & Hsu, 2013)                                                                                   |
|                                         | Personal Experience                                    | Sharing relevant personal information or experiences for support or social exchange (Ching & Hsu, 2013)                                                                                                                 |
|                                         | Noting one's own or group's learning behavior          | Statements about individual or group strengths/weaknesses in engaging with learning experiences, such as effective strategies, innovative approaches, and positive interactions with information and peers.             |
|                                         | Providing help or information to fellow team members   | A team member provides assistance or information related to learning materials, activities, tasks, or goals. (Curtis & Lawson, 2001)                                                                                    |

|                                                  |                                                       |                                                                                                                                                                                                             |
|--------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | Providing clarification                               | A team member provides clarification to assist his/her fellow member. (Shea et al., 2012)                                                                                                                   |
|                                                  | Noting one's own or group's learning behavior         | Statements about individual or group strengths/weaknesses in engaging with learning experiences, such as effective strategies, innovative approaches, and positive interactions with information and peers. |
|                                                  | Appraising level of interest and engagement           | Statements among team members regarding individual or collective engagement, interest, commitment, or participation. (Azevedo et al., 2004a; Azevedo et al., 2004b)                                         |
|                                                  | Coordinating tasks in a group activity                | Team members in a group activity distributes, and sequences tasks and sub-tasks to others/self for future completion. (Shea et al., 2012; Stein, 1982)                                                      |
|                                                  | Establishing interpersonal relationships              | Team members develop a network of interpersonal relationships that are integrated within group structures comprising norms, values, rules, roles, beliefs, and ideals. (Kreijns et al., 2022)               |
|                                                  | Evaluating the quality of a deliverable or an outcome | Team members judge the accuracy, comprehensiveness, relevance, or other aspects of an end product or its components. (Azevedo et al., 2004a; Azevedo et al., 2004b)                                         |
|                                                  | Planning Approaches to Achieve Group Goals            | Team members in a group activity consider approaches, procedures, or tasks to be used to attain goals (Zimmerman, 1989)                                                                                     |
| Instructor's Roles in Facilitating Collaboration | Communicating the curriculum                          | The course instructor communicates the important outcomes of the course to the class, including documentation of course goals, topics, rubrics, and instructor expectations. (Shea et al., 2010)            |
|                                                  | Conducting supportive demonstrations                  | The instructor is committed to demonstrating how instructional technology operates effectively in practical, real-world contexts. (Shea et al., 2010)                                                       |
|                                                  | Facilitating a collaborative thinking process         | The course instructor helps keep members engaged in a productive and collaborative thinking process (Shea et al., 2010); Yukawa, 2006)                                                                      |

|                       |                                                                 |                                                                                                                                                                                                                                                   |
|-----------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Offering useful illustrations                                   | The course instructor attempts to make course content more comprehensible by providing substantive and concrete examples (Shea et al., 2010)                                                                                                      |
|                       | Providing formative feedback on assignments                     | The course instructor explicitly evaluates assignments to offer feedback OR diagnoses misconceptions to help students learn. (Shea et al., 2010)                                                                                                  |
|                       | Realigning team members' focus on instructional design topic(s) | The course instructor guides team members back to the core instructional design topics, ensuring they stay focused on the project's objectives. (Shea et al., 2010)                                                                               |
|                       | Setting climate for learning                                    | The course instructor encourages teams to delve deeper into course concepts, such as suggesting more manageable psychomotor topics for their project. (Shea et al., 2010)                                                                         |
|                       | Scheduling coordination (emergent)                              | The course instructor organizes, plans, and manages the timing of events, activities, or meetings to ensure they align with everyone's availability and the overall goals.                                                                        |
| Task Complexity       | Failure to incorporate feedback (emergent)                      | The instructor observed that the group did not incorporate their peers' feedback to enhance their work.                                                                                                                                           |
|                       | Importance of Rubric for Clarification (emergent)               | This emphasizes the instructor's reliance on the rubric to clarify expectations when other methods of explanation did not work.                                                                                                                   |
|                       | Lack of Structured Guidelines in Course Activities              | Individual student experiences ambiguity or frustration due to a need for a defined rubric and clear expectations in completing a task                                                                                                            |
|                       | Need for Structured Peer Review (emergent)                      | The instructor identified areas for improvement in the peer review process, emphasizing the importance of structure and preparation to enhance its effectiveness.                                                                                 |
| Management Challenges | Dealing with uneven workload                                    | A team member is experiencing frustration due to an uneven distribution of tasks, which has been attributed to communication challenges and delays in task completion (Capdeferro & Romero, 2012; Oyarzun & Martin, 2023; Strauß & Rummel, 2021). |

|  |                                      |                                                                                                                                                                                                         |
|--|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Lacking accountability               | A team member feels burdened by the lack of accountability from other team members (An et al., 2008; Liu et al., 2010)                                                                                  |
|  | Struggling with communication issues | A team member struggles in communication when he/she is not effectively understood by his/her fellow team members, leading to misunderstandings, conflicts, and inefficiencies (Oyarzun & Martin, 2023) |

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# Evaluation of a Program to Enhance Online Lecturers' Digital Competence: TPACK and Artificial Intelligence

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## Abstract

The integration of technology in educational contexts has become a reality that must be addressed in both initial and ongoing teacher training. Lecturers require knowledge to incorporate digital tools into their pedagogical practices and to support constructivist learning (Ortiz et al., 2025). We have designed a training program, based on the Technological Pedagogical Content Knowledge (TPACK) model approach and the digital competence framework for teachers proposed by the Instituto Nacional de Tecnologías Educativas y Formación del Profesorado (INTEF). This program combines the use of various digital tools, including generative AI, within an instructional design aimed at implementing an active and participatory learning model in a virtual environment. A quantitative methodology was employed with a pre-experimental, pre-test and post-test research design. The sample consisted of 78 lecturers teaching at the Universidad Internacional de La Rioja (La Rioja International University), an online university, across different fields of knowledge. An ad hoc instrument was used to collect data on lecturers' perceptions of their digital competence before and after the training program. It comprised two dimensions: pedagogical knowledge and pedagogical technological knowledge, with subdimensions linked to instructional design events. Statistically significant differences were found in all items of the two dimensions used to measure digital competence based on the TPACK model and areas 2, 3 and 4 of the INTEF. We concluded that the training program was effective and had a notable impact on improving the digital competence of lecturers, who expressed high satisfaction with the program.

**Keywords:** Digital competence; Pedagogy; Technology; Artificial intelligence; Online teacher training; Higher education.

Romero-García, C., Buzón-García, O. & Parra González, E. (2025). Evaluation of a Program to Enhance online Lecturers' Digital Competence: TPACK and Artificial Intelligence, *Online Learning*, 29(4), 109-132. <https://doi.org/10.24059/olj.v29i4.5016>



## Introduction

The integration of digital technologies into education has rapidly evolved in recent decades. In the educational context, its introduction is viewed from a dual perspective: the actual learning of it to foster students' digital literacy and as a means to other kinds of learning (Cabero-Almenara et al., 2020). At present, quality education requires the inclusion of Information and Communications Technology (ICT) in the classroom, and this is only possible if lecturers have an adequate level of digital competence. In fact, this competence, particularly since 2020, has been acknowledged to be a key skill for teaching performance at all educational levels (Dervenis et al., 2022) and as an indicator of educational system quality (Martín Párraga et al., 2022; Mas García et al., 2023). The digital skills of contemporary educators are of vital importance in the teaching of different areas and subjects, as they affect the improvement of the teaching/learning process, as well as that of student and teacher assessment, and they help teaching staff to collaborate with each other and stay up to date (Carpenter et al., 2024). However, the use of technology does not ensure, in itself, greater student learning, as digital technologies need to be integrated into all the pedagogical aspects of education (Cejas-León & Navío, 2018).

Different studies have evidenced university lecturers' lack of preparation in the pedagogical integration of technology (Busbar Sánchez et al., 2022; García-Peñalvo, 2023; Pizà-Mir et al., 2023), often linking their skills to purely instrumental use (Marín Suelves et al., 2022; Melash et al., 2020; Muñoz and Ruiz-Domínguez, 2021). Furthermore, these studies emphasize that the most influential factors in developing lecturers' digital competence are initial and ongoing teacher training that incorporates models of pedagogical technology integration in the classroom (García-Ruiz et al., 2023; Jiménez-Hernández et al., 2021; Maiier & Koval, 2021), as well as the promotion of a positive (Cattaneo et al., 2022; Hämäläinen et al., 2021) and responsible attitude towards technology use among educators (Baena-Morales et al., 2020; García-Ruiz & Pérez-Escoda, 2020).

Among the various digital competence frameworks proposed by organizations and researchers for teacher training and evaluation, two have emerged as key benchmarks: the European Framework for the Digital Competence of Educators (DigCompEdu) (Redecker & Punie, 2017) and the Marco de Referencia de la Competencia Digital Docente, a Spanish Framework for the Digital Competence of Teachers, developed by INTEF (Banoy-Suarez & González-Reyes, 2024; Cabero et al., 2021; García-Ruiz et al., 2023; Palacios et al., 2024).

The INTEF framework is an adaptation of DigCompEdu for the Spanish education system and includes a particularly noteworthy feature: it embeds digital competence within a student-centered teaching model that promotes both independent and collaborative learning for progressive skills development.

## Literature Review

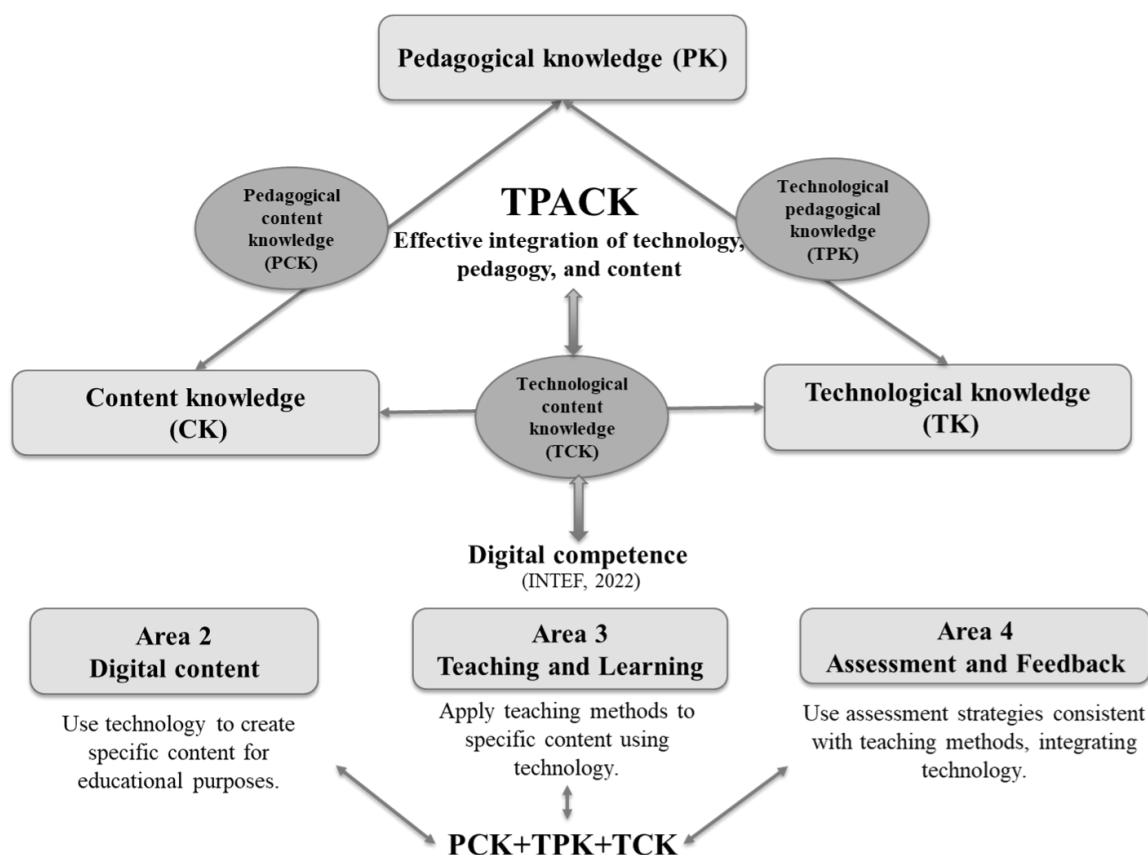
This study adopts the INTEF framework for designing the training program implemented. It operates on the premise that instructing teachers solely in the technical use of digital tools is insufficient. Instead, meaningful development and assessment of digital competence must be rooted in collaborative practices that integrate both technology and pedagogy. It organizes lecturers' digital competences into six areas, grouped into three overarching blocks: (1) professional competences, (2) pedagogical competences, and (3) pedagogical competences aimed at developing students' digital competence. The core of the

framework lies in areas 2 through 5, which form the second block—teachers’ pedagogical competences—and focus specifically on digital skills related to teaching and learning processes. Area 2– Digital content, refers to searching for, modifying and creating digital content; area 3– Teaching and learning, refers to the use of digital technologies in teaching and learning; area 4– Assessment and feedback, refers to the use of technology to improve the assessment of students and the overall teaching–learning process; and area 5– Empowering learners, addresses the use of technology to cater to individual student needs and differences.

To analyze the competences that each of these areas should include, as a reference this framework for the digital competence of teachers (INTEF, 2022) uses the theoretical model suggested by Mishra and Koehler (2006), called the TPACK model or the Technological Pedagogical Content Knowledge model (TPACK). It is based on the necessary integration and interaction of three types of knowledge: technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK), for teachers to acquire digital competence. These types of knowledge hybridize and generate new knowledge. Thus, the combination of CK and PK generates Pedagogical Content Knowledge (PCK), which enables teachers to select appropriate instructional methods for teaching a specific subject. The combination of PK and TK gives rise to Technological Pedagogical Knowledge (TPK), which explains how technologies can modify, enrich, or transform teaching strategies and classroom dynamics. In turn, the integration of CK and TK produces Technological Content Knowledge (TCK), which shows how technologies make it possible to represent, explore, or reorganize disciplinary content in new ways. Finally, the confluence of these three types of knowledge creates an interaction between technology, disciplinary content, and pedagogy, which is defined as technological pedagogical content knowledge (TPACK) (Koehler & Mishra, 2009). The INTEF Areas 2, 3, and 4 can be interpreted through their connection with the TPACK model, showing that digital teaching competence is not limited to technological knowledge but emerges from the meaningful integration of technology, pedagogy, and content. Area 2, Digital Content, is related to technological knowledge and its hybridization with content (TCK), as it involves using technology to design, adapt, and select educational materials. Area 3, Teaching and Learning, is linked to pedagogical knowledge and its combination with technology (TPK), highlighting how digital tools transform activity design, classroom organization, and learner participation. Area 4, Assessment and Feedback, is associated with content knowledge and its interaction with technological knowledge (TCK), as it involves using digital tools to assess content-related learning and to provide meaningful, evidence-based feedback. In this way, INTEF Areas 2, 3 and 4 are connected to the TPACK model, as they can be understood as the result.

**Figure 1**

*Relationship between the TPACK model and digital competence (INTEF, 2022)*



*Note.* Own elaboration based on INTEF, 2022 and Mishra and Koehler, 2006.

This model has become a reference framework for teacher training by effectively integrating technology into the teaching/learning process and the development of digital competences (Cabero & Barroso, 2016; Demeshkant et al., 2022). It is applicable across various subject areas (Binjha et al., 2023; Valtonen et al., 2017) and in both in-person and online learning environments (Valverde & Balladares, 2017). It focuses techno-pedagogical teacher training on skills development to include the ideal digital tools for specific disciplinary content, through constructivist pedagogical methods that improve student learning (Koehler et al., 2015).

In recent decades there have been numerous studies on this model, many of them as a result of the COVID-19 pandemic. Teachers were forced to be innovative in their teaching practices and incorporate technological tools (Balladares, 2020). The aforementioned model has evolved to adapt to the needs of modern society in terms of educational digital competences. This is how the model called TPACK-21 CL arose, which incorporates the digital competences needed by twenty-first century teachers (Koh et al., 2017) and highlights the importance of having a solid pedagogical basis for the integration of technology in order to achieve active, experiential student learning where technology is also involved. It advocates training teachers in digital competence through an educational process based on designing a didactic unit that provides meaningful learning experiences (Balladares, 2018). In turn, the study by Harris and Hofer (2017) defines different profiles for the TPACK model

that can be used in teacher training, such as the focus on flexible tools. When this profile is employed for designing training programs, digital tools are selected that can be used in different areas of knowledge and teachers receive guidance on the various possibilities for using these tools. The training program presented in this paper is based on the TPACK-21 CL model and aims to design a didactic proposal drawn from the participating teachers, selecting a series of tools with flexible uses.

Implementing a teacher training program based on the TPACK model helps to improve educational quality in different learning environments. Cadena (2022) established a strong positive correlation between the use of the TPACK model and an improvement in the teaching/learning process. The studies by León Naranjo (2024) emphasized that ongoing teacher training in the use of ICT using the TPACK model aided the effective integration of various digital resources into real teaching and learning practices. The studies by González-Pérez and Marrero-Galván (2023) and Miguel-Revilla et al. (2020), conducted with future teachers, evidenced the importance of improving their training in the integration of technology in teaching/learning processes in line with the TPACK model.

At present, the TPACK model is a benchmark in developing digital competence and instructional design in virtual learning environments (Vowell, 2024; Balladares-Burgos & Valverde-Berrocoso, 2022). In such environments, the use of technology provides wider opportunities to implement constructivist models focusing on active, experiential student learning. There are currently a vast number of digital tools that can be included at different points of instructional design, thereby facilitating content presentation, collaboration, activity design, and assessment. Most recently, Generative Artificial Intelligence (GenAI) tools, which spread as a result of the launch of ChatGPT in 2022, have boosted the number of digital tools that teachers can use to streamline their teaching work. Introducing GenAI into the teaching/learning process presents a great pedagogical potential. Due to their flexibility, GenAI tools enable teachers to create and update content, identify prior ideas, create personalized learning experiences, prepare questionnaires and assessment rubrics, and obtain feedback on completed tasks (Sullivan et al., 2023; Vidal et al., 2024). In short, GenAI has great potential to support instructional design (Kumar et al., 2024). Nevertheless, there are concerns related to the use of GenAI, such as the matter of plagiarism and the production of contents that lack originality (Ellis & Slade, 2023), with the subsequent need to create alternative assessment methods and the possibility of creating bias in the results offered by these tools (Wach et al., 2023). For this reason, although it is important to take steps to integrate GenAI responsibly and reliably, effective integration of GenAI tools should also be based on the teaching/learning process (Gallent-Torres et al., 2023). According to Ayuso-del Puerto and Gutiérrez-Esteban (2022), the use of GenAI tools should now be part of the training programs aimed at improving teachers' digital competence. The qualification of teachers in pedagogical and digital competences is a present-day challenge that involves using GenAI tools (Alenezi et al., 2023).

On the basis of the aforementioned arguments, there is a clear need to design training programs that contemplate the interaction between technological and pedagogical knowledge regarding content, to train teachers in digital competence (Vowell, 2024). Additionally, it is vitally important that these proposals include the areas that the framework for the digital competence recommended by INTEF (2022) considers to be most significant for teachers' pedagogical competences (Miguel-Revilla et al., 2020). On the other hand, it is currently essential to incorporate GenAI tools as part of digital competence training programmes (Cacho, 2024).

In this regard, the following research questions are posed:

- To what extent does a training program based on the TPACK model improve the digital competence of university teachers in areas 2, 3 and 4 according to the INTEF framework?
- Which dimensions of the TPACK model and which phases of instructional design are most strengthened after the training intervention?
- Which elements of the training program have contributed most to the improvement in competence?

Therefore, the main objective of this research is to analyze the effectiveness of a training program grounded in the TPACK model, designed to support the integration of various digital tools—including AI-based tools—across different stages of instructional design, with the aim of enhancing the digital competence of university lecturers at a fully online institution. Furthermore, this proposal also considers digital competence areas 2, 3 and 4 as outlined by INTEF (2022).

## Methodology

In this study, a quantitative methodology was employed using a pre-experimental research design, with pre-test and post-test measures aimed at evaluating the improvement in lecturers' digital competence following the completion of a training programme. Specifically, a questionnaire was administered to the lecturers prior to the start of the course (pre-test), and the same questionnaire was administered again at the end of the course (post-test). The pre-test served to establish a baseline measure of the participants' digital competence, while the post-test enabled an assessment of the progress made as a result of the training intervention.

### *Participants*

A non-probability convenience sample was used, as the experiment was conducted on a professional development course taught by the researchers. The universe was composed of 100 lecturers. The sample consisted of 78 lecturers teaching at the Universidad Internacional de La Rioja (UNIR), from different fields of knowledge, who attended the training course 'Metodologías Activas y herramientas digitales en el proceso de aprendizaje en la enseñanza universitaria online' [Active methodologies and digital tools in the learning process in online university education] during the 2023/24 academic year. This course is part of the 'Título de Experto Universitario en aprendizaje y enseñanza universitaria online' [University Expert Degree in online university teaching and learning]. Women represented 73.1% and 26.9% were men, with an average age of 49.15 years. In terms of years of teaching experience prior to the online environment, 11.5% had less than a year's experience, 38.5% had between 1 and 3 years, 26.9% had between 4 and 10 years and 23.1% had over 10 years of experience.

### *Procedure*

We designed a training program consisting of eight weekly sessions, each lasting three hours and delivered synchronously via the Adobe Connect platform. The program aimed to equip university lecturers with the skills to implement an active and participatory teaching and learning model in virtual classrooms by allowing them to experience this model firsthand. The session design incorporated the moments or events suggested by Gagné and

Dick (1983) in the instructional design. Each event was developed through activities that used different digital tools, some of them were GenAI and others, albeit not GenAI, involved new GenAI functions. During the sessions, tool usage was explained, and supplementary video tutorials were made available to participants. Lecturers selected a topic from one of the subjects they taught and used their corresponding PowerPoint presentation to apply all assigned tasks to specific contents. The input generated by the individual activities was shared on the Moodle platform and the group activities were presented in the classroom and shared on Wakelet ensuring all participants had access to the shared materials. Formative assessment was conducted by providing feedback to the teaching staff both during the completion of the activities on the virtual platform and on the final product they developed. In order to evaluate both the process and the final outcome, a rubric was used as the assessment tool. This rubric was shared with the teaching staff at the time the activity was introduced, thus ensuring that they were aware of the assessment criteria from the outset.

The training programme was framed within a gamification-based methodology. A narrative was designed and presented to the participating lecturers during the first session through an introductory video. Throughout the course, a series of challenges or learning activities were proposed, all contextualized within this narrative. Each time a challenge was completed, participants received a badge containing a number. Once all the badges had been collected, they obtained a code that allowed them to unlock a padlock and gain access to a privilege that supported their successful completion of the course.

Table 1 shows the instructional design events, activities, or challenges and digital and GenAI tools used in each session on the training program. The following link provides a detailed description of the instructional design: [Metodología docente y estrategias discursivas en las sesiones virtuales](#).

**Table 1**

*Instructional Design Events, Activities and Digital and GenAI Tools*

| Instructional design                                               | Activities or Challenges, and digital and GenAI tools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                    | Presentation of the trainer and the participants ( <a href="https://padlet.com/">https://padlet.com/</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Event:<br>To attract the students' attention<br>(Session 1)        | <p>Identification of prior ideas (<a href="https://app.wooclap.com/">https://app.wooclap.com/</a>). Presentation of the learning model to use and the instructional design events.</p> <p>Creation of a collaborative mural (<a href="https://linoit.com/">https://linoit.com/</a>) for the lecturers to express how they implemented these events in the virtual classroom.</p>                                                                                                                                                                                                                                        |
| Event: To inform about objectives, Objective design<br>(Session 2) | <p>Identification of prior ideas about what a learning objective is and about Bloom's taxonomy (<a href="https://www.perplexity.ai/">https://www.perplexity.ai/</a>). Explanation of what a prompt is and how to create one. Presentation of prior ideas (<a href="https://www.mentimeter.com/">https://www.mentimeter.com/</a>).</p> <p>Explanation of how to design objectives using Bloom's taxonomy. The lecturers designed the learning objectives using Bloom's taxonomy for the selected topic. This was shared (<a href="https://docs.google.com/">https://docs.google.com/</a>) and feedback was provided.</p> |

| Instructional design                                                                                               | Activities or Challenges, and digital and GenAI tools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Events:<br/>Prior ideas, Content presentation<br/>(Sessions 3 and 4)</p>                                        | <p>Review of content from Session 2 (<a href="https://jamboard.google.com/">https://jamboard.google.com/</a>). Explanation of how to identify students' prior ideas and present content at the same time.</p> <hr/> <p>Completion of three individual activities.</p> <ul style="list-style-type: none"> <li>• Activity 1: creation of an interactive presentation to synchronously present the contents using the PowerPoint for the selected topic (<a href="https://app.wooclap.com/">https://app.wooclap.com/</a>).</li> <li>• Activity 2: creation of a video based on the abridged PowerPoint (6-7 slides) (<a href="https://zoom.us/">https://zoom.us/</a>), which was enhanced with questions (<a href="https://edpuzzle.com/">https://edpuzzle.com/</a>). The GenAI on Edpuzzle was used to suggest questions and insert them automatically into the video. The enhanced video makes it possible to present content asynchronously and review the answers before the class.</li> <li>• Activity 3: creation of a course (<a href="https://app.perusall.com/">https://app.perusall.com/</a>) and a task so that students read a document that complements the content presented in the video. Using the GenAI on <i>Perusall</i>, possible questions were obtained to guide the reading of the document.</li> </ul>                                                                                                             |
| <p>Events:<br/>To put learning into practice,<br/>To provide feedback to guide learning<br/>(Sessions 5 and 6)</p> | <p>Review of content from Sessions 3 and 4 (<a href="https://quizizz.com/">https://quizizz.com/</a>). An explanation was provided on how to use this tool and the possibility of using the GenAI involved to generate questions.</p> <hr/> <p>The lecturers conducted guided reading, by means of a series of questions, of a document uploaded to <i>Perusall</i>, on 'Metodologías activas y tipos de actividades' [Active methodologies and types of activities]. This was discussed in Session 5.</p> <p>Based on the document, a co-operative conceptual map was created (groups of 6) (<a href="https://www.mindmeister.com/">https://www.mindmeister.com/</a> or <a href="https://www.canva.com/">https://www.canva.com/</a>). There was an opportunity to use the tool <a href="https://www.chatpdf.com/">https://www.chatpdf.com/</a> to summarize the document. The maps were shared on <a href="https://wakelet.com/">https://wakelet.com/</a>. Presentation and evaluation of the maps (self-evaluation, peer evaluation, and hetero-evaluation).</p> <p>Collaborative activity (groups of six, in areas of knowledge) to design an activity as part of an active methodology and supported by an ICT and/or GenAI tool. It was possible to use the tool <a href="https://chatgpt.com/">https://chatgpt.com/</a> to generate ideas. The activity was shared on <a href="https://wakelet.com/">https://wakelet.com/</a>.</p> |
| <p>Event:<br/>Evaluation of learning<br/>(Sessions 7 and 8)</p>                                                    | <p>Review of content from Sessions 5 and 6 (game with cards <a href="https://wordwall.net">https://wordwall.net</a>). Identification of prior ideas (roulette game <a href="https://wheelofnames.com/">https://wheelofnames.com/</a>). Explanation of types of evaluation, procedures, and instruments.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Instructional design | Activities or Challenges, and digital and GenAI tools                                                                                                                                                                                                                                                                                                                                                      |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | <p>Preparation of a rubric to evaluate the collaborative activity designed in session 6 using <a href="https://chatgpt.com/">https://chatgpt.com/</a> or <a href="http://rubistar.4teachers.org/index.php">http://rubistar.4teachers.org/index.php</a></p> <p>Presentation of the activity conducted and evaluation (self-evaluation, peer evaluation and hetero-evaluation) using <i>Corubric</i>.</p>    |
|                      | <p>Final review of the course contents (<a href="https://b.socrative.com/">https://b.socrative.com/</a>). An explanation was given about how to create questionnaires with this tool, as well as the option of generating questions with GenAI.</p>                                                                                                                                                        |
| Final challenge      | <p>The lecturers that completed all the challenges received a password that unlocked a virtual padlock. They then entered a virtual classroom created with the augmented reality tool (<a href="https://www.spatial.io/">https://www.spatial.io/</a>) and searched for the padlock. When they introduced the password, a message appeared telling them that they had completed the end-of-course task.</p> |

### ***Instrument***

An ad hoc questionnaire was designed to gather information on lecturers' perceptions of their digital competence. It comprised two dimensions: 'pedagogical knowledge' and 'pedagogical technological knowledge'. The first dimension established two subdimensions: 'instructional design' with 13 items, which reported the lecturers' level of skill in carrying out a series of tasks relating to instructional design, and 'use of active methodologies' with six items, which addressed the use of the main active methodologies. The second dimension was composed of 20 items relating to knowledge of digital tools and GenAI, and 20 items about their use, divided into four subdimensions: 'identification of prior ideas', 'content presentation', 'activity design' and 'evaluation'. Content knowledge is integrated into both dimensions. This is because participating lecturers directly translate their learning into the design of an instructional session for the subject they teach and subsequently implement it in the virtual classroom. The post-test included a third dimension referring to the lecturers' satisfaction with the training received. This was composed of 13 items that evaluated to what extent the organizational elements of the course had an impact on improving their competence, to what extent the ICT and GenAI tools facilitated instructional design in the virtual classroom, the usefulness of the course for teaching practice, and their overall satisfaction. The items were answered on a Likert scale (1-Not at all, 2-A little, 3-Somewhat, 4-Quite a lot, 5-Very much so). The reliability of the instrument was determined by Cronbach's alpha, and this was 0.959. The instrument was considered suitable for the research to be conducted.

### ***Procedure for data collection and analysis***

The questionnaire was shared with the lecturers online. All the participants, after being informed of the research objectives and that the confidentiality of their data was guaranteed, agreed to participate in this study. The instrument and research were approved by the UNIR Ethics Committee (PI: 098/2023). The statistical tests used were chosen based on the prior assumption of normality check. We used the Kolmogorov-Smirnov and Shapiro-Wilk tests. The results displayed significant values ( $p < 0.05$ ) for all the items and



dimensions, so therefore the data did not fit a normal distribution, and non-parametric statistics were used. Specifically, we used the Wilcoxon signed-rank test to determine whether there were differences in the level of digital competence before (pre-test) and after the intervention (post-test). To determine the magnitude of significant differences, Cohen's  $d$  was used to calculate the effect size. Small effects were considered to be  $r$  values of between 0.1 and 0.3, medium effects up to 0.5 and large effects above this value (Fritz et al., 2012). The data were organized, coded, and analyzed using the statistical software SPSS V.29.0.

## Results

In relation to the first dimension, 'pedagogical knowledge' (PK), the overall results showed statistically significant differences with a large effect size ( $z=6.201$ ,  $p=.001$ ,  $r=0.70$ ). Furthermore, the results of the Wilcoxon  $W$  test (Table 2) indicated statistically significant values ( $p < 0.05$ ) in the two subdimensions that comprise this dimension. The effect size was large in both the subdimension 'instructional design' ( $r=0.68$ ) and the subdimension 'use of active methodologies' ( $r=0.61$ ).

**Table 2**

*Results of the Wilcoxon  $W$  Test for the Subdimensions of Pedagogical Knowledge*

| Dimensions                 | Subdimensions               | Ranges   | n  | Sum of ranges | Z      | p    | r    |
|----------------------------|-----------------------------|----------|----|---------------|--------|------|------|
| Pedagogical Knowledge (PK) | Instructional design        | Positive | 57 | 2206.50       | -5.977 | .001 | 0.68 |
|                            |                             | Negative | 12 | 208.50        |        |      |      |
|                            |                             | Ties     | 9  |               |        |      |      |
|                            | Use of active methodologies | Positive | 54 | 1944.00       | -5.366 | .001 | 0.61 |
|                            |                             | Negative | 12 | 267.00        |        |      |      |
|                            |                             | Ties     | 9  |               |        |      |      |

By analyzing each item in the subdimension 'instructional design' (Table 3) we found that statistically significant differences with large effect sizes were obtained for all the items, except item Di7, whose effect was medium and item Di13, whose effect size was small.

**Table 3***Results of the Wilcoxon W Test for the Items in the Subdimension of Instructional Design*

|      | Items on the subdimension of instructional design                                                                   | Z      | p    | r    |
|------|---------------------------------------------------------------------------------------------------------------------|--------|------|------|
| Di1  | Designing learning objectives using Bloom's taxonomy                                                                | -5.837 | .001 | 0.66 |
| Di2  | Requesting information about students' prior knowledge                                                              | -4.778 | .001 | 0.54 |
| Di3  | Creating content in different formats (presentations, videos, and interactive documents)                            | -5.307 | .001 | 0.60 |
| Di4  | Designing activities based on active methodologies adapted to the subject                                           | -5.957 | .001 | 0.67 |
| Di5  | Designing activities with digital tools                                                                             | -5.190 | .001 | 0.59 |
| Di6  | Organizing collaborative activities in the virtual classroom that arouse the students' interest                     | -6.157 | .001 | 0.70 |
| Di7  | Giving indications to the student when presenting an activity (what to do, how to do it, and which space to use...) | -3.674 | .001 | 0.42 |
| Di8  | Summarizing the work conducted in the classroom                                                                     | -4.708 | .001 | 0.53 |
| Di9  | Conducting a full student assessment (initial, procedural, final)                                                   | -5.307 | .001 | 0.60 |
| Di10 | Integrating self-evaluation, peer evaluation and hetero-evaluation                                                  | -5.957 | .001 | 0.67 |
| Di11 | Using a variety of instruments for evaluation                                                                       | -5.190 | .001 | 0.59 |
| Di12 | Providing feedback to guide students' learning                                                                      | -4.730 | .001 | 0.53 |
| Di13 | Maintaining a good atmosphere in the virtual classroom                                                              | -3.135 | .002 | 0.35 |

As for the analysis of each item in the subdimension 'use of active methodologies' (Table 4) we found statistically significant differences with medium to large effect sizes for all the items.

**Table 4***Results of the Wilcoxon W Test for the Items in the Subdimension Use of Active Methodologies*

|     | Items in the subdimension use of active methodologies | Z      | p    | r    |
|-----|-------------------------------------------------------|--------|------|------|
| Ma1 | Co-operative learning                                 | -3.848 | .001 | 0.44 |

| Items in the subdimension use of active methodologies |                        | Z      | p    | r    |
|-------------------------------------------------------|------------------------|--------|------|------|
| Ma2                                                   | Collaborative learning | -3.749 | .001 | 0.42 |
| Ma3                                                   | Problem-based learning | -3.763 | .001 | 0.43 |
| Ma4                                                   | Project-based learning | -3.920 | .001 | 0.44 |
| Ma5                                                   | Game-based learning    | -3.996 | .001 | 0.45 |
| Ma6                                                   | Gamification           | -3.568 | .001 | 0.40 |

Regarding the second dimension under study relating to ‘technological pedagogical knowledge’ (TPK), the overall results show statistically significant differences, with a large effect size ( $z=-7.375$ ,  $p=.001$ ,  $r=0.83$ ).

We analyzed the subdimensions that comprised TPK relating to knowledge of different digital tools. The results of the Wilcoxon W test indicated statistically significant values ( $p < 0.05$ ) in the four subdimensions that comprise this dimension (Table 5) with large effect sizes in all of them.

**Table 5**

*Results of the Wilcoxon W Test for the Subdimensions that Comprised TPK Competence Related to Knowledge of Different Digital Tools.*

| Subdimensions of the TPK competence | Ranges   | n  | Sum of ranges | Z      | p    | r    |
|-------------------------------------|----------|----|---------------|--------|------|------|
| Prior ideas                         | Positive | 78 | 3081          | -7.681 | .001 | 0.87 |
|                                     | Negative | 0  | .00           |        |      |      |
|                                     | Ties     | 0  |               |        |      |      |
| Content presentation                | Positive | 72 | 2628          | -7.382 | .001 | 0.84 |
|                                     | Negative | 0  | .00           |        |      |      |
|                                     | Ties     | 6  |               |        |      |      |
| Activity design                     | Positive | 78 | 3081          | -7.678 | .001 | 0.87 |
|                                     | Negative | 0  | .00           |        |      |      |
|                                     | Ties     | 0  |               |        |      |      |
| Evaluation                          | Positive | 78 | 3081          | -7.684 | .001 | 0.87 |
|                                     | Negative | 0  | .00           |        |      |      |
|                                     | Ties     | 0  |               |        |      |      |

Once again, we analyzed the subdimensions that comprised TPK relating to use of different digital tools. The results of the Wilcoxon W test indicated statistically significant values ( $p < 0.05$ ) in the four subdimensions that comprise this dimension (Table 6) with large effect sizes in all of them.

**Table 6**

*Results of the Wilcoxon W Test for the Subdimensions that Comprised TPK Competence Related to the Use of Different Digital Tools.*

| Subdimensions of the TPK competence | Ranges   | n  | Sum of ranges | Z      | p    | r    |
|-------------------------------------|----------|----|---------------|--------|------|------|
| Prior ideas                         | Positive | 72 | 2628          | -7.389 | .001 | 0.84 |
|                                     | Negative | 0  | .00           |        |      |      |
|                                     | Ties     | 6  |               |        |      |      |
| Content presentation                | Positive | 60 | 2329.50       | -6.729 | .001 | 0.76 |
|                                     | Negative | 9  | 85.50         |        |      |      |
|                                     | Ties     | 9  |               |        |      |      |
| Activities                          | Positive | 69 | 2554.50       | -6.968 | .001 | 0.79 |
|                                     | Negative | 3  | 73.50         |        |      |      |
|                                     | Ties     | 6  |               |        |      |      |
| Evaluation                          | Positive | 63 | 2155.50       | -6.714 | .001 | 0.76 |
|                                     | Negative | 3  | 55.50         |        |      |      |
|                                     | Ties     | 12 |               |        |      |      |

Finally, we conducted an item-by-item analysis of each of the four subdimensions that comprise the TPK dimension relating to both knowledge and use of different digital tools at different points in the instructional design. The results obtained (Table 7) show statistically significant differences in all of the items in the subdimensions. As for the items in the subdimension of knowledge of digital tools, it is worth noting that all the effect sizes are large. Furthermore, regarding the items in the subdimension of use of digital tools, the effect sizes are large for all the items.

**Table 7***Results of the Wilcoxon W Test for all items in the Subdimensions in the TPK Dimension*

| Items in each of the TPK subdimensions |                    | Knowledge of digital tools |      |      | Use of digital tools |      |      |
|----------------------------------------|--------------------|----------------------------|------|------|----------------------|------|------|
|                                        |                    | Z                          | p    | r    | Z                    | p    | r    |
| Prior ideas                            | Wooclap            | -6.794                     | .001 | 0.77 | -5.939               | .001 | 0.67 |
|                                        | Linoit             | -7.123                     | .001 | 0.81 | -6.073               | .001 | 0.69 |
|                                        | Padlet             | -6.800                     | .001 | 0.77 | -5.508               | .001 | 0.62 |
|                                        | Perplexity         | -7.472                     | .001 | 0.85 | -6.451               | .001 | 0.73 |
| Content presentation                   | Zoom               | -5.262                     | .001 | 0.60 | -4.416               | .001 | 0.50 |
|                                        | Edpuzzle           | -7.118                     | .001 | 0.81 | -5.839               | .001 | 0.66 |
|                                        | Perusall           | -7.140                     | .001 | 0.81 | -5.709               | .001 | 0.65 |
| Activities                             | Mindmeister        | -7.134                     | .001 | 0.81 | -6.481               | .001 | 0.73 |
|                                        | Wakelet            | -6.958                     | .001 | 0.79 | -4.745               | .001 | 0.54 |
|                                        | Jamboard           | -6.202                     | .001 | 0.70 | -5.541               | .001 | 0.63 |
|                                        | Collaborative docs | -6.507                     | .001 | 0.74 | -6.787               | .001 | 0.77 |
|                                        | ChatGPT            | -6.803                     | .001 | 0.77 | -5.619               | .001 | 0.64 |
|                                        | Spatial IO         | -6.571                     | .001 | 0.74 | -5.908               | .001 | 0.67 |
|                                        | ChatPDF            | -6.590                     | .001 | 0.75 | -5.747               | .001 | 0.65 |
| Evaluation                             | Mentimeter         | -7.394                     | .001 | 0.84 | -5.920               | .001 | 0.67 |
|                                        | Quizziz            | -7.120                     | .001 | 0.81 | -6.186               | .001 | 0.70 |
|                                        | Socrative          | -6.987                     | .001 | 0.79 | -6.136               | .001 | 0.69 |
|                                        | Rubistar           | -6.842                     | .001 | 0.77 | -5.568               | .001 | 0.63 |
|                                        | Corubrics          | -7.321                     | .001 | 0.83 | -5.739               | .001 | 0.65 |

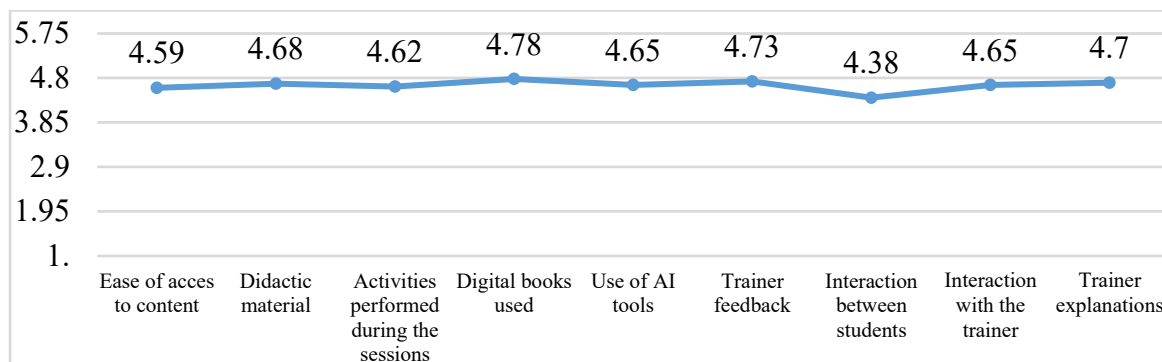
Regarding the degree of satisfaction with the training received, 100% of the lecturers indicated that the course had been useful for their teaching practice and they would recommend it to other lecturers, rating the experience overall with a score of 4.86 (on a scale from 1 to 5), therefore we can state that satisfaction was high.

In examining satisfaction further, we asked the lecturers to evaluate to what extent some organizational elements of the course had had an impact on improving their competence (Figure 2). To this effect, it can be seen that all of the items have a mean of over

4 (on a scale of 1 to 5), which means that all the elements used in the instructional design improved their digital competence. It should be noted that digital tools (4.78) trainer feedback (4.73) are two of the most highly rated elements.

**Figure 2**

*Mean scores of the elements used in organizing the course*



Lastly, we asked them to evaluate the extent to which digital tools and GenAI tools had made the instructional design easier, which resulted in an average of 4.75 and 4.43 respectively (on a scale of 1 to 5).

## Discussion

This paper presents the results of implementing a training program based on the TPACK model approach (Koehler & Mishra, 2009), aimed at improving the digital competence of lecturers at a fully online university. This proposal is based on the integration of pedagogical and technological knowledge, applied to disciplinary content, that lecturers should have in order to implement a constructivist learning model in the virtual classroom (Koehler et al., 2015; Vowell, 2024). Additionally, it focuses on improving areas 2, 3 and 4 described in the Spanish Framework for the Digital Competence of Teachers (INTEF, 2022), related to the use of technology for digital content creation, teaching and learning activities, and evaluation, respectively. This framework for digital competence was suggested by García-Ruiz et al. (2023) as a benchmark to understand which digital competences teachers should develop.

The TPACK model and the reference framework for digital competence (INTEF, 2022) have been useful in designing the training program presented. The results obtained demonstrate the effectiveness of this proposal in improving lecturers' digital competence in a virtual environment (Banoy-Suarez & González-Reyes, 2024). This competence is crucial for ensuring quality in the teaching profession (Derveniz et al., 2022), and training in this area has increasingly focused on integrating technology into pedagogical practices, as highlighted by Maier and Koval (2021). The intervention fostered a positive attitude among lecturers towards the use of technology in classroom practices and towards training in this area, as evidenced by the high level of satisfaction reported by lecturers with the training they received (Melash et al., 2020). The training programs and the attitude towards the use of technology were acknowledged as two of the key variables greatly influencing the level of lecturers' digital competence (Cattaneo et al., 2022; Hämäläinen et al., 2021). It is worth

mentioning that this perception of improved digital competence was complemented by formative assessment of the lecturers throughout the program. All the input produced by the lecturers was evaluated through feedback based on the previously shared evaluation rubrics. In fact, the feedback provided by the trainer was the second most highly rated element of the course in terms of contributing to the improvement in the lecturers' competence. Authors such as Miguel-Revilla et al. (2020) and Viñoles-Cosentino et al. (2021) have considered formative assessment to be a decisive factor in the improvement of digital competence on training programs.

The development of digital competence has been examined in terms of knowledge and use of different digital tools, including GenAI, chosen for their potential in implementing an instructional design in the virtual classroom that incorporates the following events: prior ideas, content presentation, activity design, and evaluation.

The training program supported lecturers in developing their pedagogical content knowledge. To achieve this, they completed all tasks related to each instructional design event within the context of a topic from one of the subjects they teach. This is evidenced by the significant differences—with medium to large effect sizes—observed across all items related to the instructional design tasks. Additionally, lecturers showed notable improvement in their use of the active methodologies covered in the course and included in the instructional design, with statistically significant gains and medium effect sizes. All the above leads us to state that pedagogical knowledge has been created, applied to the contents that each lecturer must work on with their students. To this effect, and as proposed by the TPACK-21 CL (Balladares, 2018; Koh et al., 2017), this established the basis for integrating technology into pedagogy, though aimed at producing meaningful learning among students.

Furthermore, on this program technological knowledge interacted with pedagogical knowledge, since the most suitable digital tools were selected to facilitate the tasks to complete for each instructional design event. Upon completing the program, lecturers demonstrated the ability to understand and effectively use all the digital tools, as evidenced by significant improvements across all related items, each showing large effect sizes. Among these tools, some were GenAI, and others contained GenAI functions, as explained in the section on procedure. The GenAI tools were selected for their flexibility and capacity to be applied to different stages of the instructional design (Kumar et al., 2024). During the program, the lecturers were shown each tool as part of an instructional design event but were given specific examples that could be applied to all other events. Accordingly, we used a TPACK model profile for lecturer training focused on flexible tools, as recommended by Harris and Hofer (2017). The lecturers did not find it difficult to combine knowledge that was purely technological with knowledge linked to a pedagogical content approach. In this regard, our results contradict those reported by Miguel-Revilla et al. (2020), who presented a training program based on TPACK for initial lecturer training and found lower levels in the technological components than in the pedagogical ones. It is also worth highlighting that there was a significant improvement in digital competence regarding content creation and evaluation, which are two of the areas where other studies have shown a lower level of competence among lecturers (Fernández Miravete & Prendes Espinosa, 2021; Marín Suelves et., 2022).

This paper presents an updated concept of lecturers' digital competence, emphasizing the knowledge and use of GenAI tools to support educators, as highlighted by Ayuso-del Puerto and Gutiérrez-Esteban (2022). These authors advocate for virtual training that incorporates GenAI tools into initial teacher education, enabling students to design

educational resources using such technologies. Due to their flexibility, GenAI tools offer significant pedagogical potential. In our program, they have been integrated into various instructional design components, thereby training teachers to use them for brainstorming, creating, and updating content creation, learning experiences, questionnaires, and evaluation rubrics (Sullivan et al., 2023; Vidal et al., 2024).

Additionally, lecturers shared the conversations they held with GenAI tools through activity submissions, allowing for the analysis and evaluation of these interactions. Consequently, they gained awareness regarding the importance of subject matter knowledge to obtain high-quality outputs from GenAI tools (Gallent-Torres et al., 2023), and of the need to assess and critically reflect on AI-generated content (Kasneci, 2023). To this effect, lecturers are now equipped to instruct their students on the responsible and critical use of GenAI, emphasizing the importance of subject matter knowledge, which is essential to identify inaccuracies and biases (Stojanov, 2023).

In summary, the training program evaluated has successfully integrated GenAI tools into teaching practices, in line with the recommendations of Alenezi et al. (2023) and Ayuso-del Puerto and Gutiérrez-Esteban (2022).

The following section presents the conclusions derived from this study, which have been developed based on the stated objectives and address the research questions posed. They synthesize the main findings obtained from the data analysis and offer an integrated perspective on the most relevant aspects identified.

## Conclusion

We conclude that the intervention presented, based on the interaction of technological, pedagogical, and content knowledge, and grounded in the TPACK model and the framework for digital competence recommended by INTEF (2022), has proven effective. It has led to a considerable improvement in digital competence in a virtual environment. In these environments, technology broadens opportunities to introduce active learning models that focus on the students (Balladares-Burgos & Valverde-Berrocoso, 2022; Demeshkant et al. 2022). This improvement takes into account knowledge of the most effective methodologies for teaching specific content, applied to the design of particular teaching and learning scenarios. It also involves selecting the most appropriate technological tools to enhance students' comprehension and mastery of specific content. It involves, in essence, learning to use technology so as to produce an instructional design that makes the students' teaching/learning process interactive, meaningful, and deep (León Naranjo, 2024). Moreover, the training program was used in different areas of knowledge, thereby enhancing its potential for lecturers in digital competence (Binjha et al. 2023; Valtonen et al. 2017). In conclusion, the lecturers were trained to effectively integrate different digital tools and generative GenAI into instructional design, thereby helping to improve digital competence adapted to present-day reality.

In terms of the limitations of this paper, we would emphasize that the intervention was conducted with 78 lecturers, a sample size that we could consider to be relatively small and restricted to a certain context, which limits generalization of the results. Nonetheless, it is worth noting that one of the objectives of this study was to analyze the effects of an intervention with a specific focus. Furthermore, the evaluation of lecturers' digital competence was analyzed through their self-perception, which could produce a higher level of digital competence than the actual level achieved (Viñoles-Cosentino et al., 2021; Zhao et



al., 2021). Nevertheless, our research has evaluated the improvement in digital competence by comparing the results that were established before and after the intervention, thereby reducing the difference between the perceived digital competence and that which was actually achieved (Muñoz & Ruiz-Domínguez, 2021).

A series of recommendations have been made for the design of training programmes to improve the digital competence of online lecturers:

- Integrate the use of digital tools into instructional design.
- Select free, easy-to-use, and flexible digital tools, i.e., tools that can be integrated into any phase of instructional design.
- Apply the phases of instructional design and digital tools, contextualizing them in the subjects they teach.

Finally, it is worth mentioning that this training program will be conducted again during this academic year, which will provide the opportunity to continue research into the evaluation of digital competence using proposals such as this one, whilst combining quantitative and qualitative methods.

### ***Acknowledgements***

We would like to express our gratitude to the International University of La Rioja for the support provided for our research. We would also like to thank the University of Granada for their collaboration in this work within the framework of a research stay.

### ***Ethics***

This work was reviewed and approved by the UNIR Ethics Committee (PI: 098/2023).

### ***Funding***

This paper received funds from the Research Project ‘Metodologías activas con tecnologías inmersivas para el desarrollo de competencias profesionales en la formación de futuros docentes [Active methodologies with immersive technologies for the development of professional skills in the training of future teachers] (MATICO)’, reference PP-2023-14, awarded in response to the call for UNIR Proprietary Research Projects 2023 issued by the Universidad Internacional de La Rioja (UNIR).

### ***Availability of data and materials***

The data sets generated and/or analyzed during the present study are not publicly available due to personal data protection but can be requested from the corresponding author upon reasonable request.

### ***Competing Interests***

The authors have no relevant financial or non-financial interests to disclose.

## References

- Alenezi, M., Mohamed, A. M., & Shaaban, T. S. (2023). Revolutionizing EFL special education: How ChatGPT is transforming the way teachers approach language learning. *Innoeduca. International Journal of Technology and Educational Innovation*, 9(2), Article 2. <https://doi.org/10.24310/innoeduca.2023.v9i2.16774>
- Ayuso-del Puerto, D., y Gutiérrez-Esteban, P. (2022). La Inteligencia Artificial como Recurso Educativo durante la Formación Inicial del Profesorado. *RIED-Revista Iberoamericana de Educación a Distancia*, 25(2), 347-362. <https://doi.org/10.5944/ried.25.2.32332>
- Baena-Morales, S., Martinez-Roig, R., & Hernández-Amorós, M.J (2020). Sustainability and educational technology— A description of the teaching self-concept. *Sustainability*, 12(24), 10309. <https://doi.org/10.3390/su122410309>
- Balladares, J. (2018). Diseño pedagógico de la educación digital para la formación del profesorado. RELATEC. *Revista Latinoamericana de Tecnología Educativa*, 17(1), 41-60. <https://doi.org/10.17398/1695-288X.17.1.41>
- Balladares, J. (2020). Una educación remota en tiempos de contingencia académica. *Revista Andina*, 2, 29-35. Universidad Andina Simón Bolívar. <https://tinyurl.com/y6t3asl7>
- Balladares-Burgos, J. y Valverde-Berrocoso, J. (2022). El modelo tecnopedagógico TPACK y su incidencia en la formación docente: una revisión de la literatura. *RECIE. Revista Caribeña de Investigación Educativa*, 6(1), 63-72. <https://doi.org/10.32541/recie.2022.v6i1.pp63-72>
- Banoy-Suarez, W., & González-Reyes, R. A. (2024). Analysis of Frameworks for Digital Skills Training for Secondary School Teachers: A Systematic Review. *TEM Journal*, 13(2), 1038. <https://doi.org/10.18421/TEM132-18>
- Barragán Sánchez, R., Llorente Cejudo, M. D. C., Aguilar Gavira, S. y Benítez Gavira, R. (2022). Autopercepción inicial y nivel de competencia digital del profesorado universitario. *Texto libre*, 15, 1-24. <https://doi.org/10.35699/1983-3652.2022.36032>
- Binjha, P. B., Das, B. C., Dansana, A., & Das, B. K. (2023). Pedagogical innovation of TPACK based K-4 learning transaction model in science and social sciences. *Asian Journal of Education and Social Studies*, 39(1), 42-52. <https://doi.org/10.9734/AJESS/2023/v39i1838>
- Cabero, J. y Barroso, J. (2016). Formación del profesorado en TIC: una visión del modelo TPACK. *Cultura y Educación*, 28(3), 633–663. <https://doi.org/10.1080/11356405.2016.1203526>
- Cabero-Almenara, J., Barroso-Osuna, J., Gutiérrez-Castillo, J. J. y Palacios-Rodríguez, A. (2020). Validación del cuestionario de competencia digital para futuros maestros mediante ecuaciones estructurales. *Bordón. Revista De Pedagogía*, 72(2), 45-63. <https://doi.org/10.13042/Bordon.2020.73436>

- Cabero-Almenara, J., Gutiérrez-Castillo, J. J., Palacios-Rodríguez, A., & Barroso-Osuna, J. (2021). Comparative European DigCompEdu Framework (JRC) and Common Framework for Teaching Digital Competence (INTEF) through expert judgment. *Texto Livre: Linguagem e Tecnologia*, 14(1). <http://doi.org/10.35699/1983-3652.2021.25740>
- Cadena, S. (2022). Modelo TPACK en el proceso de enseñanza - aprendizaje de los estudiantes de la Unidad Educativa Barreiro, Babahoyo, periodo 2020-2021. Repositorio Universidad Técnica de Babahoyo. <http://dspace.utb.edu.ec/bitstream/handle/49000/11147/C-UTB-CEPOS-TIE000022.pdf?sequence=1&isAllowed=y>
- Cacho, R. (2024). Integrating Generative AI in University Teaching and Learning: A Model for Balanced Guidelines, *Online Learning*, Volume28(3), 55-81. <https://doi.org/10.24059/olj.v28i3.4508>
- Carpenter, J. P., Rosenberg, J. M., Kessler, A., Romero-Hall, E., & Fischer, C. (2024). The importance of context in teacher educators' professional digital competence. *Teachers and Teaching*, 30(4), 400–416. <https://doi.org/10.1080/13540602.2024.2320155>
- Cattaneo, A.P., Antonietti, C., & Rauseo, M. (2022). How digitalised are vocational teachers? Assessing digital competence in vocational education and looking at its underlying factors. *Computers & Education*, 176, 104358. <https://doi.org/10.1016/j.compedu.2021.104358>
- Cejas-León, R. y Navío Gámez, A. (2018). Formación en TIC del profesorado universitario. Factores que influyen en la transferencia a la función docente. *Profesorado*, 22(3), 271–293. <https://doi.org/10.30827/profesorado.v22i3.8002>
- Demeshkant, N., Trusz, S., & Potyrała, K. (2022). Interrelationship between levels of digital competences and Technological, Pedagogical and Content Knowledge (TPACK): a preliminary study with Polish academic teachers. *Technology, Pedagogy and Education*, 31, 579 - 595. <https://doi.org/10.1080/1475939X.2022.2092547>.
- Dervenis, C., Fitsilis, P. & Iatrellis, O. (2022). A review of research on teacher competencies in higher education. *Quality Assurance in Education*, 30(2), 199-220. <https://doi.org/10.1108/QAE-08-2021-0126>
- Ellis, A. R., & Slade, E. (2023). A New Era of Learning: Considerations for ChatGPT as a Tool to Enhance Statistics and Data Science Education. *Journal of Statistics and Data Science Education*, 31(2), 1-10. <https://doi.org/10.1080/26939169.2023.2223609>
- European Commission: Joint Research Centre, Redecker, C., & Punie, Y. (2017). *European framework for the digital competence of educators: DigCompEdu*, (Y.Punie,edito) Publications Office. <https://data.europa.eu/doi/10.2760/159770>
- Fernández Miravete, A.D. y Prendes Espinosa, M. P. Evaluación de la competencia digital de una organización educativa de enseñanza secundaria a partir del modelo DigCompOrg. *Revista Complutense de Educación*, 32(4), 651-661. <https://doi.org/10.5209/rced.70953>

- Fritz, C. O., Morris, P. E., & Richler, J. J. (2012). Effect size estimates: Current use, calculations, and interpretation. *Journal of Experimental Psychology: General*, 141(1), 2-18. <https://doi.org/10.1037/a0024338>
- Gagné, R.M., & Dick, W. (1983). Instructional Psychology. *Annual Review of Psychology*, 34, 261-195. <https://doi.org/10.1146/annurev.ps.34.020183.001401>
- Gallent-Torres, C., Zapata-González, A. y Ortego-Hernando, J.L. (2023). El impacto de la inteligencia artificial generativa en educación superior: una mirada desde la ética y la integridad académica. *RELIEVE*, 29(2), art. M5. <http://doi.org/10.30827/relieve.v29i2.29134>
- García-Peñalvo, F. J. (2023). La percepción de la Inteligencia Artificial en contextos educativos tras el lanzamiento de ChatGPT: disrupción o pánico. *Education in the Knowledge Society (EKS)*, 24, e31279. <https://doi.org/10.14201/eks.31279>
- García-Ruiz, R. y Pérez Escoda, A. (2021). La competencia digital docente como clave para fortalecer el uso responsable de Internet. *Campus Virtuales* 10(1), 59-71. <http://uajournals.com/ojs/index.php/campusvirtuales/article/view/781>
- García-Ruiz, R., Buenestado-Fernández, M. y Ramírez-Montoya, M.S. (2023). Evaluación de la Competencia Digital Docente: instrumentos, resultados y propuestas. Revisión sistemática de la literatura. *Educación XXI*, 26(1), 273-301. <https://doi.org/10.5944/educxx1.33520>
- González-Pérez, P. y Marrero-Galván, J. J. (2023). Diseños TPACK de futuros docentes e influencia de la competencia digital y del engagement académico. *Estudios Pedagógicos*, 49(3), 395–411. <https://doi.org/10.4067/S0718-07052023000400395>
- Hämäläinen, R., Nissinen, K., Mannonen, J., Lämsä, J., Leino, K., & Taajamo, M. (2021). Understanding teaching professionals' digital competence: What do PIAAC and TALIS reveal about technology-related skills, attitudes, and knowledge? *Computers in Human Behavior*, 117. <https://doi.org/10.1016/j.chb.2020.106672>
- Harris, J. B., & Hofer, M. J. (2017). "TPACK stories": Schools and school districts repurposing a theoretical construct for technology-related professional development. *Journal of Research on Technology in Education*, 49(1-2). <https://doi.org/10.1080/15391523.2017.1295408>
- INTEF. (2022). *Marco de referencia de la Competencia Digital del docente*. Instituto Nacional de Tecnologías Educativas y Formación del Profesorado.
- Jiménez-Hernández, D., González-Calatayud, V., Martínez-Mayoral, M. A., & Morales, J. (2021). La mejora de la competencia digital de los futuros docentes de secundaria: una experiencia en la Universidad Miguel Hernández. *Aloma: revista de psicología, ciències de l'educació i de l'esport Blanquerna*, 39(2), 53-62. <https://doi.org/10.51698/aloma.2021.39.2.53-62>
- Kasneci, E., et. al. (2023). ChatGPT for Good? On Opportunities and Challenges of Large Language Models for Education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>

- Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60–70. <https://www.citejournal.org/volume-9/issue-1-09/general/what-is-technological-pedagogicalcontent-knowledge/>
- Koehler, M. J., Mishra, P., & Cain, W. (2015). ¿Qué son los saberes tecnológicos y pedagógicos del contenido (TPACK)? *Virtualidad, educación y ciencia*, 6(10), 9-23. <https://doi.org/10.60020/1853-6530.v6.n10.11552>
- Koh, J. H. L., Chai, C. S., & Lim, W. Y. (2017). Teacher Professional Development for TPACK- 21CL: Effects on Teacher ICT Integration and Student Outcomes. *Journal of Educational Computing Research*, 55(2), 172-196. <https://doi.org/10.1177/0735633116656848>
- Kumar, S., Gunn, A., Rose, R., Pollard, R., Johnson, M., & Ritzhaupt, D. (2024). The role of instructional designers in the integration of generative artificial intelligence in online and blended learning in higher education. *Online Learning*, 28(3), 207-231. <https://doi.org/10.24059/olj.v28i3.4501>
- León Naranjo, J. (2024). El modelo Conocimiento Tecnológico Pedagógico y de Contenido (TPACK): una estrategia para potenciar las competencias digitales de los docentes. *LATAM Revista Latinoamericana de Ciencias Sociales y Humanidades* 5(4), 2079 – 2094. <https://doi.org/10.56712/latam.v5i4.2395>
- Maier, N., & Koval, T. (2021). How to develop digital competence in pre-service FL teachers at University level. *Advanced Education*, 8(18), 11–18. <https://doi.org/10.20535/2410-8286.227639>
- Marín Suelves, D., Gabarda Méndez, V. y Ramón-Llin Mas, J. A. (2022). Análisis de la competencia digital en el futuro profesorado a través de un diseño mixto. *Revista de Educación a Distancia (RED)*, 22(70). <https://doi.org/10.6018/red.523071>
- Martín Párraga, L., Llorente Cejudo, C. y Barroso Osuna, J. (2022). Validación del Cuestionario de Registro DigCompEdu mediante Ecuaciones Estructurales: Un Estudio en una Universidad del Perú. *Education Sciences*, 12, 574. <https://doi.org/10.3390/educsci12080574>
- Mas García, V., Gabarda Méndez, V. y Peirats Chacón, J. (2023). Formação e competência digital de professores do Ensino Médio na Espanha. *Texto Livre: Linguagem e Tecnologia*, 16. <https://doi.org/10.1590/1983-3652.2023.44851>
- Melash, V.D., Molodychenki, V.V., Huz, V.V., Varenychenko, A.B., & Kirsanova, S.S. (2020). Modernization of education programs and formation of digital competences of future primary school teachers. *International Journal of Higher Education*, 9(7), 377-386. <https://doi.org/10.5430/ijhe.v9n7p377>
- Miguel-Revilla, D., Martínez-Ferreira, J. M., & Sánchez-Agustí, M. (2020). Assessing the digital competence of educators in social studies: An analysis in initial teacher training using the TPACK-21 model. *Australasian Journal of Educational Technology*, 36(2), 1–12. <https://doi.org/10.14742/ajet.5281>

- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers' college record*, 108(6), 1017-1054. <https://doi.org/10.1111/j.1467-9620.2006.0068>
- Muñoz F.J.R., & Ruiz-Domínguez, M.D.M. (2021). A competência digital dos professores de literatura no ensino médio na Espanha. *Texto Livre: Linguagem e Tecnologia*, 14(3), e31351. <https://doi.org/10.35699/1983-3652.2021.31351>
- Ortiz, J. de J. A., Hernández, S. M. de la L. V., Navarro-Illana, P., Martín-Palomino, A. P., Navarro-Illana, E., & Martínez, G. D. O. (2025). Design of a B-Learning Workshop for Teacher Digital Skills Training. *Revista De Gestão Social E Ambiental*, 19(1), e010668. <https://doi.org/10.24857/rgsa.v19n1-005>
- Palacios-Rodríguez, A., Llorente-Cejudo, C., Lucas, M., & Bem-haja, P. (2025). Macroevaluación de la competencia digital docente. Estudio DigCompEdu en España y Portugal. *RIED-Revista Iberoamericana De Educación a Distancia*, 28(1), 177–196. <https://doi.org/10.5944/ried.28.1.41379>
- Pizà-Mir, B., Moreno-Vecino, B., & Monserrat-Monserrat, M.-V. (2023). Interest of nonuniversity teachers in educational research projects. *REIRE Revista d'Innovació I Recerca En Educació*, 16(2), 1–13. <https://doi.org/10.1344/reire.42438>
- Stojanov, A. (2023). Learning with ChatGPT 3.5 as a more knowledgeable other: an autoethnographic study. *International Journal of Educational Technology in Higher Education*, 20(35), 1-17. <https://doi.org/10.1186/s41239-023-00404-7>
- Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning & Teaching*, 6(1), 31-40. <https://doi.org/10.37074/jalt.2023.6.1.17>
- Valtonen, T., Sointu, W., Kukkonen, J., Kontkanen, S., Lambert, M., & Mäkitalo-Siegl, K. (2017). TPACK actualizado para medir las habilidades del siglo XXI de los profesores en formación. *Australasian Journal of Educational Technology*, 33(3), 15-31. <https://doi.org/10.14742/ajet.3518>
- Valverde, J. y Balladares, J. (2017). Enfoque sociológico del uso del b-learning en la educación digital del docente universitario. *Sophia: colección de Filosofía de la Educación*, 23(2), 123-140. <https://doi.org/10.17163/soph.n23.2017.04>
- Vidal, J., Llorens-Largo, F., & García-Peñalvo, F. J. (2024). The new reality of education in the face of advances in generative artificial intelligence. *RIED Revista Iberoamericana de Educación a Distancia*, 27(1). <https://doi.org/10.5944/ried.27.1.37716>
- Viñoles-Cosentino, V., Esteve-Mon, F. M., Llopis-Nebot, M. Á. y Adell-Segura, J. (2021). Validación de una plataforma de evaluación formativa de la competencia digital docente en tiempos de Covid-19. *RIED-Revista Iberoamericana de Educación a Distancia*, 24(2), 87–106. <https://doi.org/10.5944/ried.24.2.29102>
- Vowell, K. S. (2024). Collaboration, connection, and culture: Understanding the impact of institutional culture on online teaching in higher education. *Online Learning Volume*, 28(3), 299-315. <https://doi.org/10.24059/olj.v28i3.4561>

- Wach, K et al. (2023). The dark side of generative artificial intelligence: A critical analysis of controversies and risks of ChatGPT. *Entrepreneurial Business and Economics Review*, 11(2), 7-24. <https://doi.org/10.15678/EBER.2023.110201>
- Zhao, Y., Pinto Llorente, A.M., Sánchez Gómez, M.C., & Zhao, L. (2021). The impact of gender and years of teaching experience on college teachers' digital competence: An empirical study on teachers in Gansu Agricultural University. *Sustainability*, 13, 4163. <https://doi.org/10.3390/su13084163>

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# Examining the Role of Basic Psychological Need Satisfaction in Communication in Online Language Learning: A Comparison of Synchronous and Asynchronous Modes

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## Abstract

Although the role of psychological needs in supporting language learning is well established, less is known about how these needs operate in different online learning modes. This study investigates how basic psychological needs satisfaction (i.e., autonomy, competence, and relatedness) is associated with students' willingness to communicate (WTC), as well as their communication quantity and quality, across asynchronous and synchronous online language learning. Using the experience sampling method (ESM), data were collected from 104 students over multiple time points during real-time online classes. Multi-group path analysis was then conducted to compare structural relationships across the two learning modes. Results showed that while competence and relatedness needs were positively associated with WTC in both modes, autonomy need satisfaction was associated with WTC only in asynchronous settings. WTC was associated with communication frequency and fluency in both modes, but its link to complexity and accuracy emerged only in synchronous sessions. These findings highlight the differentiated roles of psychological needs in shaping communicative engagement across online instructional formats.

**Keywords:** Basic psychological need satisfaction; Willingness to communicate; Asynchronous learning; Synchronous learning; Complexity; Accuracy; and Fluency (CAF); Frequency of communication

Jiang, Z., Xie, K., & Stein, D. (2025). Examining the role of basic psychological need satisfaction in online language communication: A comparison of synchronous and asynchronous modes. *Online Learning*, 29(4), 133-161.  
<https://doi.org/10.24059/olj.v29i4.5222>



## Introduction

Instructional modes play a key role in shaping the student learning experience in online learning environments. Asynchronous and synchronous learning environments offer different opportunities for interaction and engagement (Jiang et al., 2022). Asynchronous learning, with its flexible structure, allows students to engage with diverse input resources at their own pace and construct output through reflection and revision (Stein et al., 2009). Synchronous learning, by contrast, facilitates real-time oral communication, immediate feedback, and interaction that resembles face-to-face classroom communication (Hrastinski, 2008; Blake, 2011). While each mode brings pedagogical opportunities, students still struggle with sustaining motivation and engagement, particularly when instruction is misaligned with their psychological needs.

Self-Determination Theory (SDT) provides a powerful framework for understanding student motivation by focusing on basic psychological need satisfaction (BPNS): autonomy, competence, and relatedness (Ryan & Deci, 2017). When these needs are met, learners are more likely to experience autonomous motivation and sustained engagement. From a situational perspective, SDT is especially relevant for asynchronous and synchronous learning contexts, where differences in pacing, structure, and social interaction may differentially support or hinder these needs. While SDT has been applied in various online learning settings, research has rarely examined how need satisfaction functions specifically within online language learning. Although recent studies have proposed SDT-based design principles to improve motivational support in online environments (Martin et al., 2018; McEown & Oga-Baldwin, 2019; Jiang & Xie, 2022), there remains limited understanding of how the effects of autonomy, competence, and relatedness differ across asynchronous and synchronous modes and what challenges this poses to tailoring online instructional designs to better support learners' psychological needs in practice.

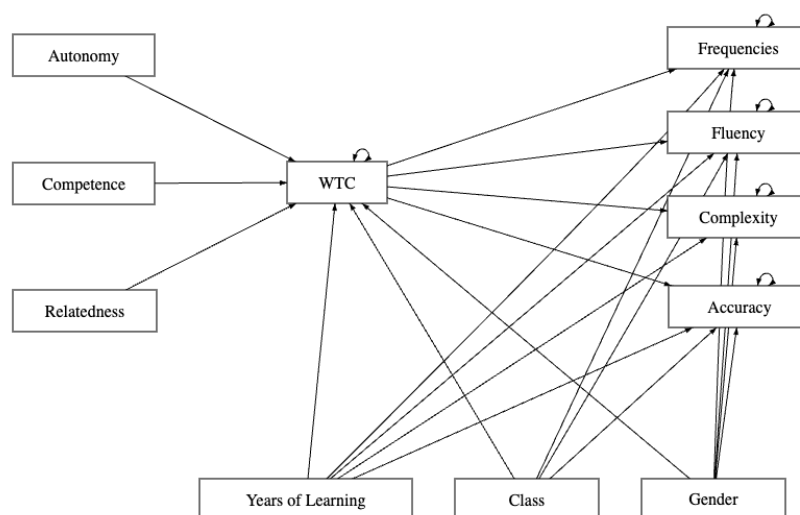
Willingness to Communicate (WTC) is another key construct for understanding language learning success. Defined as a learner's readiness to initiate communication when given the opportunity (MacIntyre, 2007), WTC has been consistently linked to language development, including both the quantity and quality of language use. Factors such as self-perceived competence, task value, and classroom climate have been shown to influence learners' WTC (Cao, 2013; Joe et al., 2017). However, most research on WTC has focused on traditional or general online settings, with limited attention to how it functions across different online learning modes. Even fewer studies have explicitly examined how psychological need satisfaction affects WTC in asynchronous and synchronous language learning environments. This gap limits our understanding of how motivational components shape learners' communicative behavior in online classrooms.

If these needs are supported differently in asynchronous and synchronous environments, they may trigger distinct patterns of willingness to communicate and, ultimately, different communicative behaviors. Investigating the distinctive role each BPNS plays can help inform mode-specific motivational design strategies that promote students' engagement and achievement in online learning. To address these gaps, the present study investigated how the satisfaction of autonomy, competence, and relatedness needs relates to learners' willingness to communicate and, in turn, how WTC influenced the quantity and quality of communication across asynchronous and synchronous online learning contexts. The study was guided by the research question: How do the relationships among basic

psychological need satisfaction, willingness to communicate, and communication outcomes differ across asynchronous and synchronous online learning modes (see Figure 1)?

**Figure 1**

*Models Tested for Multiple Group Comparison*



To address this, the following questions are examined: (a) How are autonomy, competence, and relatedness needs satisfaction associated with students' willingness to communicate? (b) How does willingness to communicate relate to the quantity of communication across learning modes, measured by the frequency of communication? (c) How does willingness to communicate relate to the quality of communication, measured by complexity, accuracy, and fluency (CAF)?

## Literature Review

### *Asynchronous and Synchronous Modes in Online Language Learning Environments*

Asynchronous learning has offered advantages in providing input-based language tasks (Li & Jiang, 2017; Tseng et al., 2016). Students can access the learning platform at their own pace and convenience and engage with a wide range of learning inputs through diverse multimedia resources while taking their time to process the information by reviewing materials, replaying videos and audios, and revisiting challenging topics. The extended engagement allows more opportunities for students to consolidate their understanding of the materials and internalize language content. The text-based format of online discussion boards also provides students with an opportunity to become more aware of their lexical and syntactic knowledge gaps when generating language output. As learners contemplate the content before posting their responses, they engage with the material at a deeper level that supports reflection on their own thoughts (Stein et al., 2009) and improvement of writing skills (Rigo & Mikuš, 2021; Saeed & Ghazali, 2017). While text-based communication is the most prevalent mode of asynchronous communication, audio-based discussion has also been implemented in practice, for example, social-media community group oral discussion (e.g., WeChat; see Wang et al., 2016), or oral discussion platforms (e.g., VoiceThread, see Sato et

al., 2017). Incorporating oral practice opportunities in asynchronous communication can balance the focus on different language skills. Moreover, the asynchronous nature allows students ample time to review instructions, organize their thoughts, and prepare materials before engaging in communication (Bailey et al., 2020; Payne & Whitney, 2002). This time flexibility and the ability to carefully craft responses can alleviate the immediate pressure of real-time interactions.

While asynchronous learning offers more flexibility, it also requires the learner to regulate their participation behaviors (Zhang et al., 2023). Students need to stay active to keep track of course progress. Insufficient real-time communication can be another frustrating factor for students who want to practice interpersonal communication in the target language (Rigo & Mikuš, 2021). Students may value an online language course less when they feel they have less opportunity to use the target language in real-time communication (Chism & Graff, 2020). Additionally, maintaining motivation to engage with course topics and content can be challenging without immediate feedback and support (White, 2017). The lack of real-time interaction and the potential delay in receiving guidance or assistance may require learners to be proactive in their learning journey.

Synchronous learning offers valuable social interactions and allows learners to negotiate meanings in the target language (Sauro, 2011). Joint attention to the communicative event in synchronous sessions has been identified as a key feature that enhances social presence in online learning environments and resembles traditional language practice (O'Rourke & Stickler, 2017). The immediacy of the synchronous session allows teachers to monitor the learning progress, identify areas of difficulty promptly and provide immediate support to address learners' needs (Perveen, 2016). In comparison to asynchronous learning, synchronous learning has demonstrated a higher level of language output from learners (Lamy & Hampel, 2007). Engaging in synchronous sessions allows students to interact with their peers more actively; they have the opportunity to observe other classmates' responses during the discussion, leading to higher motivation to engage in communication (Hrastinski, 2008).

Despite the increased quantity of target language output in synchronous sessions, concerns arise regarding the quality of interaction. Time constraints and the pressure to engage in rapid exchanges may lead students to prioritize fluency over accuracy (Lee, 2002). Differences in proficiency also affect learning experiences: students with higher proficiency levels tend to enjoy synchronous sessions more (Spring et al., 2019), while lower-proficiency learners may struggle to produce sufficient language output, resulting in limited interaction with shorter and simpler sentences (Lamy & Hampel, 2007). When students perceive their listening and speaking skills in the target language to be weak, they may feel less enthusiastic about participating in synchronous sessions (Perveen, 2016). The structured and less flexible nature of synchronous learning can also affect student satisfaction, especially if peer interaction is perceived as mandatory (Thurmond et al., 2002). When students feel pressured or perceive a threat to their self-image, their motivation to participate may decline (Le et al., 2018).

While synchronous and asynchronous learning modes differ in delivery, what remains consistent is the critical role of students' psychological states in shaping engagement. It is therefore essential for educators to create psychologically supportive learning environments that promote autonomy, reinforce competence, reduce perceived pressure or threat, and foster meaningful connections with others.

### ***The Roles of Basic Psychological Need Satisfaction in Online Learning Environments***

According to BPNS, learners who experience effective psychological support in the learning environment are more likely to become autonomous and demonstrate greater persistence in their activities (Ryan & Deci, 2017). In the context of language learning, autonomous learners will be “willing to use the new language to interact and learn without requiring constant effort from the teacher” (McEown & Oga-Baldwin, 2019, p. 1). When learners exhibit such autonomous behavior, they have the potential to achieve better learning outcomes (Comanaru & Noels, 2009; Ryan & Deci, 2017).

The need for autonomy, defined as a sense of choice and control, is essential for fostering student engagement. Language programs that emphasize autonomy are likely to promote the potential development of language competence (Reeve & Jang, 2006). When students feel that participation is driven by their own volition, they are more likely to engage willingly in the learning process (Xie, 2006). An autonomy-supportive environment nurtures willingness, allowing students to transform intention into active engagement, which in turn contributes to improved learning outcomes. Research suggests that such environments help students internalize their learning goals (Dincer et al., 2012), foster persistence (Noels, 2001), and encourage proactive use of diverse learning strategies and seeking assistance (Najeeb, 2013).

The need for competence encompasses students’ feelings of mastery and their perception of their own abilities. Students who feel more competent tend to be more self-determined (Noels, 2001). When the instructional environment is designed to support competence through clear goals, structured feedback, and tasks that align with students’ skill levels, it creates conditions where students feel capable of meeting learning challenges. When students perceive themselves as competent, they become more inclined to engage actively in language communication (Joe et al., 2017). Additionally, feeling competent motivates students to adopt effective language learning strategies to monitor their learning process (Mills et al., 2007). The competence-driven engagement contributes significantly to language proficiency. For instance, Tanaka (2017) found that students who felt competent in their language skills demonstrated greater vocabulary knowledge and a stronger interest in language learning overall.

The need for relatedness refers to feeling connected, supported, and valued by others. When learners feel welcomed within a learning community, they are more likely to develop a sense of belonging, which fosters their willingness to participate (Deci & Ryan, 2000). In online learning environments, relatedness can be fostered through meaningful interactions with teachers, peers, and native speakers. As learners strive to become members of a language community (Norton, 2001), their behaviors are often driven by a desire to connect and engage with others within that group. A study by Akbari et al. (2015), which examined online language learning on Facebook, revealed that a well-structured learning community enhances access to both peers and teachers while also providing opportunities to practice language with native speakers. This increased interaction strengthens learners’ sense of relatedness within the online environment, which, in turn, positively influences their autonomous regulation of behaviors.

People’s BPNS varies from task to task, day to day, and setting to setting. Research has investigated how individuals’ situational needs satisfaction fluctuates. For instance, an early study conducted by Reeve and Sickenius (1994) developed a nine-item short survey to measure ephemeral need satisfaction. It captures individuals’ satisfaction with their

psychological needs over a relatively short period of time when students were doing tasks. Participants engaged in various educational activities, such as solving spatial relations puzzles, and reported their feelings regarding the satisfaction of their needs during these tasks. Similarly, Ma (2009) examined the relationship between task motivation and need satisfaction among second language learners. The study highlighted the importance of considering need satisfaction at the task level, as it can differ from the more stable trait-like need satisfaction observed in general language learning. Specifically, tasks that provided encouraging feedback were associated with higher levels of autonomy and competence need satisfaction among the students. This temporal view has also been applied to the study of classroom environments to capture the nuanced relationship between different classroom setting variables and need satisfaction (Jang et al., 2016).

Since the dynamics of interaction differ between synchronous and asynchronous learning modes, the influence of each psychological need may also vary. Understanding the extent to which each need is satisfied is essential for explaining how students' experiences and outcomes are shaped across these distinct learning environments.

### ***BPNS and WTC in Online Learning Environments***

How to get language learners to talk in the target language has always been a challenge for language teachers in the classroom. Why do some learners participate, while others avoid communication in the classroom? Dörnyei (2005) used the expression “crossing the Rubicon” as a metaphor for learners' decision to communicate at the moment. This momentary choice reflects their WTC, a construct that captures learners' intention to use the target language in a given situation. Educators and researchers have thus become increasingly interested in identifying the factors that influence learners' willingness to communicate and in designing interventions that can support learners to “cross the Rubicon,” shifting from silence to speech, and ultimately improve their language learning performance. Understanding how WTC operates in real classroom contexts is therefore essential for promoting meaningful interaction and long-term language development.

WTC is a volitional construct that refers to an individual's readiness to engage in communication in a second language (L2) in a specific situation (MacIntyre, 2007); the key characteristic of WTC is whether the learner chooses to initiate communication when there is a choice. For example, MacIntyre et al. (2007) examined the differences between extroverts and introverts in terms of WTC and found that both types of students' WTC decreased when they were unable to choose the task they were most happy with. Moreover, even introverts were found to have a higher WTC than extroverts when given introvert-preferred tasks.

WTC is strongly related to students' perceived competence. It is more directly related to subjective self-evaluation of one's ability to communicate (Gregersen et al., 2014). In a meta-analysis conducted by Jin and Lee (2022), they confirmed that L2 competence was the most significant predictor of WTC. Lack of confidence in task performance has a detrimental effect on WTC (Cao & Philp, 2006). Kang (2005) suggested that after experiencing difficulties or problems, students may feel discouraged and thus become less willing to communicate. However, Eddy-U (2015) pointed out that extremely simple tasks could also be demotivating. Thus, students' perceived competence is influenced by the appropriateness of task difficulty; tasks that are neither too difficult nor too easy, are most likely to promote state WTC.

Researchers also found social factors in the classroom are significantly related to WTC. Support from teachers and peers has been found to positively be related to situational WTC. A low-threat positive classroom atmosphere is crucial to getting students to talk (Dewaele & Dewaele, 2018). Peng (2012) interviewed four Chinese university students six times over one and a half semesters and suggested that teacher support and immediacy behaviors seemed to facilitate state WTC in L2 classrooms. Cao (2013) found that peer support (e.g., classmates or group members who are cooperative) could also bring higher state WTC. Similarly, Joe et al. (2017) examined the social climate in the language classroom by testing classroom mutual respect, teacher academic support and teacher emotional support. The result showed that students' WTC was positively related to the positive social climate, and the relation was mediated by students' need satisfaction.

Studies have shown that WTC fluctuates based on classroom conditions and interactional opportunities, suggesting that its relationship with other constructs may vary across different environments. Although there is evidence linking WTC to BPNS, few studies have directly examined how each psychological need functions in relation to WTC, and the relationship between these constructs remains unknown in online language learning environments.

### ***Communication Quantity and Quality***

Communication quantity can be measured by the frequency of using the target language. Several studies have examined the relationship between WTC and the frequency of L2 use, highlighting a consistent trend in the field of second language acquisition. MacIntyre and Clément (1996) conducted a study in a monolingual Canadian context, revealing that motivation positively influenced WTC, which led to an increased frequency of L2 communication. Building on this, Clément et al. (2003) examined individual and contextual variables among Canadian university students, confirming that WTC significantly predicted the frequency of L2 use. Similarly, MacIntyre and Charos (1996) explored various factors impacting L2 communication and found that WTC, motivation, and perceived competence collectively influenced the frequency of L2 communication. Furthermore, studies conducted in Japan from Yashima et al. (2004) and Hashimoto (2002) provided further evidence that WTC shapes the frequency of L2 use inside and outside classrooms.

Communication quality can be evaluated through CAF measures, that is, complexity, accuracy, and fluency (Larsen-Freeman, 2006). CAF measures are performance indicators applied to second language (L2) oral and written production. Complexity refers to the extent to which language users produce sophisticated or elaborated structures and vocabulary (Wolfe-Quintero et al., 1998). Accuracy describes how much error-free production is made (Jiang et al, 2023; Jiang, 2013). Fluency refers to the production of language without undue pausing (Ellis & Barkuizen, 2005), characterized by the rapid production of language (Wolfe-Quintero, et al., 1998). Past studies have approached the examination of language learning performance from different perspectives, such as oral assessment (Buckingham & Alpaslan, 2017), and language accuracy and fluency (Yousefi & Ahmad Kasaian, 2014).

The relationship between L2 WTC and L2 achievement remains complex and less direct than often assumed. For example, Leeming et al. (2024) explored the role of WTC in a task-based learning environment, specifically focusing on its association with spoken language task production. Using structural equation modeling, Leeming and colleagues found that WTC not only directly predicted the quantity of words produced but also mediated the effect of students' perceived communicative competence on word output. Similarly, Yousefi

and Ahmad Kasaian (2014) found that learners with higher WTC displayed greater fluency and accuracy in their spoken language in the Iranian EFL context. However, in Kim et al.'s (2022) study in English training programs in Australia, though they found WTC directly influenced L2 contact frequency, it did not predict fluency improvements. Joe et al. (2017) also did not find a predictive relationship between general WTC and language achievement using final exam score as the outcome. One possible reason could be that the measurements for WTC and language performance were situated from different perspectives. Language performance was measured by in-class achievement and WTC instruments were focused on the general level of willingness to communicate with strangers, friends, and acquaintances. Thus, to capture the situational WTC in the classroom, the measurements targeting the classroom activities will be optimal. Previous studies show that WTC's impact on L2 learning outcomes is context-dependent and influenced by various factors. There remains a need for further research on how WTC shapes L2 use and learning outcomes in different contexts in online learning.

Based on the literature reviewed above, several key gaps emerge that this study aims to address. While research has established the importance of basic psychological need satisfaction in online learning and the role of WTC in language learning success, limited research has examined how these constructs interact specifically within different online language learning modes. The literature suggests that asynchronous and synchronous environments offer distinct affordances that may differentially support learners' psychological needs, yet empirical evidence comparing these relationships across modes remains scarce. Furthermore, while WTC has been linked to language learning outcomes, the specific pathways through which WTC influences both the quantity and quality of communication in online contexts require further investigation.

To address these gaps and test the theoretical model presented in Figure 1, this study examines the relationships among basic psychological need satisfaction, willingness to communicate, and communication outcomes across asynchronous and synchronous online language learning environments. Based on the theoretical foundations and empirical findings discussed above, the following hypotheses are proposed:

**H1.** Autonomy, competence, and relatedness need satisfaction are each positively associated with students' WTC in both asynchronous and synchronous learning modes.

**H2.** The strength of the associations between need satisfaction and WTC differs by learning mode:

- **H2a.** Competence need satisfaction has a consistent effect on WTC across both modes.
- **H2b.** Autonomy need satisfaction is more strongly associated with WTC in asynchronous learning.
- **H2c.** Relatedness need satisfaction is more strongly associated with WTC in synchronous learning.

**H3.** WTC is positively associated with both the quantity of communication (measured by frequency) and the quality of communication (measured by complexity, accuracy, and fluency) across both learning modes.

## Methods

### *Context*

The study was conducted in an online Chinese learning program for high school students, offered by a midwestern university in the United States. The program provided language courses ranging from novice to AP levels through Design2Learn. To earn credits, students were required to complete both asynchronous and synchronous learning tasks. The asynchronous assignments included review tasks for previously covered topics and preview tasks for upcoming topics. These assignments, often managed independently by students, typically involved activities to familiarize students with new content, check their understanding (e.g., using Quizlet flashcards), engage in interpretive communication (e.g., reading or listening exercises), and participate in presentational activities (e.g., writing). Most of the asynchronous assignments were writing-based, and students were expected to complete them by the end of each week. In the following week, students could sign up for 50-minute lab sessions conducted via Zoom, with a maximum of eight students per session. These synchronous activities aimed to enhance students' speaking skills through structured drills and meaningful communicative tasks. The sessions provided learners with opportunities to apply what they had learned in real-life contexts, reinforcing their oral proficiency.

### *Participants*

Study participants were recruited from all five levels of online classes, with class difficulty ranging from beginning classes to AP classes. A total of 104 students engaged in asynchronous learning, and 98 students participated in synchronous learning. While completion of both asynchronous and synchronous learning tasks was a course requirement, a number of students did not attend the synchronous sessions, resulting in a discrepancy in participant numbers between the two modes. The analytical sample for each time point ranged from 80–84 participants for asynchronous sessions and 79–80 participants for synchronous sessions, representing stable retention rates of 76.9%–80.8% and 80.6%–81.6% respectively.

Most participants were female, comprising 60% of the sample, while male students accounted for approximately 36% of the sample. The median age was 16 years, ranging from 11 years to 18 years. The majority of participants were between 15 and 17 years old (82.3%). Students had diverse prior experience in learning Chinese, with about 60% of participants reporting 0 to 4 years of learning, and approximately 29% having more than five years of Chinese learning experience.

### *Procedures*

The study employed Experience-Sampling Methods (ESM) to capture participants' experiences in the moment and in context (Csikszentmihalyi & Larson, 2014). ESM offers a significant advantage by providing enhanced ecological validity (Xie et al., 2023). It grants educational researchers access to real-time information, thereby reducing biases associated with one-shot questionnaires. By capturing the "present self," ESM enables students to reflect more accurately on their experiential feelings. Considering the study's specific focus on students' perceptions of specific learning events, the event-based sampling technique was chosen. In this study, the term "event" pertains to both asynchronous learning activities and synchronous learning activities. Data were collected across six time points over three content units, each consisting of one asynchronous and one synchronous learning session. Surveys were administered after students completed asynchronous assignments (typically due on



Sundays) and again after synchronous Zoom sessions. Each survey measured students' satisfaction of autonomy, competence, and relatedness needs, willingness to communicate, and frequency of language use. Performance data included weekly writing artifacts and oral scores from synchronous sessions.

## ***Measurements***

### Basic Psychological Need Satisfaction

Items assessing students' situational autonomy, competence, and relatedness needs were adapted from the Intrinsic Motivation Inventory (IMI; Deci et al., 1994) and the Activity-Feeling States Scale (AFS; Reeve & Sickenius, 1994). The IMI autonomy items, originally developed for computer-based tasks, captured perceptions of choice and volition. Three items were used, yielding a reliability ( $\omega$ ) of 0.65. To supplement this, AFS items were used to measure competence (e.g., "...competent," "...my skills are improving") and relatedness (e.g., "...I belong and the people here care about me"). Each subscale included three items rated on a 7-point Likert scale, with  $\omega = 0.90$  for competence and  $\omega = 0.82$  for relatedness.

### Willingness to Communicate

WTC was measured using nine items adapted from Peng and Woodrow (2010) to reflect situational WTC in online classroom contexts. The items assessed willingness to present, interact with peers, and communicate with teachers. Two additional items were created to capture teacher-student communication, a key feature of online learning. Responses were rated on a 7-point scale, and the scale demonstrated good reliability ( $\omega = 0.85$ ).

### Frequency of Communication

To assess the quantity of communication, students reported how frequently they used the target language during both asynchronous and synchronous learning activities. A self-report scale was developed, consisting of six items that asked students to estimate the percentage of time they engaged in communication with peers and instructors using the target language, ranging from 0% (never) to 100% (always). Items captured students' perceived engagement in a range of communicative behaviors, including participating in discussions, asking and answering questions, and initiating conversations.

### Asynchronous Performance (Writing—CAF)

Asynchronous performance was assessed using Complexity, Accuracy, and Fluency (CAF) measures. Students were asked to write a post in response to the given topic as the asynchronous assignments. Writing from discussion posts was segmented into T-units. A total of 3,032 T-units were analyzed.

Accuracy was calculated as the proportion of error-free T-units. Fluency was assessed by the total number of characters, and complexity was measured as the average T-unit length (Pan, 2018; Kussyk, 2017; Plakans et al., 2019). Standardized scores were calculated for asynchronous complexity and accuracy variables; fluency scores were log-transformed and used in the path analysis. See Appendix A for technical details.

### Synchronous Performance (Speaking – CAF)

To evaluate Chinese oral CAF in Zoom sessions, we followed the method proposed by Wang et al., (2018), which involved using the International English Language Testing System (IELTS) band descriptors for speaking. Among various language proficiency criteria (e.g., HSK, TOFEL), the IELTS descriptors were considered the most appropriate subjective measures for assessing oral proficiency in Chinese CAF, as they were the only CAF-focused measures. We adapted and simplified these descriptors into three dimensions to ensure consistency in the evaluation criteria during synchronous sessions. Teachers rated students' performance after each session. The "Fluency" dimension corresponded to the fluency and coherence category, the "Complexity" dimension aligned with the lexical resource and grammatical range, and the "Accuracy" dimension encompassed the measures of lexicogrammatical accuracy and pronunciation accuracy. Standardized scores were calculated for synchronous language performance variables and used in the path analysis.

### Covariates

Years of learning experience were included as a control variable in the path analyses, given their potential influence on students' communication behaviors and language performance. In addition, class-level comparisons using one-way ANOVA and Welch ANOVA revealed significant differences across psychological needs, WTC, and performance measures, with students in higher-level classes generally demonstrating stronger outcomes. Gender comparisons also showed that male and female students differed significantly in autonomy and competence satisfaction, WTC, and communication frequency. To account for these systematic differences, class level and gender were included as covariates in the model. While we acknowledge that developmental stage can influence language learning outcomes, the present study focused on high school students with a narrow age range. Age was not included as a covariate due to limited variability and lack of significant differences in preliminary analyses.

### ***Data Analysis Plan***

Multiple group path analyses were used to investigate the differences in the relationships between two modes of learning. Robust standard errors were used to account for the non-independence of repeated measures from the same participants. This estimator adjusts the standard errors and chi-square test statistics using a sandwich estimator when data deviate from normal distribution and have a nested structure. This approach handles the analyses of multiple groups simultaneously. The group variable of interest in the study refers to the learning mode, which is a categorical variable representing asynchronous learning and synchronous learning. By employing this method, this study investigated whether the proposed relationships were identical in asynchronous learning mode and synchronous learning mode. We first estimated a fully constrained model in which all parameters were constrained to be equal and proceeded with a fully unconstrained model in which all parameters were freely estimated. A Satorra-Bentler scaled (mean-adjusted) chi-square test ( $S-B\chi^2$ ) was conducted to determine if the unconstrained model fits the data better than the constrained model. The computation of  $S-B\chi^2$  incorporated a scaling correction for the  $\chi^2$  statistic (Satorra & Bentler, 2010).  $S-B\chi^2$  is a robust test statistic for assessing mean and covariance structure models across different distributions and sample sizes. If the  $S-B\chi^2$  test is found to be significant, it indicates that there is a significant difference between the

unconstrained model and the constrained model, suggesting that the unconstrained model fits the data better and captures the relationships among the variables.

Model fit was assessed using several indices. A non-significant model chi-square test indicates good fit. RMSEA values between 0.05–0.08 suggest reasonable fit, and values below 0.05 indicate good fit (Browne & Cudeck, 1992). CFI values above 0.95 are considered good, with 0.90–0.95 being acceptable (Hu & Bentler, 1999). TLI values above 0.95 indicate acceptable fit, and above 0.97 indicate good fit (Schermelleh-Engel et al., 2003). SRMR values below 0.08 suggest good fit, while values above 0.10 indicate poor fit (Schermelleh-Engel et al., 2003).

## Results

### *Descriptive Statistics*

The following table lists the descriptive statistics for the observations in asynchronous learning and synchronous learning. For need satisfaction, WTC, and communication frequency questions. 246 observations were collected during asynchronous learning while 239 observations were collected in synchronous learning. In general, participants reported moderate to high levels of need satisfaction and willingness to communicate in both asynchronous and synchronous learning modes. Although the mean scores of each type of need satisfaction and WTC were higher in asynchronous learning compared to synchronous learning, t-tests did not reveal any statistically significant differences between the two learning modes. Participants in the asynchronous learning mode demonstrated a wide range of fluency scores. To reduce the impact of extreme values, scores were log-transformed using the natural logarithm.

For variables collected through the survey, the number of observations in synchronous sessions were slightly lower compared to the asynchronous session, but the missing rate is negligible (Schafer, 1999), which is 0.2%; Missing data for asynchronous learning writing and synchronous learning speaking scores occurred because some students did not complete the assignment or attend the lab sessions, resulting in the absence of the scores. The missing rate of writing scores and speaking scores was not substantial, which were 22% and 13%, respectively. To minimize potential bias resulting from missing data, we used Full Information Maximum Likelihood (FIML) estimation in the path analysis, which incorporates all available information from the observed data to estimate the statistical model instead of excluding cases with missing data.

**Table 1**

### *Descriptive Statistics for Variables*

| Variable Names      | <i>N</i> | Mean   | <i>SD</i> | Min  | Max  | Skewness | Kurtosis |
|---------------------|----------|--------|-----------|------|------|----------|----------|
| <b>Asynchronous</b> |          |        |           |      |      |          |          |
| Autonomy            | 246      | 4.37   | 1.11      | 1.33 | 6.67 | -.22     | 2.54     |
| Competence          | 246      | 4.92   | 1.17      | 1    | 7    | -.87     | 3.72     |
| Relatedness         | 246      | 4.31   | 1.29      | 1    | 7    | -.13     | 2.81     |
| WTC                 | 246      | 4.67   | 1         | 1.67 | 7    | -.25     | 2.95     |
| Frequency           | 246      | 60.03  | 23.9      | 3.33 | 100  | -.24     | 2.15     |
| Fluency             | 191      | 146.07 | 125.47    | 14   | 482  | 1.08     | 2.77     |

|                           |     |       |       |      |       |       |      |
|---------------------------|-----|-------|-------|------|-------|-------|------|
| Fluency - Log Transformed | 191 | 4.63  | .85   | 2.64 | 6.18  | .16   | 2.11 |
| Complexity                | 191 | 8.79  | 2.24  | 4    | 15.23 | .29   | 2.48 |
| Accuracy                  | 191 | .77   | .2    | 0    | 1     | -1.28 | 5.35 |
| <b>Synchronous</b>        |     |       |       |      |       |       |      |
| Autonomy                  | 239 | 4.28  | 1.1   | 1    | 7     | 1.2   | .04  |
| Competence                | 239 | 4.81  | 1.19  | 1    | 7     | -.84  | 3.81 |
| Relatedness               | 239 | 4.26  | 1.37  | 1    | 7     | 1.87  | -.04 |
| WTC                       | 239 | 4.62  | 1.04  | 1.44 | 6.89  | -.5   | 3    |
| Frequency                 | 239 | 60.38 | 24.96 | 0    | 100   | -.23  | 2.14 |
| Fluency                   | 207 | 4.1   | .83   | 2    | 5     | -.65  | 2.8  |
| Complexity                | 207 | 3.55  | 1.15  | 1    | 5     | -.16  | 1.74 |
| Accuracy                  | 207 | 3.99  | .9    | 1    | 5     | -.67  | 2.93 |

The correlations of the variables were summarized in Table 2. The correlations in two learning modes exhibited the same pattern. WTC, all need satisfaction variables, and frequency of communication were positively correlated with each other. Fluency and complexity were positively correlated with WTC. Accuracy was only found to be correlated with WTC in synchronous sessions.

**Table 2**

*Correlations of Study Variables*

|              |                      | 1     | 2     | 3     | 4       | 5       | 6      | 7      | 8     | 9      | 10  | 11 |
|--------------|----------------------|-------|-------|-------|---------|---------|--------|--------|-------|--------|-----|----|
| Asynchronous | 1. Autonomy          | -     |       |       |         |         |        |        |       |        |     |    |
|              | 2. Competence        | .45** | -     |       |         |         |        |        |       |        |     |    |
|              | 3. Relatedness       | .43** | .34** | -     |         |         |        |        |       |        |     |    |
|              | 4. WTC               | .52** | .64** | .58** | -       |         |        |        |       |        |     |    |
|              | 5. Frequency         | .49** | .47** | .43** | .69**   | -       |        |        |       |        |     |    |
|              | 6. Fluency           | -.03  | .16*  | .08   | .17*    | .23**   | -      |        |       |        |     |    |
|              | 7. Complexity        | 0     | .20** | .09   | .16*    | .23**   | .64**  | -      |       |        |     |    |
|              | 8. Accuracy          | -.1   | .03   | -.04  | -.07    | -.13    | .03    | -.03   | -     |        |     |    |
|              | 9. Years of Learning | -.08  | .13*  | -.04  | .01     | .10     | .47*** | .42*** | 0.2   | -      |     |    |
|              | 10. Class Level      | -.13* | .13*  | -.04  | .13*    | .19**   | .84*** | .65*** | .10   | .61*** | -   |    |
|              | 11. Gender (Female)  | -.12  | -     | -.11  | -.27*** | -.29*** | -.03   | -.05   | .18*  | .18**  | 0   | -  |
|              |                      | 1     | 2     | 3     | 4       | 5       | 6      | 7      | 8     | 9      | 10  | 11 |
| Synchronous  | 1. Autonomy          | -     |       |       |         |         |        |        |       |        |     |    |
|              | 2. Competence        | .36** | -     |       |         |         |        |        |       |        |     |    |
|              | 3. Relatedness       | .49** | .38** | -     |         |         |        |        |       |        |     |    |
|              | 4. WTC               | .48** | .59** | .62** | -       |         |        |        |       |        |     |    |
|              | 5. Frequency         | .44** | .48** | .46** | .66**   | -       |        |        |       |        |     |    |
|              | 6. Fluency           | .06   | .13   | .00   | .16*    | .24**   | -      |        |       |        |     |    |
|              | 7. Complexity        | -.07  | .15*  | -.06  | .20**   | .28**   | .59**  | -      |       |        |     |    |
|              | 8. Accuracy          | .09   | .19** | .03   | .20**   | .30**   | .67**  | .43**  | -     |        |     |    |
|              | 9. Years of Learning | -.14* | .09   | -.12  | -.01    | .12     | .36*** | .60*** | .28** | -      |     |    |
|              | 10. Class Level      | -.10  | .08   | -.10  | .09     | .19**   | .41*** | .83*** | .26** | .61*** | -   |    |
|              | 11. Gender (Female)  | -.14* | -.13* | -.07  | -.26*** | -.29*** | -.01   | -.02   | -.12  | -.19** | .00 | -  |

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

### Model Selection

The comparison showed that the unconstrained model (in which all paths were freely estimated) exhibited a better fit to the data compared to the fully constrained model (in which all structural paths were set to be equal across the two modes). The fully constrained model did not fit the data well, with undesired values of all index measures (see Table 2). As for the unconstrained model, the fit indices provided evidence of a good model fit, with the CFI indicating a satisfactory fit. The RMSEA suggested an acceptable fit, and the SRMR indicated a good fit. Although the chi-square test remained significant, it is important to note that the chi-square test is sensitive to sample size. Therefore, the overall fit indices suggested that the unconstrained model can better capture the complex dynamics of the relationship among the variables.

**Table 3**

*The Fit Indices and the Satorra-Bentler  $\chi^2$  Difference Test for Model Comparison*

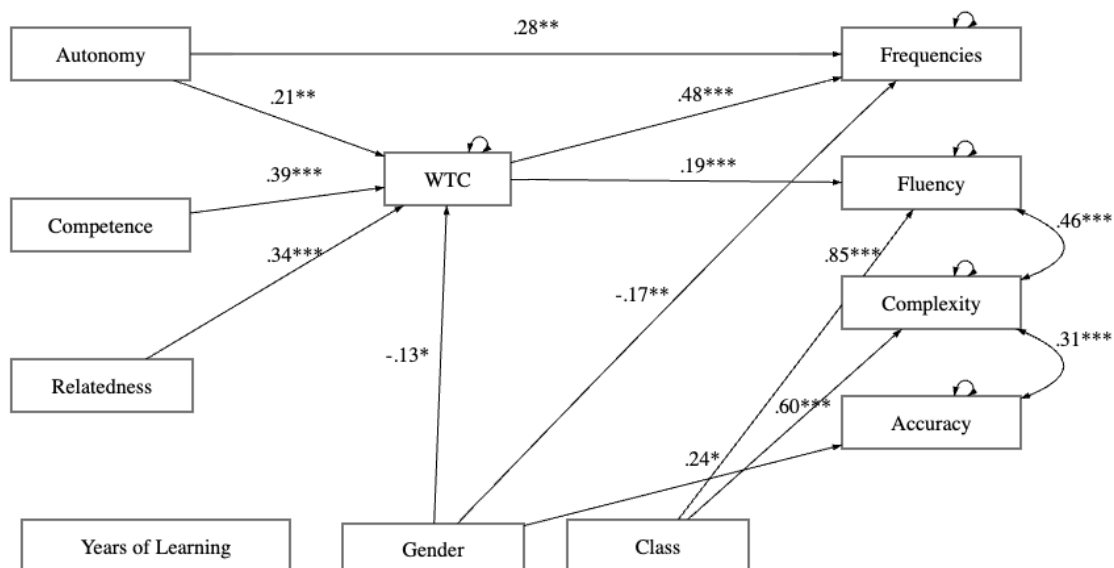
| Model                          | $\chi^2$<br>(df, p-value) | CFI | TLI | RMSEA | SRMR | Satorra-Bentler $\chi^2$<br>Difference Test<br>(df, p-value) |
|--------------------------------|---------------------------|-----|-----|-------|------|--------------------------------------------------------------|
| Fully Constrained<br>Model (1) | 238.274<br>(58, <.001)    | .79 | .71 | .12   | .14  |                                                              |
| The Unconstrained<br>Model (2) | 60.316<br>(24, <.001)     | .96 | .86 | .08   | .04  |                                                              |
| 1 vs. 2                        |                           |     |     |       |      | 187.89<br>(34, <.001)                                        |

Based on the modification suggestions provided in the Mplus output, a path from autonomy need to frequency of communication was added to the model. When students felt their autonomy need was respected and supported, they experienced a sense of freedom to express themselves and perceived having choices in determining their participation. This autonomy and perceived control allowed them to take ownership of their communication behaviors. As a result, they participated more frequently in communication activities. After incorporating the path from autonomy need to frequency of communication, the model demonstrated a satisfactory fit to the data:  $\chi^2$  (22, 434) = 25.694,  $p$  = .26, RMSEA = .03, CFI = 1, TLI = .99, SRMR = .03.

The model results were presented in Figure 2 and Figure 3. Both figures presented the standardized coefficients. Only significant paths were included in the figure to ensure a clear presentation. The standardized coefficients were also presented in Table 4.

**Figure 2**

*Standardized Path Coefficients of the Final Model for Asynchronous Learning Mode*

**Figure 3**

*Standardized Path Coefficients of the Final Model for Synchronous Learning Mode*

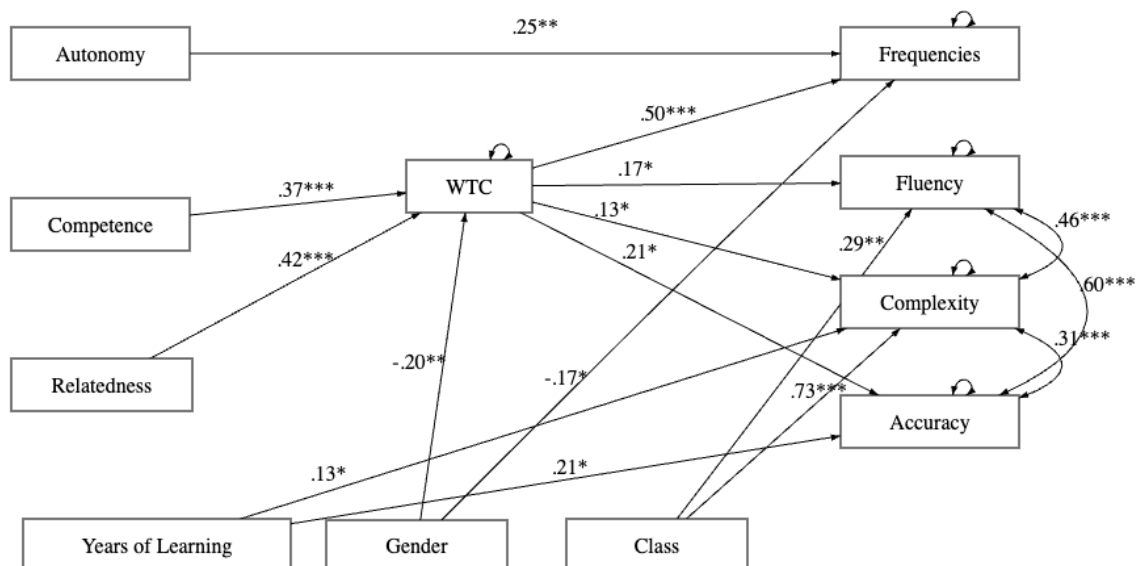


**Table 4***Summary of Path Coefficients Among Variables between Modes*

| Standardized Paths |   |            | Asynchronous |     |       | Synchronous |     |       |
|--------------------|---|------------|--------------|-----|-------|-------------|-----|-------|
|                    |   |            | $\beta$      | SE  | p     | $\beta$     | SE  | p     |
| Autonomy           | → | WTC        | .21**        | .07 | 0.003 | .12         | .08 | .140  |
|                    |   | Frequency  | .28**        | .08 | 0.001 | .25**       | .09 | .005  |
| Competence         | → | WTC        | .39***       | .07 | <.001 | .37***      | .08 | <.001 |
| Relatedness        | → | WTC        | .34***       | .08 | <.001 | .42***      | .10 | <.001 |
| WTC                | → | Accuracy   | -.03         | .09 | 0.718 | .21**       | .08 | .013  |
|                    |   | Complexity | .10          | .08 | 0.218 | .13*        | .07 | .045  |
|                    |   | Fluency    | .19***       | .05 | <.001 | .17*        | .09 | .049  |
|                    |   | Frequency  | .48***       | .09 | <.001 | .50***      | .09 | <.001 |
| Class              | → | WTC        | .12          | .07 | 0.086 | .09         | .07 | .196  |
|                    |   | Accuracy   | .03          | .10 | 0.783 | .10         | .11 | .359  |
|                    |   | Complexity | .60***       | .07 | <.001 | .73***      | .05 | <.001 |
|                    |   | Fluency    | .85***       | .05 | <.001 | .29**       | .11 | .005  |
|                    |   | Frequency  | .08          | .06 | 0.179 | .06         | .08 | .487  |
| Gender             | → | WTC        | -.13*        | .06 | 0.047 | -.20**      | .06 | .002  |
|                    |   | Accuracy   | .24*         | .10 | 0.022 | -.07        | .09 | .489  |
|                    |   | Complexity | .05          | .06 | 0.381 | .00         | .06 | .980  |
|                    |   | Fluency    | .11          | .06 | 0.071 | .02         | .09 | .835  |
|                    |   | Frequency  | -.17**       | .07 | 0.009 | -.17*       | .07 | .011  |
| Years of Learning  | → | WTC        | -.05         | .06 | 0.395 | .01         | .07 | .929  |
|                    |   | Accuracy   | .11          | .08 | 0.155 | .21*        | .10 | .041  |
|                    |   | Complexity | .06          | .07 | 0.374 | .13*        | .05 | .017  |
|                    |   | Fluency    | -.09         | .07 | 0.193 | .14         | .10 | .174  |
|                    |   | Frequency  | .10          | .08 | 0.197 | .15         | .09 | .073  |

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ 

The hypothesis H1 proposed that all types of need satisfaction are positively related to WTC in both learning modes. The findings did not fully support H1. Controlling for students' gender, class levels, and years of learning experience, while both competence need satisfaction and relatedness need satisfaction were found to be significantly related to willingness to communicate, the significant relationship between autonomy need satisfaction and WTC was only found in asynchronous learning mode.

However, the findings provided substantial evidence for H2 hypothesis, in which the effect of need satisfaction on WTC was assumed to vary across learning modes. Competence showed similar effects in both modes, while autonomy had a stronger relationship with WTC in asynchronous learning. In contrast, relatedness showed a slightly stronger relationship with WTC in synchronous sessions.

According to the results, one unit increase in autonomy need satisfaction in asynchronous learning mode yielded a .21 increase in the WTC level,  $p = .003$ . The relationships between competence need satisfaction and WTC were very similar in asynchronous learning ( $\beta = .39$ ,  $p < .001$ ) and synchronous learning ( $\beta = .37$ ,  $p < .001$ ). The relationship between relatedness need satisfaction and WTC was relatively higher in

synchronous learning ( $\beta = .42, p < .001$ ) as compared to asynchronous learning ( $\beta = .34, p < .001$ ).

H3 hypothesis suggesting associations between WTC and communication quantity and quality was partially supported. WTC showed a positive relationship with communication participation frequency in two learning modes, with comparable effects observed in asynchronous mode ( $\beta = .48, p < .001$ ) and synchronous mode ( $\beta = .50, p < .001$ ), though the coefficient observed in synchronous learning was slightly stronger.

Similarly, WTC was also positively related to the fluency of language performance in both learning modes. A stronger relationship was observed in asynchronous learning ( $\beta = .19, p < .001$ ) than in synchronous learning ( $\beta = .17, p = .049$ ). However, significant associations between complexity and accuracy and WTC were only found in synchronous learning mode ( $\beta = .13, p = .045$ ;  $\beta = .21, p = .013$ ).

Although there was no hypothesis involving the relationship between autonomy need satisfaction and communication frequency, autonomy need satisfaction was found to be associated with communication frequency in both asynchronous learning ( $\beta = .28, p = .001$ ), and synchronous learning ( $\beta = .25, p = .005$ ).

In addition, the control variables (gender, years of learning, and class levels) were found to have different relationships in different learning modes. In both asynchronous learning and synchronous learning, gender was related to frequency of communication. Female students showed lower communication frequency than male students in both asynchronous ( $p = .009$ ) and synchronous learning ( $p = .011$ ), and lower WTC in both modes (asynchronous:  $p = .047$ ; synchronous:  $p = .002$ ). Female students also demonstrated higher accuracy in asynchronous learning ( $p = .022$ ). Class levels were significantly related to language fluency and complexity in both modes, but the relationship was not observed with accuracy. In asynchronous learning, as the class level increased, students' language complexity ( $\beta = .60, p < .001$ ) and fluency ( $\beta = .85, p < .001$ ) tended to increase. Similarly, higher class levels were associated with increased scores in complexity ( $\beta = .73, p < .001$ ) and fluency ( $\beta = .29, p = .005$ ) in synchronous learning. Years of learning was positively related to complexity ( $\beta = .13, p = .017$ ) and accuracy ( $\beta = .21, p = .041$ ) in synchronous learning mode. But it was found to have no significant relationship with language performance in asynchronous learning when controlling for all other effects in the model.

## Discussion

### *Same Relationship Patterns in Asynchronous and Synchronous Learning*

The findings align with previous studies emphasizing the importance of creating a motivational environment to support students' psychological needs in online learning (Jiang & Xie, 2022; Martin et al., 2018). The correlational results confirm that a positive relationship between all BPNS and WTC existed in both modes, suggesting the consistent important role of need satisfaction in promoting language engagement.

The present study also revealed several common findings regarding the relationships between the variables in both asynchronous and synchronous learning modes. Firstly, competence and relatedness were consistently found to be significantly related to WTC in both modes. Students who reported higher levels of competence and a sense of connection with others were more willing to engage in communication activities. This suggests that



fostering students' perceived competence and creating a supportive social environment are crucial factors in promoting WTC, regardless of the learning mode (Shi et al., 2023). The findings further underscore the consistent roles of these needs in influencing WTC in two modes of learning.

This finding is consistent with research on WTC in traditional classrooms. Learners who perceive themselves as competent and feel connected with others or local communities are more likely to seek opportunities for language practice and initiate conversations instead of waiting for someone to start conversations (MacIntyre et al., 1999; Yashima, 2002). It should be noted that competence need satisfaction refers to the perception of whether one's abilities are satisfied by the environment. An individual who was a capable communicator does not always perceive their needs were satisfied. While they possess necessary skills to complete tasks, their subjective evaluation of their competence need could be affected by the online environmental affordances. When competence need are thwarted, they may feel reluctant to engage in communication. Instructors would need to consider individual differences in competence levels and design tasks that provide opportunities for individuals to experience success and stimulate communication intentions. The stronger relationship between relatedness and WTC observed in synchronous sessions could be related to the unique characteristics of synchronous sessions. In previous research, it has been shown that social presence and immediacy foster engagement (Bowers & Kumar, 2015). With synchronous sessions, students can interact and receive feedback in real-time, which promotes a stronger sense of connection with the instructor and among students.

Moreover, the relationship between WTC and communication frequency, WTC and fluency of communication were consistent in both learning modes. This further highlighted the significance of fostering WTC as a vital component of language learning development in an online learning context. Studies have consistently demonstrated the positive relationship between WTC and frequency of communication (e.g., McCroskey & Charos (1996)). In asynchronous sessions, learners with high WTC tend to make more discussion posts, post questions and comments, and share relevant resources. In synchronous sessions, the positive relationship can be observed through active participation in responding to teachers' questions, sharing their opinions, and engaging in group discussions.

### ***Unique Relationship Patterns in Asynchronous and Synchronous Learning***

A key finding of this study is the differential role of autonomy need satisfaction in relation to WTC across learning modes. Autonomy was significantly associated with WTC in asynchronous learning, but not in synchronous settings. This aligns with the nature of asynchronous learning, where learners have greater control over their pace and participation, allowing for more individualized engagement and decision-making (Moore, 2019). In contrast, the synchronous environment in this study was highly structured and teacher-led, limiting students' opportunities to exercise autonomy. Real-time interactions, limited speaking opportunities due to class size, and the presence of an authoritative instructor may have constrained learners' sense of agency, weakening the autonomy -WTC link.

The association between WTC and language performance also varied by mode. In asynchronous learning, WTC was related only to fluency, while in synchronous settings, WTC correlated with fluency, complexity, and accuracy. Task type also appeared to mediate the WTC - performance relationship. The use of creative tasks and rehearsal tasks can lead to variations in language performance outcomes (Wright, 2020). Synchronous learning may have provided more opportunities for holistic language development, likely due to its

interactive and feedback-rich nature. The structured tasks in synchronous classes, such as guided sentence construction and example-based responses, gave students immediate support and clearer targets, contributing to better performance outcomes (Buckingham & Alpaslan, 2017). Moreover, the interactive nature of synchronous sessions encouraged students with higher WTC to actively participate, dominate discussions, and take advantage of authentic communication moments. These experiences offered more opportunities for elaboration and real-time feedback, fostering greater accuracy and complexity.

In contrast, asynchronous tasks in our context focused on semi-creative writing. Although students were encouraged to generate original content, the lack of immediate feedback may have limited opportunities for refining language structures. Learners were less likely to restructure their interlanguage systems without direct interaction or correction, which is necessary for sustained development of linguistic complexity (Hsu, 2016).

## Implications

From a practical standpoint, the findings of this study can inform instructional practices aimed at promoting students' needs satisfaction and enhancing their engagement in language learning. Instructional design should consider aspects that satisfy learners' needs.

Autonomy need satisfaction plays a more influential role in fostering willingness to communicate in asynchronous learning, as the self-paced nature of this mode allows learners to have greater control over their learning process. This finding is particularly relevant for adolescent learners, who are developing independence and benefit from autonomy-supportive environments that sustain their engagement over time (Jang et al., 2016). Instructors should consider creating a supportive environment that balances learner autonomy with guidance and structure. Instructors can limit task imposition and provide choices and flexible options for learning activities, which allow learners to have a sense of ownership and agency in their learning journey (Jiang & Xie, 2022; Martin et al., 2018). Additionally, instructors should emphasize the learners' perspective by highlighting the relevance and meaningfulness of the activities to their individual goals and interests.

To enhance competence support and promote effective language communication, it is recommended to provide structural guidance with optimal challenges, and personalized feedback (White et al., 2021). In asynchronous learning, instructors can design structural practices that make input comprehensible to learners. This can be achieved through clear instructions, visual aids, and scaffolded learning materials. Breaking down complex tasks into manageable steps can help learners retrieve information and understand the input more effectively. In synchronous learning, it is beneficial to design communicative activities that gradually progress from meaning-based activities to fully communicative activities using task-based language learning approaches in adolescent language classrooms (Jiang et al., 2022; Lai et al., 2011; Tseng et al., 2016). This step-by-step approach allows students to build up their language skills and confidence in a supportive environment. Starting with activities that focus on understanding and expressing meaning, such as discussions or role-plays, and gradually moving towards more authentic communicative tasks can help learners develop their speaking and listening abilities.

To support the relatedness need, it is important to provide sufficient opportunities for interactions while also establishing a caring environment. The need for connection is especially pronounced among adolescent learners, who are at a developmental stage where social relationships significantly influence their willingness to participate in academic

activities (Balfanz, 2023). This is particularly important in synchronous learning environments where learners are required to interact with teachers to practice their oral skills. However, it is important to acknowledge that learners may experience anxiety when speaking in a foreign language. Therefore, creating a risk-free environment is key to encouraging learners to actively participate and speak (van der Zwaard & Bannink, 2014). This can be achieved through various strategies, such as fostering a supportive and non-judgmental atmosphere, providing constructive feedback, and offering encouragement and praise for learners' efforts.

## **Limitations**

Several limitations should be considered when interpreting these findings. First, this study employed a correlational design using survey data and performance measures, which limits our ability to establish causal relationships between psychological need satisfaction, WTC, and communication outcomes. Moreover, we employed ESM with self-report surveys, attrition rates affected our sample across the six time points, with some participants missing data due to non-completion of assignments or absence from sessions.

Second, our sample consisted entirely of adolescent learners in high school program. Adolescents may experience psychological needs and communication patterns differently than learners at other ages due to developmental and social factors, thus, findings may not generalize to young or adult language learning contexts.

Third, the study focused specifically on Chinese language learning, which presents unique challenges with character-based writing and tonal pronunciation. Results may differ for other language learning contexts, particularly those more linguistically similar to learners' first language.

Fourth, our findings emerge from a specific online program structure with particular teaching approaches and technological platforms. Different instructional settings may yield different patterns. Future research should examine similar models in varied instructional environments and with more diverse student samples to enhance the generalizability and applicability of the findings.

## **Conclusion**

This study investigated how the satisfaction of basic psychological needs (autonomy, competence, and relatedness) relates to students' WTC and how WTC, in turn, predicts the quantity and quality of communication across asynchronous and synchronous learning modes. It not only further confirms the state-like nature of situational need satisfaction and WTC, but also discovers the specific role that need satisfaction plays in various learning mode in relation to WTC. The results highlight that while competence and relatedness consistently support WTC across both learning contexts, autonomy exerts a stronger influence in asynchronous settings where learners exercise greater control over participation. Moreover, WTC was a significant predictor of communication frequency and fluency in both modes, but its association with complexity and accuracy emerged only in synchronous sessions. The results contribute to the existing theoretical knowledge by highlighting the importance of considering the specific context and circumstances in which needs satisfaction operates.

## **Declarations**

The authors declare no conflicts of interest. The authors declare no funding for this research. Permission to collect data from human subjects was granted by the Institutional Review Board (IRB) at The Ohio State University, USA.

## References

- Akbari, E., Pilot, A., & Robert-Jan Simons, P. (2015). Autonomy, competence, and relatedness in foreign language learning through Facebook. *Computers in Human Behavior*, 48, 126–134. <https://doi.org/10.1016/j.chb.2015.01.036>
- Bailey, D., Almusharraf, N., & Hatcher, R. (2020). Finding satisfaction: Intrinsic motivation for synchronous and asynchronous communication in the online language learning context. *Education and Information Technologies*, 1–21. <https://doi.org/10/gh6mnr>
- Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S. L. (2009). Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education*, 12(1), 1–6.
- Balfanz, R. (2023). Centering school connectedness. *State Education Standard*, 23(3), 13–17.
- Blake, R. J. (2011). Current trends in online language learning. *Annual Review of Applied Linguistics*, 31, 19–35. <https://doi.org/10.1017/S026719051100002X>
- Bowers, J., & Kumar, P. (2015). Students' perceptions of teaching and social presence: A comparative analysis of face-to-face and online learning environments. *International Journal of Web-Based Learning and Teaching Technologies (IJWLTT)*, 10(1), 27–44. <https://doi.org/10/d83r>
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, 21(2), 230–258. <https://doi.org/10/dbn>
- Buckingham, L., & Alpaslan, R. S. (2017). Promoting speaking proficiency and willingness to communicate in Turkish young learners of English through asynchronous computer-mediated practice. *System*, 65, 25–37. <https://doi.org/10/f94tjh>
- Cao, Y., & Philp, J. (2006). Interactional context and willingness to communicate: A comparison of behavior in whole class, group and dyadic interaction. *System*, 34(4), 480–493. <https://doi.org/10/dfz9bq>
- Cao, Y. (2013). Exploring dynamism in willingness to communicate: A longitudinal case study. *Australian Review of Applied Linguistics*, 36(2), 160–176. <https://doi.org/10/gj4p5h>
- Chism, R. L., & Graff, C. (2020). The impact of online lower-level courses on world language learners' self-perceptions, mindset and willingness to communicate. In M. R. Freiermuth & N. Zarrinabadi (Eds.), *Technology and the psychology of second language learners and users* (pp. 543–569). Springer International Publishing. [https://doi.org/10.1007/978-3-030-34212-8\\_21](https://doi.org/10.1007/978-3-030-34212-8_21)
- Clément, R., Baker, S., & Macintyre, P. (2003). Willingness to communicate in a Second Language: The effects of context, norms, and vitality. *Journal of Language and Social Psychology*, 22, 190–209. <https://doi.org/10.1177/0261927X03022002003>
- Comanaru, R., & Noels, K. A. (2009). Self-determination, motivation, and the learning of Chinese as a heritage language. *Canadian Modern Language Review*, 66(1), 131–158.

- Csikszentmihalyi, M., & Larson, R. (2014). *Flow and the foundations of positive psychology*. Springer.
- Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, 62(1), 119–142. <https://doi.org/10.1111/j.1467-6494.1994.tb00797.x>
- Dewaele, J.-M., & Dewaele, L. (2018). Learner-internal and learner-external predictors of willingness to communicate in the FL classroom. *Journal of the European Second Language Association*, 2(1), 24-37. <https://doi.org/10.22599/jesla.37>
- Dincer, A., Yesilyurt, S., & Takkac, M. (2012). The effects of autonomy-supportive climates on EFL Learner's engagement, achievement and competence in English speaking classrooms. *Procedia - Social and Behavioral Sciences*, 46, 3890–3894. <https://doi.org/10.1016/j.sbspro.2012.06.167>
- Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Routledge. <https://doi.org/10.4324/9781410613349>
- Eddy-U, M. (2015). Motivation for participation or non-participation in group tasks: A dynamic systems model of task-situated willingness to communicate. *System*, 50, 43–55. <https://doi.org/10.1016/j.system.2015.03.005>
- Ellis, R., & Barkhuizen, G. (2005). *Analysing learner language*. Oxford University Press.
- Gregersen, T., Macintyre, P. D., & Meza, M. D. (2014). The motion of emotion: Idiodynamic case studies of learners' foreign language anxiety. *The Modern Language Journal*, 98(2), 574–588. <https://doi.org/10/f54vb3>
- Hashimoto, Y. (2002). Motivation and willingness to communicate as predictors of reported L2 use: The Japanese ESL context. *Second Language Studies*, 20 (2), 29-70.
- Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Quarterly*, 31(4), 51–55.
- Hsu, H.-C. (2016). Voice blogging and L2 speaking performance. *Computer Assisted Language Learning*, 29(5), 968–983. <https://doi.org/10.1080/09588221.2015.1113185>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10/dbt>
- Jang, H., Kim, E. J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction*, 43, 27–38. <https://doi.org/10.1016/j.learninstruc.2016.01.002>
- Jiang, W. (2013). Measurements of development in L2 written production: The case of L2 Chinese. *Applied Linguistics*, 34(1), 1–24. <https://doi.org/10/f4nt27>

- Jiang, Z., Akinkuolie, B., Huang, L., & Xie, K. (2022). Designing group tasks in online Task-Based Language Teaching environments: A systematic review. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, 12(1), 1–23.
- Jiang, Z., & Xie, K. (2022). Motivating online language learners: From theory to design strategies. *Journal of Technology and Chinese Language Teaching*, 13(1), 1–25.
- Jiang, Z., Xu, Z., Pan, Z., He, J., & Xie, K. (2023). Exploring the role of artificial intelligence in facilitating assessment of writing performance in second language learning. *Languages*, 8(4), 247.
- Jin, S., & Lee, H. (2022). Willingness to communicate and its high-evidence factors: A meta-analytic structural equation modeling approach. *Journal of Language and Social Psychology*, 41(6), 716–745. <https://doi.org/10.1177/0261927X221092098>
- Joe, H.-K., Hiver, P., & Al-Hoorie, A. H. (2017). Classroom social climate, self-determined motivation, willingness to communicate, and achievement: A study of structural relationships in instructed second language settings. *Learning and Individual Differences*, 53, 133–144. <https://doi.org/10.1016/j.lindif.2016.11.005>
- Kang, S.-J. (2005). Dynamic emergence of situational willingness to communicate in a second language. *System*, 33(2), 277–292. <https://doi.org/10.1016/j.system.2004.10.004>
- Kim, J., Zhao, H., & Diskin-Holdaway, C. (2022). Willingness to communicate and second language fluency: Korean-speaking short-term sojourners in Australia. *Languages*, 7(2), 112. <https://doi.org/10.3390/languages7020112>
- Kusyk, M. (2017). The development of complexity, accuracy and fluency in L2 written production through informal participation in online activities. *CALICO Journal*, 34(1), 75–96. <https://doi.org/10/gjzrrf>
- Lamy, M., & Hampel, R. (2007). *Online communication in language learning and teaching*. Springer.
- Lai, C., Zhao, Y., & Wang, J. (2011). Task-based language teaching in online ab initio foreign language classrooms. *The Modern Language Journal*, 95, 81–103. <https://doi.org/10.1111/j.1540-4781.2011.01271.x>
- Larsen-Freeman, D. (2006). The emergence of complexity, fluency, and accuracy in the oral and written production of five Chinese learners of English. *Applied Linguistics*, 27(4), 590–619. <https://doi.org/10/c32r4v>
- Le, T. V., Cunningham, U., & Watts, K. (2018). The relationship between willingness to communicate and social presence in an online English language course. *The JALT CALL Journal*, 14(1), 43–59.
- Lee, L. (2002). Enhancing learners' communication skills through synchronous electronic interaction and task-based instruction. *Foreign Language Annals*, 35(1), 16–24. <https://doi.org/10/fmk4cm>

- Leeming, P., Vitta, J. P., Hiver, P., Hicks, D., McLean, S., & Nicklin, C. (2024). Willingness to communicate, speaking self-efficacy, and perceived communicative competence as predictors of second language spoken task production. *Language Learning*, 74(4), 917–949. <https://doi.org/10.1111/lang.12640>
- Li, J., & Jiang, Z. (2017). Students' perceptions about a flipped online Chinese language course. *Journal of Technology and Chinese Language Teaching*, 8(2), 25–38.
- Ma, J. H. (2009). *Autonomy, competence, and relatedness in L2 learners' task motivation: A self-determination theory perspective*. [Doctoral dissertation, University of Hawai'i at Manoa]. ProQuest Dissertations and Theses database.
- MacIntyre, P. D., Babin, P. A., & Clement, R. (1999). Willingness to communicate: Antecedents & consequences. *Communication Quarterly*, 47(2), 215–229. <https://doi.org/10/bstqhx>
- MacIntyre, P. D. (2007). Willingness to communicate in the second language: Understanding the decision to speak as a volitional process. *The Modern Language Journal*, 91(4), 564–576.
- MacIntyre, P. D., & Charos, C. (1996). Personality, attitudes, and affect as predictors of second language communication. *Journal of Language and Social Psychology*, 15(1), 3–26. <https://doi.org/10.1177/0261927X960151001>
- MacIntyre, P. D., & Clément, R. (1996). A model of willingness to communicate in a second language: The concept, its antecedents, and implications. *11th World Congress of Applied Linguistics, Jyväskylä, Finland*.
- MacIntyre, P. D., Clément, R., & Noels, K. A. (2007). Affective variables, attitude and personality in context. *Handbook of French Applied Linguistics*, 270–298. <https://doi.org/10/gj2m2p>
- Martin, N., Kelly, N., & Terry, P. (2018). A framework for self-determination in massive open online courses: Design for autonomy, competence, and relatedness. *Australasian Journal of Educational Technology*, 34(2). <https://doi.org/10.14742/ajet.3722>
- McEown, M. S., & Oga-Baldwin, W. L. Q. (2019). Self-determination for all language learners: New applications for formal language education. *System*, 86, 102124. <https://doi.org/10.1016/j.system.2019.102124>
- Mills, N., Pajares, F., & Herron, C. (2007). Self-efficacy of college intermediate French students: Relation to achievement and motivation. *Language Learning*, 57(3), 417–442. <https://doi.org/10.1111/j.1467-9922.2007.00421.x>
- Moore, M. G. (2019). The theory of transactional distance. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (4th edition, pp. 32–46). Routledge.
- Najeeb, S. S. (2013). Learner autonomy in language learning. *Procedia - Social and Behavioral Sciences*, 70, 1238–1242. <https://doi.org/10.1016/j.sbspro.2013.01.183>



- Noels, K. A. (2001). New orientations in language learning motivation: Towards a model of intrinsic, extrinsic, and integrative orientations and motivation. *Motivation and Second Language Acquisition*, 23, 43–68.
- Norton, B. (2001). Non-participation, imagined communities and the language classroom. *Learner Contributions to Language Learning: New Directions in Research*, 6(2), 159–171.
- O'Rourke, B., & Stickler, U. (2017). Synchronous communication technologies for language learning: Promise and challenges in research and pedagogy. *Language Learning in Higher Education*, 7(1), 1–20. <https://doi.org/10/gjm27r>
- Pan, X. (2018). *Investigating the development of syntactic complexity in L2 Chinese writing* [Doctoral dissertation, University of Iowa]. <https://doi.org/10.17077/etd.mwpr44tk>
- Payne, J., & Whitney, P. (2002). Developing L2 Oral proficiency through synchronous CMC: Output, working memory, and Interlanguage development. *CALICO Journal*, 20(1), 7–32.
- Peng, J.-E. (2012). Towards an ecological understanding of willingness to communicate in EFL classrooms in China. *System*, 40(2), 203–213.
- Peng, J.-E., & Woodrow, L. (2010). Willingness to communicate in English: A model in the Chinese EFL classroom context. *Language Learning*, 60(4), 834–876. <https://doi.org/10/dt4dxr>
- Perveen, A. (2016). Synchronous and asynchronous E-language learning: A case study of virtual university of Pakistan. *Open Praxis*, 8(1), 21–39. <https://doi.org/10/gjsrf3>
- Plakans, L., Gebril, A., & Bilki, Z. (2019). Shaping a score: Complexity, accuracy, and fluency in integrated writing performances. *Language Testing*, 36(2), 161–179. <https://doi.org/10/gg5jfb>
- Reeve, J., & Sickenius, B. (1994). Development and validation of a brief measure of the three psychological needs underlying intrinsic motivation: The AFS scales. *Educational and Psychological Measurement*, 54(2), 506–515.
- Rigo, F., & Mikuš, J. (2021). Asynchronous and synchronous distance learning of English as a foreign language. *Media Literacy and Academic Research*, 4(1), 89–106.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.
- Saeed, M. A., & Ghazali, K. (2017). Asynchronous group review of EFL writing: Interactions and text revisions. *Language Learning & Technology*, 21(2), 200–226.

- Sato, E., Chen, J. C. C., & Jourdain, S. (2017). Integrating digital technology in an intensive, fully online college course for Japanese beginning learners: A standards-based, performance-driven approach. *The Modern Language Journal*, 101(4), 756-775.
- Satorra, A., & Bentler, P. M. (2010). Ensuring positiveness of the scaled difference chi-square test statistic. *Psychometrika*, 75, 243-248.
- Sauro, S. (2011). SCMC for SLA: A research synthesis. *CALICO Journal*, 28(2), 369-391. <https://doi.org/10/gjm27c>
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of psychological research online*, 8(2), 23-74.
- Shi, H., Hur, J., Tang, Y. M., & Dennen, V. P. (2023). Instructional strategies for engaging online learners: Do learner-centeredness and modality matter? *Online Learning*, 27(4), 271-294.
- Spring, R., Kato, F., & Mori, C. (2019). Factors associated with improvement in oral fluency when using video-synchronous mediated communication with native speakers. *Foreign Language Annals*, 52(1), 87-100. <https://doi.org/10/gj3f58>
- Stein, D. S., Wanstreet, C. E., & Calvin, J. (2009). How a novice adult online learner experiences transactional distance. *Quarterly Review of Distance Education*, 10(3), 305-311.
- Tanaka, M. (2017). Factors affecting motivation for short in-class extensive reading. *Journal of Asia TEFL*, 14(1), 98-113.
- Tseng, M., Broadstock, M., & Chen, H. (2016). An investigation of the design of a four-stage flipped classroom in Mandarin Chinese. *Journal of Technology and Chinese Language Teaching*, 7(1), 15-42.
- Thurmond, V. A., Wambach, K., Connors, H. R., & Frey, B. B. (2002). Evaluation of student satisfaction: Determining the impact of a web-based environment by controlling for student characteristics. *American Journal of Distance Education*, 16(3), 169-190. <https://doi.org/10/drw8fd>
- van der Zwaard, R., & Bannink, A. (2014). Video call or chat? Negotiation of meaning and issues of face in telecollaboration. *System*, 44, 137-148. <https://doi.org/10.1016/j.system.2014.03.007>
- Wang, J., An, N., & Wright, C. (2018). Enhancing beginner learners' oral proficiency in a flipped Chinese foreign language classroom. *Computer Assisted Language Learning*, 31(5-6), 490-521. <https://doi.org/10/gdvprw>
- Wang, Y., Fang, W.-C., Han, J., & Chen, N.-S. (2016). Exploring the affordances of WeChat for facilitating teaching, social and cognitive presence in semi-synchronous language exchange. *Australasian Journal of Educational Technology*, 32(4). <https://doi.org/10.14742/ajet.2640>
- White, C. (2003). *Language learning in distance education*. Cambridge University Press.

- White, C., Zheng, Y., & Skyrme, G. (2021). Developing a model for investigating one-to-one synchronous Chinese online language teaching via videoconferencing. *Computer Assisted Language Learning*, 34(1–2), 92–113.
- Wolfe-Quintero, K., Inagaki, S., & Kim, H.-Y. (1998). *Second Language Development in Writing: Measures of Fluency, Accuracy, and Complexity*. University of Hawaii Press.
- Wright, C. (2020). Effects of task type on L2 Mandarin fluency development. *Journal of Second Language Studies*, 3(2), 157–179. <https://doi.org/10.1075/jsls.00010.wri>
- Xie, K., Debacker, T. K., & Ferguson, C. (2006). Extending the traditional classroom through online discussion: The role of student motivation. *Journal of Educational Computing Research*, 34(1), 67–89. <https://doi.org/10.2190/7BAK-EGAH-3MH1-K7C6>
- Xie, K., Vongkulluksn, V. W., Heddy, B. C., & Jiang, Z. (2023). Experience sampling methodology and technology: An approach for examining situational, longitudinal, and multi-dimensional characteristics of engagement. *Educational Technology Research and Development*, 1–31. <https://doi.org/10.1007/s11423-023-10259-4>
- Yashima, T. (2002). Willingness to communicate in a second language: The Japanese EFL context. *The Modern Language Journal*, 86(1), 54–66. <https://doi.org/10/bh4g2f>
- Yashima, T., Zenuk-Nishide, L., & Shimizu, K. (2004). The influence of attitudes and affect on willingness to communicate and second language communication. *Language Learning*, 54(1), 119–152. <https://doi.org/10/ff3mf4>
- Yousefi, M., & Ahmad Kasaian, S. (2014). Relationship between willingness to communicate and Iranian EFL learner's speaking fluency and accuracy. *Journal of Advances in English Language Teaching*, 2(6), 61–72.
- Zhang, Z., Xu, Q., Koehler, A. A., & Newby, T. (2023). Comparing blended and online learners' self-efficacy, self-regulation, and actual learning in the context of educational technology. *Online Learning*, 27(4), 295–314.

## Appendix

### Asynchronous Performance CAF Measures

| Dimension             | Operational Definition                          | Measurement Unit                   | Calculation Method                      | References                          |
|-----------------------|-------------------------------------------------|------------------------------------|-----------------------------------------|-------------------------------------|
| Complexity            | Syntactic sophistication of language production | Average T-unit <sup>a</sup> length | Total characters / Total T-units        | Pan (2018)                          |
| Accuracy <sup>b</sup> | Error-free language production                  | Proportion of error-free T-units.  | Error-free T-units / Total T-units      | Jiang (2013)                        |
| Fluency               | Quantity of language production                 | Total character count              | Sum of all characters in writing sample | Kusyk (2017); Plakans et al. (2019) |

*Note.*

<sup>a</sup> All measures were calculated based on T-unit segmentation of student writing posts. T-units were defined as simple sentences regardless of being subject-less or with one subject (Jiang, 2013). The identification of T-units often relies on the subjective judgment of researchers. In Chinese, the length of T-units is typically measured in characters, which serve as the fundamental unit in the Chinese language system (Pan, 2018). We used punctuation to guide the initial segmentation and adjusted through manual review and corrections. A total of 3,032 T-units were analyzed across all participants and time points.

<sup>b</sup> Each coder individually examined and evaluated all units, assigning a label of “1” to each error-free unit. Inter-rater reliability for accuracy coding was .93. For cases where discrepancies arose, the two coders discussed and resolved disagreements to ensure complete consensus.

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# Examining Differences Among K-12 Teachers' Motivation for Online Teaching

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## Abstract

This quantitative study aimed to determine K-12 teachers' level of motivation for online teaching and investigate possible differences in motivation according to group demographics. The Online Teaching Motivation Scale (OTMS) (Wiles et al., 2023) was used to collect data from K-12 teachers ( $N = 62$ ) in the Southeastern United States between October 2023 and July 2024. Participants reported a mean motivation for online teaching of 2.66 ( $SD = 0.52$ ) on a 4-point Likert-like scale. Significant differences in overall motivation and self-efficacy for online teaching were found when examining content areas (STEM versus non-STEM) and grade bands (elementary, middle, and secondary). Additionally, significant differences in perceptions of administrative support for online teaching were found among grade bands. Finally, teachers' perceptions of online teaching and learning showed significant differences between grade bands, content areas, and gender. Implications for school and district leaders are discussed based on these differences among demographic groups. Results also imply the need to develop and implement differentiated systems of support to meet the diverse needs of teachers using online tools in their classrooms.

*Keywords:* Online teaching; Teacher motivation; Differentiated support

Morrison, A., Smart, J., Wiles, D., & Bennett, L. (2025). Examining differences among K-12 teachers' motivation for online teaching, *Online Learning*, 29(4), 162-173.  
<http://doi.10.24059/olj.v29i4.5218>

## Introduction

The 2024 National Education Technology Plan outlines a call to action highlighting the need to address three “digital divides”: the digital use divide, the digital design divide, and the digital access divide (US Department of Education, 2024). The current study responds to this call to action, specifically addressing the digital design divide. The digital design divide can be defined as the “divide between and within those systems that provide every educator with the time and support they need to build their capacities to design learning experiences with digital tools, and those that do not” (US Department of Education, 2024, p. 34). The plan states that closing this divide will require “a clear vision, re-imagining systems of support, and bringing teachers to the table as co-designers of their professional learning” (US Department of Education, 2024, p. 34). These tasks require understanding teachers’ needs and their involvement in developing professional learning related to using digital tools in diverse classroom settings.

Teachers’ preparation is strongly correlated with student achievement (Darling-Hammond, 2000), indicating a crucial need for practical teacher training to equip educators with the tools necessary for online instruction (Johnson et al., 2023). Often, teachers do not receive training on best practices for online teaching in their formal teacher preparation programs, requiring that knowledge gap to be filled by continuing professional development (Barbour et al., 2012; Johnson et al., 2023). Closing the digital design divide will require school and district leaders to identify teachers’ deficit areas related to online teaching, solicit input from teachers regarding their professional development needs, and consider how teachers’ strengths might be leveraged to support other educators.

Further support for this work includes the rise in student enrollment in virtual schools and the continued integration of online tools in brick-and-mortar classrooms. Enrollment in virtual schools in the US nearly doubled from 2018 to 2023 (CCD, 2023), and even before the COVID-19 pandemic, the majority of public schools surveyed reported the use of online tools, such as interactive textbooks and experiences, to some extent in the classroom (Gray & Lewis, 2021). Given these trends, creating effective support systems for teachers will require understanding the status of K-12 teachers’ motivation for online teaching and identifying what differences in motivation, if any, exist among varied educator demographic groups.

The purpose of this quantitative study was to examine K-12 teachers’ overall motivation for teaching online and investigate variations in motivational levels for online teaching across multiple demographic variables. The findings from this study have the potential to serve as the foundation for the development and implementation of differentiated practices and support systems for K-12 teachers using online tools for instruction.

## Review of Related Literature

Educators’ motivation for online teaching is impacted by both internal and external factors (Scherer et al., 2014; Petko, 2012; Baroudi & Shaya, 2022). These factors combine to influence how teachers report their efficacy for online teaching, their perceptions of administrative support, and their overall perceptions of the effectiveness of online learning (Wiles et al., 2023).

### ***Internal and External Factors Affecting Teachers' Motivation***

As virtual school enrollment continues to rise (CCD, 2023) and the use of online tools in the classroom increases (Gray & Lewis, 2021), a logical response is continued investigation of teachers' motivation related to online teaching. Internal factors that impact teachers' motivation to integrate technology in the classroom include self-efficacy for using technology, perceptions of technology's usefulness (Scherer et al., 2014), and beliefs that technology has the potential to improve student learning (Petko, 2012). These findings are consistent with prior research indicating that teachers' self-efficacy can predict individuals' willingness to try new strategies (Bandura, 1977; Thurlings et al., 2015). Since pedagogical strategies utilized in fully face-to-face settings are not always successful in online or technology-mediated learning environments (Barbour, 2012), an openness to acquiring additional skills and implementing new instructional approaches is necessary for effective online teaching.

External motivational factors, such as professional development (PD) and administrative support, are also relevant when addressing the evolving educational landscape. Support has been linked to teachers' use of technology integration in the classroom (Ertmer et al., 2012). Additionally, teachers' self-efficacy for online teaching is directly impacted by the availability of training related to designing online instruction and professional development (PD) specifically related to online teaching (Baroudi & Shaya, 2022). Ongoing training and PD pertaining to best practices in online teaching fills an unmet need for many teachers since, historically, traditional teacher education programs have not addressed these topics (Barbour, 2012; Johnson et al., 2023). PD is most effective if it models the type of online instruction the instructors will implement (Borup & Evmenova, 2019). It provides a powerful opportunity for teachers to navigate situations similar to what their students will encounter while learning in these educational settings. Collaboration among colleagues can also be an effective method of PD, impacting both teachers' technological pedagogical content knowledge (TPACK) self-efficacy (Verstraeten et al., 2025) and their technological integration practices (Ertmer et al., 2012). Finally, school leaders provided a critical support element for K-12 teachers, and their leadership styles have been linked to teacher effectiveness (Sirisookslip et al., 2015), job satisfaction, and well-being (Ertürk, 2022). Providing administrative support has become increasingly complex in the digital age (Hakansson Lindqvist & Pettersson, 2019). However, there is still limited research on strategies for effective leadership in online or blended school settings (McLeod & Richardson, 2014). Shortcomings in external support for teachers and school leaders pertaining to online teaching are evident (Barbour, 2012; McLeod & Richardson, 2014), requiring a data-informed response.

## **Methods**

### ***Survey Structure and Implementation***

The Online Teaching Motivation Scale (OTMS) was selected as the data collection instrument for this study because it reliably measures K-12 teachers' motivation for teaching online and operates under a broad definition of online teaching encompassing multiple modalities (fully online, hybrid, in-person) and levels of digital tool integration (Wiles et al., 2023). The OTMS is a 24-item, Likert-type survey composed of three subscales: (1) teachers' self-efficacy for online teaching ( $N=7$ ), (2) teachers' perceptions of online teaching and learning ( $N=8$ ), and (3) teachers' perceptions of administrative support for online teaching

( $N=9$ ). The OTMS was distributed to participants electronically using a secure Qualtrics link. No identifying characteristics were associated with the participants' survey data to maintain participant anonymity and encourage complete transparency in teacher responses.

### ***Participants***

Participants for this study ( $N = 62$ ) were recruited using snowball sampling from elementary, middle, and secondary grades from states in the Southeastern United States (AL, GA, NC, and SC). Data collection spanned 10 months, beginning in October 2023 and concluding in July 2024. Teacher participants ranged in experience from two to 35 years ( $M = 15.85$ ;  $SD = 8.69$ ). Table 1 presents additional demographic data for the teacher participants.

### ***Data Analysis***

Data were analyzed using descriptive analysis, independent samples t-tests, one-way ANOVA, and Cronbach's alpha reliability. First, reliability was calculated for the summative Online Teaching Motivation Scale (OTMS) data and each subscale to analyze the internal consistency of the survey data. Next, descriptive statistics were reviewed to examine measures of central tendency for each variable. Independent samples t-tests were run to compare means for participants' summative scores for the OTMS and each subscale across the following independent variables: gender, teaching experience (novice/veteran), and content area (STEM/non-STEM). In addition, a one-way ANOVA was conducted to compare means of the summative scores for the OTMS and subscale data by grade band, which consisted of four levels (elementary, middle, secondary, and multiple grade bands).

**Table 1**

#### *Participant Demographics*

| Variable                       | Percentage of Total Participants |
|--------------------------------|----------------------------------|
| Gender                         |                                  |
| Male                           | 6.5%                             |
| Female                         | 93.5%                            |
| Teaching Experience            |                                  |
| Novice (<5 years' experience)  | 9.7%                             |
| Veteran (5+ years' experience) | 90.3%                            |
| Grade Band                     |                                  |
| Elementary                     | 37.1%                            |
| Middle                         | 12.9%                            |
| Secondary                      | 40.3%                            |
| Multiple Grade Bands           | 9.7%                             |



### Content Area

|                       |       |
|-----------------------|-------|
| STEM Content Area     | 33.9% |
| Non-STEM Content Area | 66.1% |

*Note.*  $N=62$  for the total participant group.

## Results

### *Reliability*

Cronbach's alpha was calculated for the summative Online Teaching Motivation Scale (OTMS) (i.e., motivation) and each subscale (i.e., teacher perceptions of online teaching and learning, teacher self-efficacy for online teaching, and teacher perceptions of administrative support for online teaching). The original validation study for the OTMS (Wiles et al., 2023) examined data collected during the height of the COVID-19 pandemic (2020-2021); therefore, this confirmatory step was taken to evaluate the instrument's reliability in the present context (post-COVID-19). Reliability for all scales ranged from 0.91 to 0.94, indicating excellent internal consistency (George & Mallery, 2024).

**Table 2**

### *Summative OTMS & Subscale Reliability*

| Scale                                     | Item Numbers                    | Cronbach's $\alpha$ |
|-------------------------------------------|---------------------------------|---------------------|
| Self-Efficacy for Online Teaching         | 2, 5, 8, 11, 17, 19, 22         | 0.91                |
| Perceptions of Online Teaching & Learning | 3, 4, 6, 12, 15, 16, 18, 24     | 0.91                |
| Perceptions of Administrative Support     | 1, 7, 9, 10, 13, 14, 20, 21, 23 | 0.91                |
| Summative Motivation for Online Teaching  | 1-24                            | 0.94                |

### *Descriptive Statistics*

Descriptive statistics were reviewed for the summative Online Teaching Motivation Scale (OTMS) and subscale data. The items on the instrument are written with a positive orientation (e.g., "I am confident in my ability to make online learning engaging for my students"); therefore, the closer the score is to 4.0, the more positive the response (Wiles et al., 2023). The mean item response for the summative OTMS was 2.66, and the subscale means ranged from 2.49 to 2.84.

**Table 3***Mean Item Response Descriptive Statistics for Summative OTMS and Subscales*

|                                                           | N  | Min  | Max  | M    | SD   |
|-----------------------------------------------------------|----|------|------|------|------|
| Self-Efficacy for Online Teaching                         | 62 | 1.29 | 4.00 | 2.84 | 0.61 |
| Perceptions of Online Teaching & Learning                 | 62 | 1.00 | 3.88 | 2.49 | 0.63 |
| Perceptions of Administrative Support for Online Teaching | 62 | 1.22 | 3.89 | 2.67 | 0.62 |
| Overall Motivation for Online Teaching                    | 62 | 1.33 | 3.92 | 2.66 | 0.52 |

Note. 1=Strongly Disagree, 2= Disagree, 3= Agree, 4=Strongly Agree

### ***Independent Samples T-Test***

Independent samples t-test revealed multiple significant findings among the demographic groups examined. The sections below report these results across the following independent variables: gender, teaching experience, and content area.

#### ***Gender***

The demographic question on the survey for the independent variable “gender” included multiple options (e.g., male, female, non-binary); however, respondents selected only “female” or “male.” As such, an independent samples t-test was appropriate for this demographic variable. The findings revealed a significant difference between male and female teachers’ perceptions of online teaching and learning,  $t(60) = -2.159$ ,  $p = 0.035$ . Male teachers reported significantly more positive perceptions of online teaching and learning ( $M = 3.13$ ,  $SD = 0.54$ ) than female teachers ( $M = 2.44$ ,  $SD = 0.62$ ). There were no significant differences between male and female teachers in perceptions of administrative support, efficacy for online teaching, or overall motivation for online teaching and learning.

#### ***Teaching Experience***

Participants were placed into one of two teaching experience groups: novice or veteran. Novice teachers had less than five years of teaching experience, while veteran teachers had five or more years of teaching experience. An independent samples t-test revealed no significant differences between novice and veteran teachers for overall motivation for online teaching, nor any of the subscales examined. Though not statistically significant, the data did reveal that veteran teachers reported higher motivation levels for online teaching ( $M = 2.69$ ,  $SD = 0.54$ ) than novice teachers ( $M = 2.38$ ,  $SD = 0.14$ ).

### **Content Area**

Independent samples t-tests revealed multiple significant differences concerning teachers' content areas. Teachers in STEM content areas reported significantly higher efficacy for online teaching,  $t(60) = 2.405$ ,  $p = 0.019$ , more positive perceptions of online teaching and learning,  $t(60) = 2.895$ ,  $p = 0.005$ , and greater overall motivation for online teaching and learning than teachers in non-STEM content areas,  $t(60) = 2.096$ ,  $p = 0.040$ . Table 4 provides a detailed comparison of the independent variables for these statistics.

**Table 4**

#### *Differences in Motivation Between Content Areas*

|                                       | <i>M</i> | <i>SD</i> | <i>p</i> |
|---------------------------------------|----------|-----------|----------|
| Self-Efficacy for Online Teaching*    |          |           | 0.019    |
| STEM                                  | 3.10     | 0.54      |          |
| Non-STEM                              | 2.71     | 0.61      |          |
| Perceptions of Online Teaching*       |          |           | 0.005    |
| STEM                                  | 2.79     | 0.60      |          |
| Non-STEM                              | 2.33     | 0.59      |          |
| Perceptions of Administrative Support |          |           | 0.763    |
| STEM                                  | 2.70     | 0.52      |          |
| Non-STEM                              | 2.65     | 0.67      |          |
| Overall Motivation*                   |          |           | 0.040    |
| STEM                                  | 2.85     | 0.47      |          |
| Non-STEM                              | 2.56     | 0.52      |          |

*Note.* \*Indicates a significant difference between content areas.

### **Grade Band**

A series of one-way ANOVAs were conducted to investigate each dependent variable across the four levels of the grade band variable (elementary, middle, secondary, and multiple grade bands). In analyzing efficacy for online teaching, a one-way ANOVA revealed a statistically significant difference between grade bands,  $F = (3, 58) = 2.88$ ,  $p = 0.043$ . A Tukey post-hoc test revealed that efficacy for online teaching was statistically significantly higher for middle-grade teachers ( $M = 3.29$ ;  $SD = 0.55$ ) than for secondary teachers ( $M = 2.62$ ;  $SD = 0.64$ ). There was no significant difference for elementary teachers.

A one-way ANOVA revealed a statistically significant difference in perceptions of online teaching and learning between grade bands,  $F = (3, 58) = 3.64$ ,  $p = 0.018$ . A Tukey post-hoc test revealed that perceptions of online teaching and learning were significantly

more positive for middle-grade teachers ( $M = 3.05$ ;  $SD = 0.48$ ) than for secondary teachers ( $M = 2.28$ ;  $SD = 0.64$ ). There was no significant difference for elementary teachers.

A one-way ANOVA revealed a statistically significant difference in perceptions of administrative support between grade bands,  $F(3, 58) = 4.96$ ,  $p = 0.004$ . A Tukey post-hoc test revealed that perceptions of administrative support were significantly more positive for elementary teachers ( $M = 2.97$ ;  $SD = 0.53$ ) than for secondary teachers ( $M = 2.35$ ;  $SD = 0.55$ ). There was no significant difference for middle grades teachers.

Finally, in analyzing overall motivation for online teaching and learning, a one-way ANOVA revealed a statistically significant difference between grade bands,  $F(3, 58) = 4.34$ ,  $p = 0.008$ . A Tukey post-hoc test showed that both elementary teachers ( $M = 2.81$ ;  $SD = 0.49$ ) and middle-grade teachers ( $M = 2.99$ ;  $SD = 0.53$ ) reported significantly higher overall motivation than secondary teachers ( $M = 2.41$ ;  $SD = 0.45$ ).

## Discussion

Findings from this study reveal both the potential and the challenges involved in building teacher motivation for online teaching. The average motivation score for K-12 teachers was 2.66 ( $SD = 0.52$ ) on a 4-point Likert-like scale, suggesting room for meaningful growth in teachers' professional readiness for utilizing online teaching in K-12 settings. Given the significant differences identified across gender, content areas, and grade levels, it is clear that a differentiated approach to professional development and support is needed. These results reinforce the need for "re-imagined systems of support" to address the digital design divide (U.S. Department of Education, 2024, p. 34).

Regarding content areas, teachers in STEM fields reported significantly higher scores for self-efficacy, perceptions of online teaching and learning, and overall motivation for online teaching than their non-STEM counterparts. These findings highlight a chance to strengthen professional learning through cross-departmental collaboration. Encouraging dialogue between STEM and non-STEM teachers through multidisciplinary professional learning communities (PLCs) may foster greater confidence and provide innovative strategies for delivering instruction across all subject areas. Research by Long et al. (2024) supports this approach, finding that PLCs can enhance teacher motivation and willingness to take on new and challenging tasks.

While male teachers reported more favorable perceptions of online teaching and learning than female teachers, subgroup sizes were imbalanced, limiting the strength of inferences that can be drawn. Still, this finding points to the importance of examining how gender may influence teachers' motivation to use digital tools in their instruction. Additional data collection, including qualitative methods, is recommended to understand these findings further.

Concerning grade bands, middle-grade teachers reported higher levels of self-efficacy and more favorable perceptions of online teaching than their secondary counterparts. Similarly, elementary and middle school teachers reported higher overall motivation for online teaching than secondary education teachers. Given the strong links between teachers' self-efficacy, their instructional innovation (Bandura, 1977; Thurlings et al., 2015), and commitment to the profession (Chesnut & Burley, 2015), it is essential that professional

learning systems account for these disparities. Targeted support through coaching, modeling, or peer mentorship may help secondary teachers build the confidence and agency needed to engage students meaningfully in online learning spaces. Additionally, teachers who demonstrate strong motivation and efficacy for online instruction should be empowered to lead PD efforts and serve as peer mentors, creating leadership pathways that reinforce teacher expertise while driving innovation.

Finally, elementary teachers report significantly more positive perceptions of administrative support for online teaching compared to secondary teachers. Since administrators are a critical source of instructional support and influence (Ertmer et al., 2012), these findings suggest an opportunity for training to develop specific leadership competencies in administrators supporting teachers using digital tools in their classrooms. Districts could establish vertical team meetings to allow administrators across grade bands to exchange ideas and share practical support strategies, including evaluating existing observational protocols and feedback practices for teachers using online tools for instruction.

## **Limitations and Future Studies**

There were some limitations of this study, including the size of the participant group and the imbalance in some of the subgroup sizes (specifically related to gender and teaching experience). While these limitations related to subgroups are worth noting, the imbalances within specific demographic subgroups are limitations not only in this study but also in the field of K-12 education, making it challenging to address. The 2020-2021 NCES report examining the characteristics of public-school teachers showed that males make up only 23% of the educator population, and early-career teachers with less than three years of experience contribute to only 7% of the educator population (NCES, 2023). In future studies, strategic planning of data collection methods could aid in gathering more data from these underrepresented groups. Data was also collected from a specific US region (the Southeast). Future studies should seek to diversify their participant group to areas across the United States to determine if the needs of teachers vary based on their geographic location.

Finally, future studies should probe teachers with questions designed to uncover specific inputs (such as instructional coaching, training, conference attendance, etc.) that contribute to their motivation for online teaching. These additional data collection methods would provide more detailed insights into why some teacher groups report higher motivation for online teaching than others, which could be drawn upon to support teachers with lower motivation levels.

## **Conclusion**

The context of this study highlights the need for collective efforts across K–12 schools in the United States to establish robust support systems for teachers as they become more skilled and competent in designing learning experiences with digital tools (U.S. Department of Education, 2024). To be effective, these systems must account for internal and external factors influencing teachers' motivation to engage in online teaching. The findings suggest that a one-size-fits-all approach will be insufficient. Instead, differentiated professional learning and more customized support are critical to addressing the diverse and fluid needs of K-12 educators. Two emerging recommendations from the study are the development of multidisciplinary PLCs and integrating administratively vertical team

meetings. These structures foster collaborative spaces where teachers can share strategies, access peer support, and align digital practices across grade levels and content areas. Together, they form a foundation for sustainable professional learning that can adapt to evolving technologies and instructional models. Looking toward the future, we recommend several directions for research that include expanding the geographic scope of participants to capture broader regional differences and incorporating qualitative methods to uncover more profound insights into the types of support teachers perceive as most effective in fostering their motivation for online teaching. By addressing both the systemic and individual dimensions of teacher development, this research supports the creation of meaningful, context-responsive strategies for digital teaching and learning across K-12 settings.

### **Declarations**

The authors declare no conflicts of interest associated with this article.

## References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-214. <https://doi.org/10.1037/0033-295X.84.2.191>
- Barbour, M.K. (2012). Training teachers for a virtual school system: A call to action. In D. Polly, C. Mims, & K. Persichitte (Eds.), *Creating technology-rich teacher education programs: Key issues* (pp. 499-517). Hershey, PA: IGI Global.
- Baroudi, S., & Shaya, N. (2022). Exploring predictors of teachers' self-efficacy for online teaching in the Arab world amid COVID-19. *Education and Information Technologies*, 27(6), 8093–8110. <https://doi.org/10.1007/s10639-022-10946-4>
- Borup, J. & Evmenova, A.S. (2019). The effectiveness of professional development in overcoming obstacles to effective online instruction in a college of education. *Online Learning*, 23(2), 1-2. <https://doi.org/10.24059/olj.v23i2.1468>
- Chesnut, S.R., & Burley, H. (2015). Self-efficacy as a predictor of commitment to the teaching profession: A meta-analysis. *Educational Research Review*, 15, 1-16.
- Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives*, 8(1), 1–44.
- Ertmer, P. A., Ottenbriet-Lefwich, A.T., Sadik, O., Sendurer, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education*, 59, 423-435.
- Ertürk, R. (2022). The relationship between school administrators' supportive behaviors and teachers' job satisfaction and subjective well-being. *International Journal of Contemporary Educational Research*, 8(4), 184-195. <https://doi.org/10.33200/ijcer.956667>
- George, D., & Mallery, P. (2024). *IBM SPSS Statistics 29 Step by Step: A Simple Guide and Reference* (18th ed.). Routledge.
- Gray, L., & Lewis, L. (2021). *Use of Educational Technology for Instruction in Public Schools: 2019–20* (NCES 2021- 017). U.S. Department of Education. Washington, DC: National Center for Education Statistics. <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2021017>
- Håkansson Lindqvist, M., & Pettersson, F. (2019). Digitalization and school leadership: On the complexity of leading for digitalization in school. *Campus-Wide Information Systems*, 36(3), 218–230. <https://doi.org/10.1108/IJILT-11-2018-0126>
- Johnson, C. C., Walton, J. B., Strickler, L., & Elliott, J. B. (2023). Online teaching in K-12 education in the United States: A systematic review. *Review of Educational Research*, 93(3), 353–411. <https://doi.org/10.3102/00346543221105550>
- Long, C., Li, C., Huang, G., & Fu, J. (2024). How to better promote teaching? Unveiling the links between professional learning communities and intrinsic motivation among

- foreign language teachers. *Heliyon*, 10(16), Article e36011.  
<https://doi.org/10.1016/j.heliyon.2024.e36011>
- McLeod, S., & Richardson, J. W. (2014). School administrators and K-12 online and blended learning. In R. E. Ferdig & K. Kennedy (Eds.), *Handbook of research on K-12 online and blended learning* (pp. 285-302). ETC Press. <http://repository.cmu.edu/etcpress/28>
- National Center for Education Statistics. (2023, May). *Characteristics of public school teachers*. In *The Condition of Education*. U.S. Department of Education, Institute of Education Sciences.  
<https://nces.ed.gov/programs/coe/indicator/clr/public-school-teachers>
- Petko, D. (2012). Teachers' pedagogical beliefs and their use of digital media in classrooms: Sharpening the focus of the "will, skill, tool" model and integrating teachers' constructivist orientations. *Computers & Education*, 58, 1351-1359.
- U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD). (2023). "Public Elementary/Secondary School Universe Survey," 2012-13 through 2022-23. [https://nces.ed.gov/programs/digest/d23/tables/dt23\\_216.20.asp](https://nces.ed.gov/programs/digest/d23/tables/dt23_216.20.asp)
- U.S. Department of Education, Office of Educational Technology. (2024). National Educational Technology Plan, Washington, DC.
- Scherer, R., Siddiq, F., Teo, T. (2015). Becoming more specific: Measuring and modeling teachers' perceived usefulness of ICT in the context of teaching and learning. *Computers & Education*, 88, 202-2014.
- Sirisookslip, S., Ariratana, W., & Ngang, T. K. (2015). The impact of leadership styles of school administrators on affecting teacher effectiveness. *Procedia - Social and Behavioral Sciences*, 186, 1031-1037.
- Thurlings, M., Evers, A. T., & Vermeulen, M. (2015). Toward a model of explaining teachers' innovative behavior: A literature review. *Review of Educational Research*, 85(3), 430-471. <https://doi.org/10.3102/0034654314557949>
- Verstraeten, J., van Dongen-Leunis, A., Valente, T. W., Koning, B. B., Nederhand, M.L., Scheepers, R., van Deen, W. K. (2025). University teachers' advice networks, self-efficacy, and readiness for online teaching. *International Journal of Educational Research Open*, 9, 100478.
- Wiles, D., Morrison, A., Smart, J., Bennett, L., & Peters, S. (2023). The Online Teaching Motivation Scale (OTMS): Development and validation of a survey instrument. *Online Learning*, 27(4), 6-25. DOI: <https://doi.org/10.24059/olj.v27i4.4035>

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# A Cross-Cultural Examination of the Online Self-regulated Learning Questionnaire (OSLQ) with Korean College Students

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## Abstract

The Online Self-Regulated Learning Questionnaire (OSLQ) is a widely used self-report instrument for assessing student self-regulated learning (SRL). Despite its prevalence, the dimensionality of the OSLQ is often unclear across different populations, and its item-level characteristics remain underexplored. This study investigates the psychometric properties of the OSLQ with a sample of 571 Korean college students, using both confirmatory factor analysis (CFA) and item factor analysis (IFA). CFA results supported a seven-factor model over the original six-factor version. Furthermore, IFA results revealed that the OSLQ items have high item discrimination, a wide range of item difficulties, providing strong marginal reliability for students within a latent ability ( $\theta$ ) range of -2.5 to 1.5. A key finding was that students with moderate to low SRL ability tend to overestimate their skills. These findings confirm the OSLQ's psychometric robustness and cultural relevance for Korean college students, particularly for assessing those with lower ability levels, while also highlighting the limitations of self-report measures.

**Keywords:** Online learning, self-regulated learning, online self-regulated learning questionnaire, OSLQ, item factor analysis

Na, C., Jeong, S., Clarke-Midura, J., & van Dijk, W. (2025). A cross-cultural examination of the online self-regulated learning questionnaire (OSLQ) with Korean college students. *Online Learning*, 29(4), 174- 198. <https://doi.org/10.24059/olj.v29i4.5216>

## Introduction

The rapid growth of online education in recent years has granted students more autonomy, but it has also placed greater demands on their ability to independently manage their learning (Broadbent & Poon, 2015; Guntur & Purnomo, 2024). As such, self-regulated learning (SRL)—a proactive process in which learners deliberately organize and manage their cognitive, motivational, and behavioral resources—has emerged as a key competence for academic success (Zimmerman, 2000). SRL involves a cyclical process of setting goals, employing strategies to attain those goals, monitoring progress, and reflecting upon the outcomes to inform future learning actions (Pintrich, 2004). As online environments often lack the external structure and supervision found in traditional classrooms, students' ability to self-regulate plays a critical role in promoting meaningful and learning experiences (Cheng et al., 2025; Dunn & Hayakawa, 2021; Hayes et al., 2015; Zhao et al., 2025).

Recent advances in data collection methods and technologies in online learning environments have focused on identifying, assessing, and diagnosing students' use of SRL strategies through multi-channel and multimodal data sources (de Mooji et al., 2025). While such innovations offer rich insights into students' SRL, self-report questionnaires remain one of the most commonly used tools. These SRL questionnaires typically ask students to reflect on their learning behaviors and indicate the extent of their strategy use using Likert-scale items. The continued popularity of self-report measures can be attributed to their ease of administration and scalability (e.g., Roth et al., 2016) and their strong alignment with theoretical frameworks (e.g., Pintrich et al., 2000). Moreover, they often complement behavioral indicators, such as clickstream measures from learning management systems (e.g., Li et al., 2020).

In online learning contexts, a growing body of research has widely used the Online Self-Regulated Learning Questionnaire (OSLQ; Barnard et al., 2009) to assess students' SRL strategies. Past research has shown that the OSLQ effectively captures students' self-regulation processes (e.g., Lai & Hwang, 2016) and helps classify their SRL levels (e.g., Na et al., 2024; Barnard-Brak et al., 2010). Despite its broad application, the OSLQ's psychometric quality remains substantially underexplored. Previous validation studies have reported inconsistent factor structures (i.e., dimensionality) across different countries and sample characteristics (e.g., Martinez-Lopez et al., 2017). Moreover, while most studies have focused on construct-level validation through exploratory or confirmatory factor analyses, few have examined item-level characteristics such as item difficulty and discrimination. This gap may lead to misinterpretation of scores, limiting the educational utility of the OSLQ.

To address these limitations, we focus on examining the dimensionality of online self-regulated learning, as measured by the OSLQ, among Korean college students, and investigating its item characteristics. As online learning has become more prevalent in the context of Korean higher education, the role of SRL has been more critical (Joo et al., 2008). However, previous studies in online learning have often adapted SRL instruments for traditional learning settings. To assess accurately students' SRL strategies in online environments, it is necessary to validate instruments that are better fit to online learning contexts. Furthermore, given the inconsistent psychometric properties found in previous studies, our research aims to provide confirmatory evidence for the OSLQ's factor structure and enhance understanding of its item-level properties. This validation is particularly significant in light of the increasing use of OSLQ across various educational settings, including culturally diverse settings. This validation study is important for SRL research. Confirming that the OSLQ is a reliable tool for Korean college students allows researchers

and educators to better identify learners who struggle with self-regulation, and in turn, develop the targeted interventions needed to enhance their success in online learning environments.

## Related Literature

### *Self-regulated Learning in Online Learning Environments*

While SRL has been regarded as critical elements in educational settings, prior literature demonstrated that the role of SRL has been more emphasized in online learning environment (Bernard et al., 2009; Kizilcec et al., 2017). Unlike traditional classroom setting (e.g., face-to-face setting), online learning environments often require students to be more self-directed and responsible for their learning processes and outcomes, due to the reduced supervision and immediate feedback from instructors (Broadbent & Poon, 2015). With this high degree of autonomy, the ability to self-regulate is paramount for fostering learners' meaningful online learning experiences (e.g., Na et al., 2024; Yeh et al., 2019) and therefore achieving academic success in these settings (e.g., Broadbent & Poon, 2015; McManus, 2000). These inherent differences between traditional and online learning settings require a distinct understanding of, and approaches to measuring students' SRL that are more suitable for online learning contexts.

For example, a meta-analysis by Zhao et al. (2025) synthesizing 42 studies conducted between 2011 and 2022, revealed a modest yet positive average correlation between SRL strategy use and academic performance ( $r = .14, p < .001$ ) in online and blended-learning environments. Notably, the strength of the effect sizes at the undergraduate ( $r = .16, p < .001$ ) and graduate levels ( $r = .18, p < .001$ ) was larger than that at the K–12 level ( $r = -.11, p < .001$ ), indicating that the role of SRL is more critical in higher education online settings. Similarly, a synthesis by Cheng et al. (2025) of 80 correlational effect sizes from 27 reports found that SRL strategy use was positively correlated with learning performance ( $r = .21, p < .001$ ) in online higher education. Interestingly, the type of instrument used to measure SRL served as a significant moderator ( $Q(4) = 13.16, p = .01$ ). This suggests that different SRL instruments can significantly influence the magnitudes of the relations between SRL and academic performance, highlighting selecting and using valid and appropriate instruments are key to SRL research.

### *Importance of Assessing Self-regulated Learning*

Over the past decade, advances in learning analytics and the emergence of AI in education have introduced novel possibilities for measuring students' SRL processes in online settings (Järvelä et al., 2023). Recent developments have enabled researchers to gather and analyze multimodal data to deepen our understanding of how students regulate their learning (de Mooji et al., 2025; Sharma et al., 2024). Frameworks like the SMA (self-regulated learning processes, multimodal data, and analysis) grid proposed by Molenaar et al. (2023), emphasize combining multiple data sources and multichannel data streams, including tracing or physiology data, to capture the complex and dynamic nature of individuals' SRL processes (Azevedo, 2015).

However, self-report surveys, which function as self-perception and outcome-oriented measurement approach, are still recognized as valid methods for detecting how students use SRL strategies during their learning. This is because they can serve as calibrators for making inferences from other data sources (Molenaar et al., 2023). In this regard, the accurate

measurement of SRL behaviors is essential for understanding and improving student performance in online learning settings (Barnard et al., 2009). By identifying how well students can manage their learning processes, educators and researchers can develop targeted interventions to support those who struggle with self-regulation. Thus, having reliable tools to measure SRL is crucial for advancing educational practices and policies. Therefore, as online education continues to grow, adapting SRL measurement tools to various cultural and educational contexts becomes increasingly important (Lau, 2022). Different student populations may exhibit unique self-regulatory behaviors based on their cultural backgrounds, prior educational experiences, and the specific demands of their learning environments. Therefore, ongoing development and validation of SRL instruments across diverse settings are necessary to ensure their effectiveness and applicability.

### ***Previous Validation Studies of OSLQ***

The Online Self-Regulated Learning Questionnaire (OSLQ) was originally developed by Barnard et al. (2009) to address the need for a reliable tool to measure SRL in online environments, using a sample of U.S. college students. The OSLQ consists of 24 items that are grouped into six factors, each assessing a different aspect of SRL: Goal Setting, Environment Structuring, Task Strategies, Time Management, Help-Seeking, and Self-Evaluation. These items are rated using a 5-point Likert-type response format, with values ranging from strongly disagree (1) to strongly agree (5). The comprehensive nature of the OSLQ has made it a widely recognized and valuable tool for researchers, enabling them to gain crucial insights into students' self-regulatory behaviors and identify areas requiring intervention.

As the OSLQ has seen widespread adoption, efforts have been undertaken to validate the instrument across diverse cultural and educational settings, including the United States, Belgium, Hong Kong, Turkey, and Brazil (see Table 1). This is not surprising, as cultural differences have always been a critical concern in the SRL literature (McInerney & King, 2018; Purdie & Hattie, 1996). Indeed, previous studies conducted with Brazilian and Hong Kong students identified two- and seven-factor solutions, respectively, rather than the original six-factor structure (Lau, 2022; Rufini et al., 2021). Such variation suggests that the psychometric properties of the OSLQ may depend on cultural or educational contexts, warranting further validation studies in diverse settings.

To date, no study has yet validated the OSLQ with Korean college students. This is a noteworthy gap in the literature, especially given the traditional values of Korean culture, which are rooted in Confucianism and collectivism (Beik & Cho, 2024; Lee et al., 2017; Turingan & Yang, 2009). Beik and Cho (2024) argue that collectivism leads Korean students to be highly sensitive to others' evaluations and to focus heavily on comparisons with others. Moreover, classroom culture in Korea still remains largely instructivist rather than constructivist. For example, in their cross-cultural study, Yoo et al. (2014) found that Korea instructors preferred teacher-to-learner interactions in online learning activities, whereas U.S. instructors tended to focus on learner-to-learner interactions. Such cultural uniqueness may influence how they respond to specific OSLQ items, particularly those related to peer-based evaluations.

Methodologically, previous validation studies also have some limitations regarding their analytic approaches. Specifically, most of them have primarily adopted confirmatory factor analysis (CFA) to assess construct validity. A traditional CFA is a tool used to test whether respondents' observed responses fit an *a priori factor structure*, assuming

continuous item responses and linear relationships with latent factors (Ferrando, 2009). However, the Likert scales are ordinal, not continuous, and thus it is problematic to assume linear relationships between observed and latent scores. Specifically, if the outcome responses are categorical or ordinal, the residuals cannot be normally distributed (Miles & Shevlin, 2001). In this regard, violating the assumption of normality can lead to misspecification of item parameters and standard errors. Moreover, in the context of CFA, a simulation study by Rhemtulla et al. (2012) showed that using a continuous approach with fewer than five categories can risk underestimating both factor loadings and standard errors, thereby leading to model misspecification.

However, item factor analysis (IFA), which assumes non-linear relationships between latent scores and categorical item responses (Wirth & Edwards, 2007), allows us to account for the ordinal nature of Likert scale responses and to examine item-level parameters such as item discrimination and item difficulty (i.e., thresholds). In short, IFA is an extension of CFA, but its purpose is to understand how individual items (questions) relate to a given knowledge, skill, or trait using categorical data (e.g., true/false or Likert scale).

Additionally, previous studies primarily reported internal reliability using Cronbach's alpha. Since Cronbach's alpha stems from a composite score on the test, it assumes that reliability is uniform across each person's ability (i.e., latent scores,  $\theta$ ). However, the degree to which the SRL measurement tool is reliable can vary depending on an individual's latent ability.

**Table 1**

*Existing Validation Studies or Checking Dimensionality of the OSLQ*

| References              | Participants                                                                                                                             | Factor structures                                                                                                                                                                        | Validity                                                                                                        | Reliability                                                                                                                                                    |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kilis & Yildirim (2017) | Undergraduates of public university in Turkey (N = 321)                                                                                  | Six-factor model (N <sub>item</sub> = 24)<br>1. Goal Setting,<br>2. Environmental Structuring,<br>3. Time Management<br>4. Cognitive strategies<br>5. Help-Seeking<br>6. Self-Evaluation | Construct validity (CFA)                                                                                        | Internal consistency (Cronbach's $\alpha$ : $.67 < \alpha < .87$ )                                                                                             |
| Fung et al. (2018)      | Study 1: Primary and Secondary students in Hong Kong (N = 412)<br><br>Study 2: Mathematically talented primary and secondary students in | Six-factor model (N <sub>item</sub> = 24)<br>1. Goal Setting,<br>2. Environmental structuring,<br>3. Time Management<br>4. Cognitive strategies<br>5. Help-Seeking<br>6. Self-Evaluation | Study 1: Construct validity (CFA) and Measurement Invariance by gender<br><br>Study 2: Construct validity (CFA) | Study 1: Internal consistency (Cronbach's $\alpha$ : $.75 < \alpha < .86$ )<br><br>Study 2: Internal consistency (Cronbach's $\alpha$ : $.78 < \alpha < .87$ ) |

|                             | Hongkong (N = 374)                                                                                  |                                                                                                                                                                                                                                                   |                                                                              |                                                                   |
|-----------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Vanslambrouck et al. (2019) | Adult learners (blended learning settings) in Belgium (N = 213)                                     | Seven-factor model (N <sub>item</sub> = 24)<br>1. Goal Setting,<br>2. Environmental structuring,<br>3. Time Management<br>4. Cognitive strategies<br>5. Help-Seeking<br>6. Self-Evaluation through Strategies<br>7. Self-Evaluation through peers | Construct validity (CFA)                                                     | Internal consistency (Cronbach's $\alpha$ : .59 < $\alpha$ < .93) |
| Rufini et al. (2021)        | Undergraduates who registered for online pedagogy courses in Brazil (N = 1,434)                     | Two-factor models (N <sub>item</sub> = 19)<br>1. Goal Setting / Environmental Structuring / Time Management<br>2. Task Strategies / Help-Seeking / Self-Evaluation                                                                                | EFA                                                                          | Not reported                                                      |
| Lau (2021)                  | Junior secondary students in Hong Kong (N = 716)                                                    | Seven-factor model (N <sub>item</sub> = 28)<br>1. Goal Setting,<br>2. Environment Structuring,<br>3. Time Management,<br>4. Effort regulation,<br>5. Cognitive/monitoring strategies,<br>6. Help-Seeking,<br>7. Self-Evaluation                   | Construct validity (CFA)                                                     | Internal consistency (Cronbach's $\alpha$ : .80 < $\alpha$ < .91) |
| Funa et al. (2023)          | Preservice teachers (N = 301) in Philippines (10 preservice and five faculty members for interview) | Six-factor model (N <sub>item</sub> = 24)<br>1. Goal Setting,<br>2. Environmental structuring,<br>3. Time Management<br>4. Cognitive strategies<br>5. Help-Seeking<br>6. Self-Evaluation                                                          | Construct validity (EFA and CFA)<br>Content validity (Qualitative Interview) | Internal consistency (Cronbach's $\alpha$ : .71 < $\alpha$ < .91) |

*Note.* EFA refers to exploratory factor analysis; CFA refers to confirmatory factor analysis.

### ***Goals of Present Study***

Our study aims to conduct a cross-cultural validation of the OSLQ with Korean college students, ensuring that the instrument is culturally relevant and psychometrically robust within this group. Specifically, we use both CFA and IFA to determine the dimensionality of the OSLQ and to investigate item characteristics. This work is guided by the following research questions:

**Research Question 1:** What underlying factor structure (i.e., dimensionality) of the OSLQ best fits the responses of Korean college students?

**Research Question 2:** What are the item characteristics, specifically item difficulty and item discrimination, of the OSLQ as demonstrated by Korean college students?

## Methods

### *Participants and Procedures*

A total of 750 college students were initially recruited for this study. Participants were from an online introductory mathematics course at a public university in South Korea. The course was designed for first-year students to learn undergraduate-level mathematical concepts. At the beginning of the semester, participants completed a demographic survey, which included questions about gender and academic majors (categorized as STEM or non-STEM). At the end of the semester, they completed the OSLQ survey. The final analytic sample ( $n = 571$ ;  $M_{\text{age}} = 19.4$  years; 60.7% female) was selected based on two criteria: (a) voluntary consent to participate and (b) enrollment in academically oriented majors. Students in career-oriented majors, such as veterinary medicine or nursing, were excluded in the analyses due to potential differences in motivation and response patterns on the OSLQ instrument, relative to students in other fields. Among the valid respondents, 72.5% were majoring in STEM fields ( $n = 414$ ), whereas 27.5% were in non-STEM majors ( $n = 157$ ). The survey system was configured to prevent participants from proceeding without completing each page, resulting in no missing data. Given the asynchronous and self-paced nature of the online course, all survey administration process was conducted through the course learning management system.

### *Measures*

The original OSLQ (Barnard et al., 2009) consists of six factors: Goal Setting (five items), Environment Structuring (four items), Task Strategies (four items), Time Management (three items), Help-Seeking (four items), and Self-Evaluation (four items). The items use a five-point self-report format from (1) strongly disagree to (5) strongly agree. To avoid potential loss of meaning in the items, we conducted a translation and back-translation process (Brislin, 1970). The internal reliability of this study ranged from .77 to .93 (see Table 2 for all items with their descriptive statistics and internal consistency based on the current sample).

### *Analytical Strategies*

First, we conducted CFAs to examine the dimensionality of the OSLQ. Specifically, we built two competing models—original six-factor model (Barnard et al., 2009) and seven-factor model by splitting Self-Evaluation into two subfactors (Vanslambrouck et al., 2019). Although both constructs have traditionally been categorized under the broader concept of

self-evaluation in OSLQ, several studies have demonstrated that Self-Evaluation against Peers and Self-Evaluation using Strategies are distinct (Vanslambrouck et al., 2019). According to Topping (2009), peer assessment refers to a structured process in which students assessed, or are assessed by, their peers or classmates in the online courses. In this regard, Self-Evaluation against Peers involves students assessing their own learning by comparing it to the progress and activities of their peers. In this case, the primary reference point for self-evaluation is external and the perceived performance or learning behaviors of others.

In contrast, Self-Evaluation using Strategies refers to students reflecting on their own learning progress by evaluating the effectiveness of the strategies and techniques they have used. In this case, a key indicator to self-evaluation is internal, with students monitoring and making judgments about their learning based on how well their chosen strategies have been useful to support effective and meaningful learning. Based on this rationale, we therefore split Self-Evaluation into two factors, Self-Evaluation using Strategies and Self-Evaluation against Peers, in the seven-factor model.

We evaluated these two CFA models using model  $\chi^2$  test, Comparative fit index (CFI), Tucker–Lewis index (TLI), root-mean-square error of approximation (RMSEA), and standardized root-mean-square residual (SRMR). We regarded a non-significant  $\chi^2$  test, TLI and CFI  $\geq .90$ , RMSEA  $\leq .06$ , and SRMR  $\leq .08$  as acceptable model fit (Hu & Bentler, 1999). We also checked linear relationships between observed item response patterns and latent ability. To address non-normal distributions at the item levels, MLR estimator was used to estimate all CFA models. The Satorra-Bentler scaled chi-square difference test (Satorra & Bentler, 2010) were used to conduct model comparisons.

We next conducted IFAs to understand the item characteristics of the OSLQ using WLSMV estimation with THETA parameterization. We evaluated the global model fit using the same criteria as in CFA. Unlike CFA, IFA does not assume linear relationships between factor scores and observed response patterns (Wirth & Edward, 2009). We estimated two types of parameters from IFAs: factor loadings and thresholds corresponding to response options. These two types of parameters in IFA can be directly transformed to two types of parameters—item discriminations ( $a$ , how well an item can differentiate between individuals who have different levels of latent ability) and difficulties ( $b_i$ , transition points between ordered response options)—in the graded response model of the polytomous IRT model (Samejima, 2016). From these item parameters, test information, and marginal reliability, we can evaluate how reliably and well each item functions according to respondents' latent abilities. CFA and IFA analyses were conducted in *Mplus* version 8.8 (Muthén & Muthén, 1998–2017) and all other analyses were conducted with *Jamovi* (The jamovi project, 2024).



**Table 2**  
*Descriptive Statistics for OSLQ Item Response Patterns*

| <i>SRL<br/>subconstructs</i>                  | <i>Item descriptions</i>                                                                                                                            | <i>M</i> | <i>Med</i> | <i>SD</i> | <i>Response Patterns (%)</i> |              |              |              |              |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|-----------|------------------------------|--------------|--------------|--------------|--------------|
|                                               |                                                                                                                                                     |          |            |           | <i>1 (%)</i>                 | <i>2 (%)</i> | <i>3 (%)</i> | <i>4 (%)</i> | <i>5 (%)</i> |
| Goal Setting<br>( $\alpha = .88$ )            | Q1. I set standards for my assignments in online courses.                                                                                           | 4.07     | 4.00       | 0.86      | 1.2                          | 3.0          | 17.5         | 44.5         | 33.8         |
|                                               | Q2. I set short-term (daily or weekly) goals as well as long-term goals (monthly or for the semester).                                              | 3.96     | 4.00       | 0.95      | 1.2                          | 6.3          | 21.4         | 37.7         | 33.5         |
|                                               | Q3. I keep a high standard for my learning in my online courses.                                                                                    | 3.37     | 3.00       | 1.13      | 5.3                          | 17.0         | 32.2         | 26.4         | 19.1         |
|                                               | Q4. I set goals to help me manage studying time for my online courses.                                                                              | 3.73     | 4.00       | 1.00      | 1.9                          | 9.6          | 26.1         | 37.8         | 24.5         |
|                                               | Q5. I don't compromise the quality of my work because it is online.                                                                                 | 3.68     | 4.00       | 1.03      | 1.6                          | 13.1         | 25.2         | 36.1         | 24.0         |
| Environment Structuring<br>( $\alpha = .86$ ) | Q6. I choose the location where I study to avoid too much distraction.                                                                              | 4.14     | 4.00       | 0.82      | 0.7                          | 2.8          | 14.9         | 45.2         | 36.4         |
|                                               | Q7. I found a comfortable place to study.                                                                                                           | 4.24     | 4.00       | 0.75      | 0.4                          | 1.9          | 11.2         | 46.1         | 40.5         |
|                                               | Q8. I know where I can study most efficiently for online courses.                                                                                   | 3.97     | 4.00       | 0.94      | 1.6                          | 4.7          | 21.7         | 39.2         | 32.7         |
|                                               | Q9. I choose a time with few distractions for studying for my online courses.                                                                       | 4.09     | 4.00       | 0.86      | 0.9                          | 4.2          | 15.1         | 44.8         | 35.0         |
| Task Strategies<br>( $\alpha = .77$ )         | Q10. I try to take more thorough notes for my online courses because notes are even more important for learning online than in a regular classroom. | 3.69     | 4.00       | 1.11      | 4.6                          | 10.7         | 21.9         | 36.6         | 26.3         |
|                                               | Q11. I read aloud instructional materials posted online to fight against distractions.                                                              | 2.93     | 3.00       | 1.27      | 13.0                         | 29.8         | 23.3         | 18.9         | 15.1         |
|                                               | Q12. I prepare my questions before joining in the chat room and discussion.                                                                         | 3.35     | 3.00       | 1.14      | 5.8                          | 17.3         | 30.8         | 27.8         | 18.2         |
|                                               | Q13. I work extra problems in my online courses in addition to the assigned ones to master the course content.                                      | 3.63     | 4.00       | 0.99      | 2.1                          | 10.3         | 31.2         | 35.7         | 20.7         |
| Time Management                               | Q14. I allocate extra studying time for my online courses because I know it is time demanding.                                                      | 3.65     | 4.00       | 0.99      | 1.9                          | 10.3         | 29.9         | 35.9         | 21.9         |

|                              |                                                                                                                           |      |      |      |     |      |      |      |      |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------|------|------|------|-----|------|------|------|------|
| (α = .80)                    | Q15. I try to schedule the same time every day or every week to study for my online courses, and I observe the schedule.  | 3.66 | 4.00 | 1.11 | 4.4 | 11.7 | 22.8 | 35.4 | 25.7 |
|                              | Q16. Although we don't have to attend daily classes, I still try to distribute my studying time evenly across days.       | 3.60 | 4.00 | 1.04 | 2.8 | 11.7 | 29.8 | 33.6 | 22.1 |
| Help-Seeking<br>(α = .77)    | Q17. I find someone who is knowledgeable in course content so that I can consult with him or her when I need help.        | 3.62 | 4.00 | 1.10 | 5.8 | 9.8  | 21.9 | 41.3 | 21.2 |
|                              | Q18. I share my problems with my classmates online, so we know what we are struggling with and how to solve our problems. | 3.51 | 4.00 | 1.13 | 5.6 | 14.4 | 24.2 | 35.6 | 20.3 |
|                              | Q19. If needed, I try to meet my classmates face-to-face.                                                                 | 3.73 | 4.00 | 1.09 | 4.4 | 8.2  | 24.9 | 34.9 | 27.7 |
|                              | Q20. I am persistent in getting help from the instructor through e-mail.                                                  | 3.45 | 3.00 | 1.05 | 3.5 | 14.2 | 34.5 | 29.4 | 18.4 |
| Self-Evaluation<br>(α = .89) | Q21. I summarize my learning in online courses to examine my understanding of what I have learned.                        | 3.70 | 4.00 | 0.98 | 2.5 | 7.4  | 31.3 | 35.9 | 22.9 |
|                              | Q22. I ask myself a lot of questions about the course material when studying for an online course.                        | 3.55 | 4.00 | 1.00 | 2.6 | 10.9 | 34.3 | 33.1 | 19.1 |
|                              | Q23. I communicate with my classmates to find out how I am doing in my online classes.                                    | 3.45 | 4.00 | 1.15 | 6.5 | 14.4 | 26.8 | 32.6 | 19.8 |
|                              | Q24. I communicate with my classmates to find out what I am learning that is different from what they are learning.       | 3.37 | 3.00 | 1.18 | 7.7 | 15.9 | 26.6 | 31.5 | 18.2 |

*Note.* M = Mean, Med = Median, and SD = Standard deviation. In the seven-factor model, the internal reliability of Self-Evaluation using Strategies is  $\alpha = .84$ , and Self-Evaluation against Peers is  $\alpha = .93$ .

## Results

### *Research Question 1: Dimensionality of OSLQ*

Descriptive statistics and response patterns for all items are presented in Table 2. First, the comparison of global model fit between the two CFA models (see Table 3) indicated that the seven-factor model had a better fit. The Satorra-Bentler scaled chi-square difference test (Satorra & Bentler, 2010) confirmed that the seven-factor model fit the data significantly better than the six-factor model,  $\chi^2(6) = 208.91, p < .001$ . The standardized factor loadings of the seven-factor model ranged from .52 to .93, all of which are acceptable (see Table A1 in Appendix A).

**Table 3**

*A comparison of CFA Model Fit between Six- and Seven-Factor Models*

|              | $\chi^2$    | df  | CFI  | TLI  | RMSEA                     | SRMR |
|--------------|-------------|-----|------|------|---------------------------|------|
| Seven-factor | 586.05<br>2 | 231 | .940 | .928 | .052, 90% CI [.047, .057] | .046 |
| Six-factor   | 819.56<br>1 | 237 | .901 | .885 | .066, 90% CI [.061, .071] | .064 |

*Note.* CFI = Comparative fit index, TLI = Tucker–Lewis index, RMSEA = Root-mean-square Error of Approximation estimate, and SRMR = Standardized Root-Mean-square Residual.

Despite the acceptable model fit, we did not find a linear relationship between the latent scores estimated by CFA and the observed item responses. Figure 1 shows the item responses predicted by CFA for latent scores within  $\pm 3.5$  SDs of the mean of 0. We found that linear slopes did not function well for many items because some predicted item responses were not located within the possible range of item responses (i.e., below 1 or above 5). For example, some predicted item responses in Task Strategies were close to 0. To address this issue and to examine the item characteristics of the OSLQ, we ran the IFA—assuming nonlinear relationships between observed and latent scores—with the seven-factor model.

### *Research Question 2: Item Characteristics of OSLQ*

The IFA model showed a good fit for the seven-factor model:  $\chi^2(231) = 1129.478, p < .001$ , CFI = .964, TLI = .957, RMSEA = .083, SRMR = .036. Figure 2 shows the discrimination estimates for each item (see the upper section in Figure 2), along with the range of item difficulty estimates and their thresholds (see the lower section in Figure 2). All item parameters are fully reported in Table A2 in Appendix A.

Item discrimination parameters ranged from .73 (for Q19) to 2.87 (for Q23), and each SRL substructure showed similar levels of item discrimination. Interestingly, items related to Self-Evaluation against Peers were significantly more discriminating than items related to Self-Evaluation using Strategies. This supports our hypothesis of the seven-factor model that Self-Evaluation using Strategies is psychometrically distinct from Self-Evaluation against Peers.

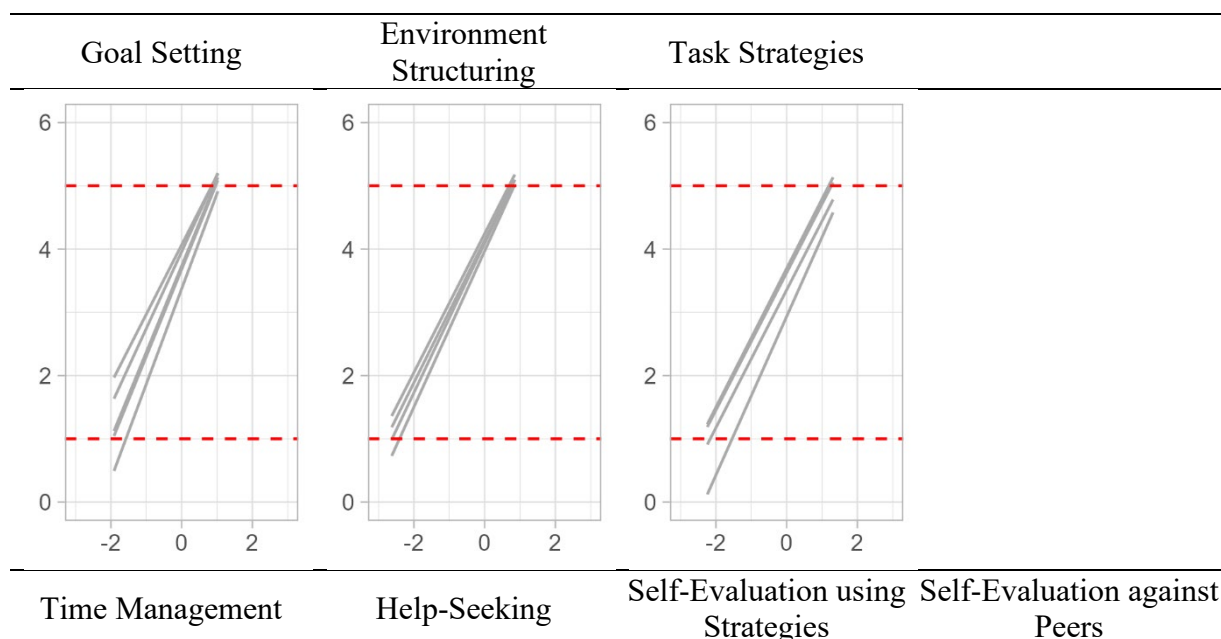
The OSLQ items showed a wide range of item difficulties. Reporting frequent uses of SRL strategies (i.e., selecting “5. Strongly agree”) required a latent SRL ability level of more than 0.5 to 1.0 SD above average (i.e.,  $b_4$ ). On the other hand, the first, second, and third

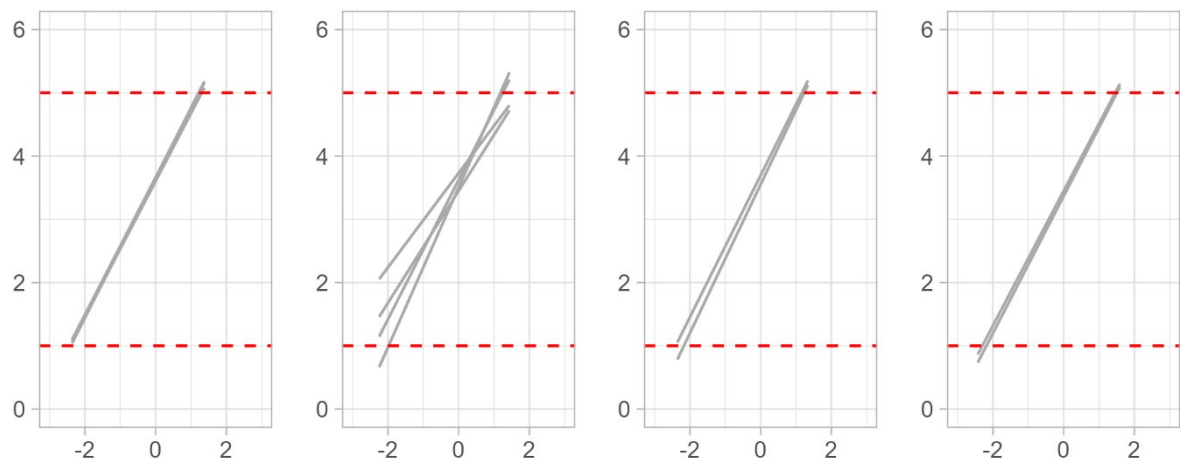
threshold parameters ( $b_1$ ,  $b_2$ , and  $b_3$ ) were negative, meaning that students with below-average SRL ability (i.e.,  $\theta < 0$  on the Y-axis in Figure 2) can use SRL strategies to some extent. Finally, test information functions (see Figure 3) for each SRL subcomponent indicated that the OSLQ provided the most information for students with latent abilities approximately 2.5 SD below and 1.5 SD above the mean. In other words, the OSLQ items can provide the most information about the latent SRL ability for students within this range ( $-2.5 < \theta < 1.5$ ).

Specifically, based on the test information functions (see Figure 4), the items in the Environmental Structuring -construct (blue line) were more informative for students with lower levels of the latent trait ( $-3.6 < \theta < -1.0$ ), whereas the items in the Self-Evaluation against Peers sub-construct (light green line) were more effective in measuring students with higher levels of the latent trait ( $-2.0 < \theta < 1.5$ ). Moreover, the estimated latent ability of students is most reliably measured within this same range, although there is some variation within constructs (see Figure 4). All item parameters, including item discrimination and item difficulty (i.e., threshold,  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4$ ), are reported in Table A2 in Appendix A.

**Figure 1**

*Linear Relationships Between Observed Response Patterns and Latent Abilities (i.e., Latent Scores)*





*Note.* X-axis refers to the latent scores (i.e., students' latent ability of SRL,  $\theta$ ) and y-axis refers to the observed response patterns. Each regression line depicts a linear relationship between observed response patterns (y-axis) and factor scores (x-axis). Red dotted lines in the graphs mean a possible range of observed response patterns, ranging from 1 (totally disagree) to 5 (totally agree).

**Figure 2**

*Item Discriminations (Upper) and Item Difficulties and Thresholds (Lower) of OSLQ items*

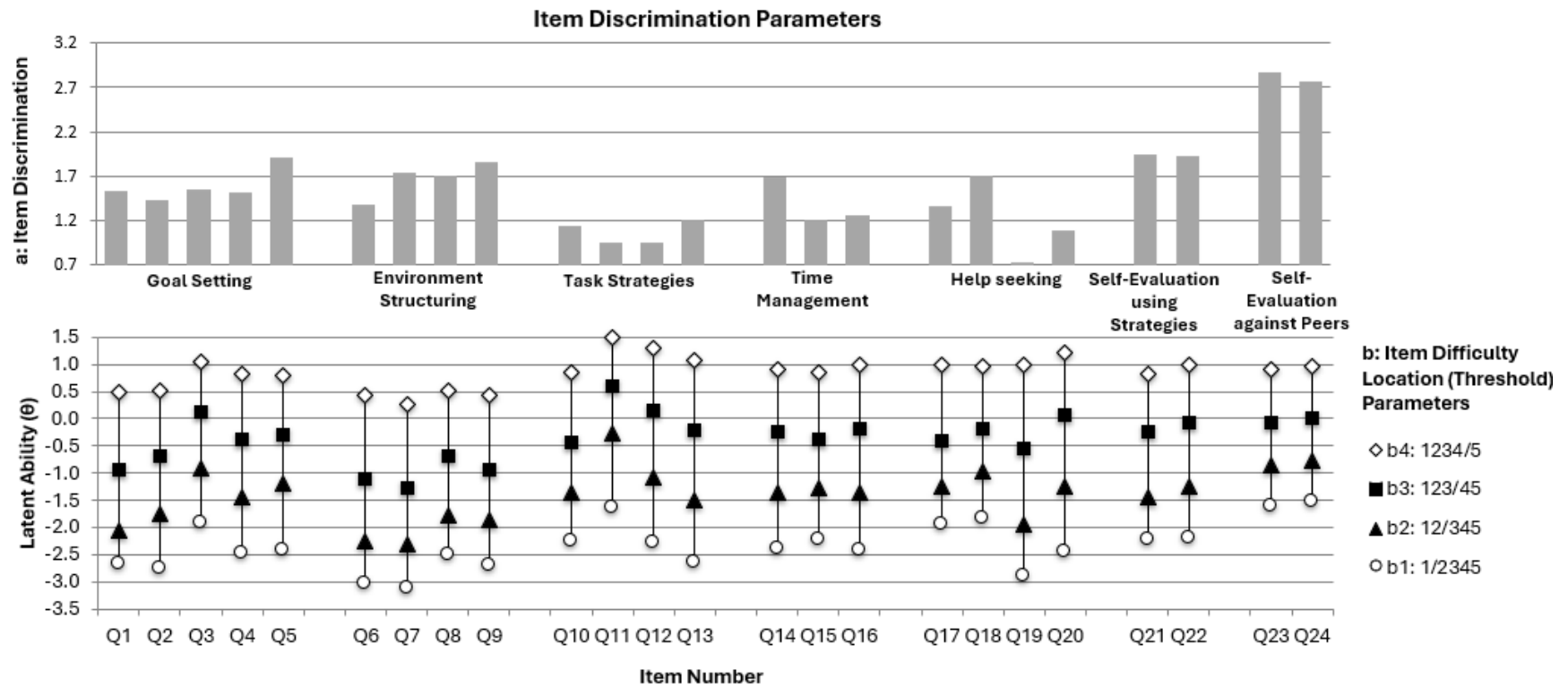
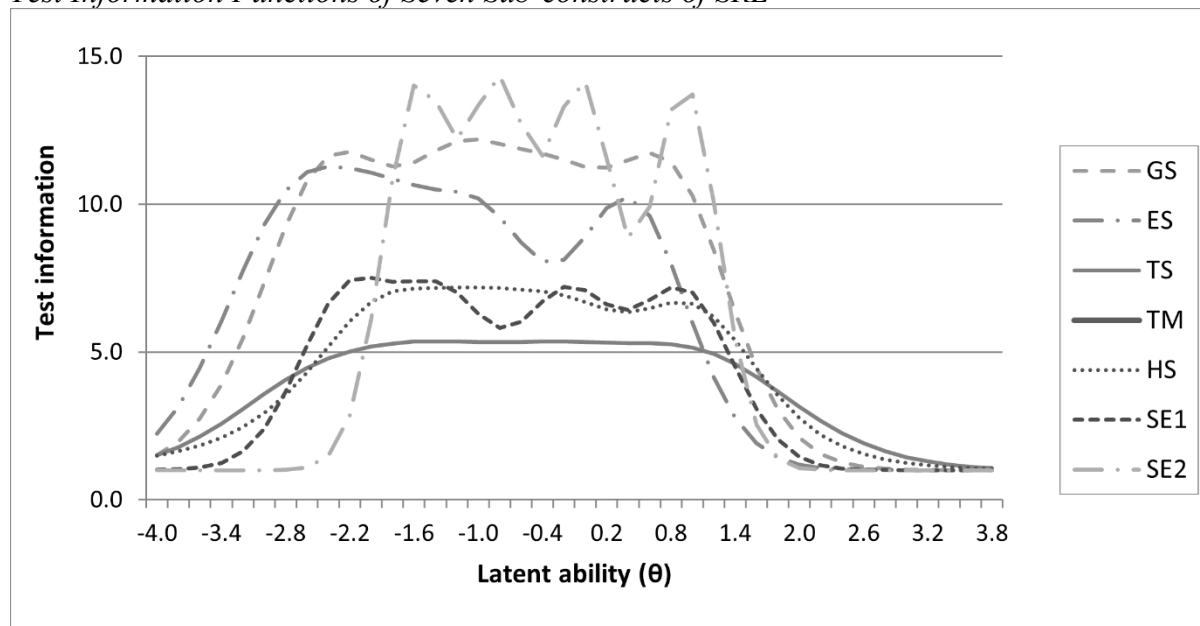
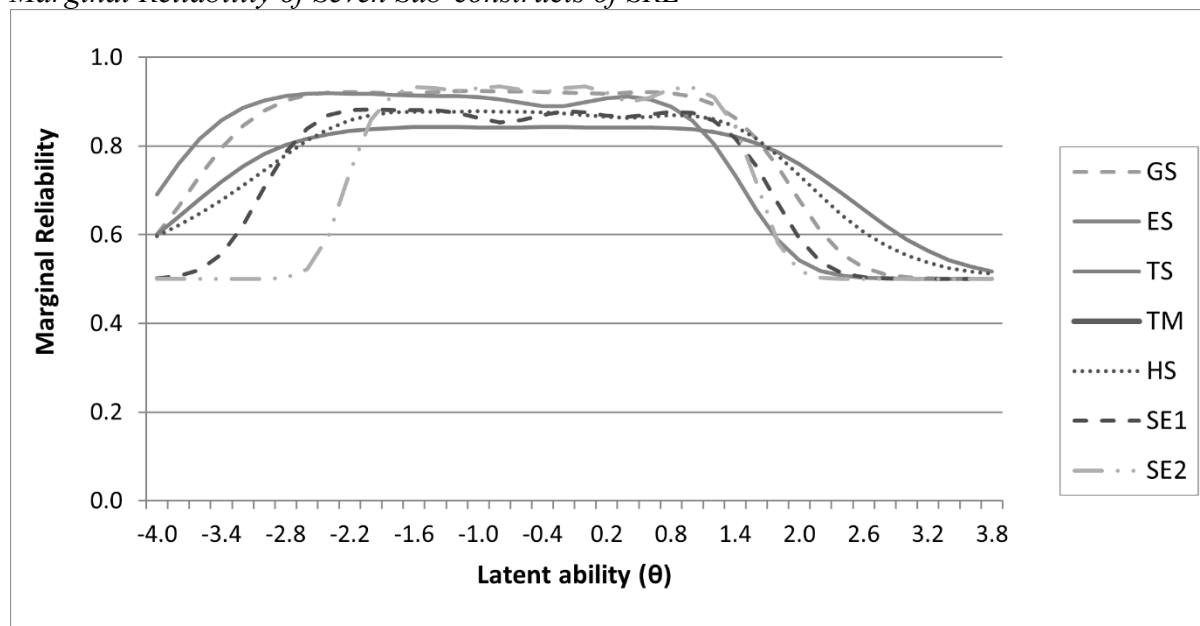


**Figure 3***Test Information Functions of Seven Sub-constructs of SRL*

Note. GS = Goal Setting, ES = Environmental Structuring, TS = Task Strategies, TM = Time Management, HS = Help-Seeking, SE1 = Self-Evaluation using Strategies, and SE2 = Self-Evaluation against Peers. X axis refers to latent ability ( $\theta$ ) of SRL, and Y-axis refers to test information estimated from item factor analyses.

**Figure 4***Marginal Reliability of Seven Sub-constructs of SRL*

Note. GS = Goal Setting, ES = Environmental Structuring, TS = Task Strategies, TM = Time Management, HS = Help-Seeking, SE1 = Self-Evaluation using Strategies, and SE2 = Self-Evaluation against Peers. X axis refers to latent ability ( $\theta$ ) of SRL, and Y-axis refers to marginal reliability ( $r_{xx}$ ) estimated from item factor analyses.

## Discussion

The OSLQ has been widely recognized as a useful instrument for assessing students' use of self-regulatory strategies in online learning environments (Roth et al., 2016).

Originally developed in the United States, the instrument has since been validated in various cultural contexts, such as Hong Kong (Fung et al., 2018; Lau, 2021), Turkey (Kilis & Yildirim, 2018), Singapore (Lin et al., 2023), and Brazil (Rufini et al., 2021), consistently demonstrating its reliability and cross-cultural applicability. Since how well a measurement instrument works can change across different educational systems and sociocultural environments, it is essential to test and validate the instrument before using it in a new context (Cho et al., 2007). As such, this study aimed to examine the dimensionality and item characteristics of the OSLQ for Korean students. Overall, the results underscore the psychometric soundness and cultural relevance of the OSLQ for assessing SRL among Korean college students, supporting its utility across varying levels of SRL abilities. The main findings and implications are outlined below.

First, the CFA results provided empirical support for a seven-factor structure of the OSLQ, offering a better fit than the original six-factor structure. This is consistent with Lau's (2022) recent validation study, which also questioned the unidimensionality of certain factors. The result is also corroborated by application studies, such as Vanslambrouck et al. (2019). These findings suggest that a refined seven-factor model may better capture the underlying dimensions of online SRL, particularly by distinguishing between different modes of Self-Evaluation.

Specifically, the IFA results indicated that the items loaded onto Self-Evaluation using Strategies had different psychometric features (i.e., item discriminations) from those loaded onto Self-Evaluation against Peers. This suggests that these two constructs may represent distinct dimensions of Self-Evaluation, each with unique characteristics and implications for students' SRL processes, especially within the Korean context. These findings might be attributed to the cultural characteristics of Korean higher education. Beik and Cho (2024) point out that Korean students tend to be highly sensitive to others' evaluations and rely heavily on social comparison. As they suggest, even though items fall under the same self-evaluation construct, students may perceive those involving peer comparison as fundamentally different in nature. This could explain why the factor split into two separate constructs. Another explanation is that online courses in this context tend to be designed to be individual-centric, which naturally reduces opportunities to engage in communication, peer feedback, or group-based activities (Yoo et al., 2014). Such instructional design also inadvertently limits the social aspects of self-evaluation, such as peer comparison. Consequently, students are more likely to depend on personal cognitive strategies, such as summarization and self-questioning, for evaluating their learning progress.

Next, the item-level analyses demonstrated that the OSLQ features high item discrimination across its components (see Figure 2). This indicates that individual items are effective in distinguishing between students with differing levels of SRL abilities. This finding suggests that the OSLQ is not only psychometrically sound, but also well-suited for capturing a wide spectrum of SRL behaviors among Korean college students, ensuring that it is a robust tool for both research and educational practice in this context.

Given that the marginal reliability was concentrated within a broad spectrum of latent ability ( $-2.5 < \theta < 1.5$ ), the test information in some sub-constructs of SRL was centered around lower levels of true ability (see Figure 3). This indicates that the OSLQ was particularly effective in assessing students with lower self-regulated learning abilities. Further research with diverse samples is needed to determine whether such partial functionality of the OSLQ is due to the characteristics of the Korean college sample or inherent limitations of the



OSLQ instrument itself. Further, to better capture higher levels of self-regulated learning, complementary survey items or additional measurement tools may be required.

A particularly noteworthy observation from our analysis is the pattern of responses among students with low SRL latent abilities ( $\theta < 0$ ). Despite their lower SRL levels, a substantial number of these students reported moderate to high use of SRL strategies (i.e., selecting “3. Neutral” and “4. Agree”). This trend implies that students might generally overestimate their SRL abilities. The fact that even lower-ability students report higher-than-average use of SRL strategies indicates a possible overestimation of their SRL abilities. These results align with research on metacognition, which suggest that students often exhibit poor metacognitive calibration, meaning they struggle to accurately access their own abilities (Dunlosky & Metcalfe, 2008; Hacker & Bol, 2019). These findings are further connected to the need for more objective or performance-based measures, rather than self-reported measures, to help students accurately assess and develop their SRL abilities (Winne & Perry, 2000).

Based on the findings mentioned above, we propose several practical implications for college educators. First, instructors should recognize that online courses may include diverse subgroup students who engage in SRL differently due to their cultural backgrounds. It is important to use culturally appropriate tools to accurately identify these groups and design learning activities and environments that address their specific needs. Second, for students with low SRL abilities, tailored support should be provided to promote equitable learning outcomes.

## **Limitations and Future Research**

The current study has some limitations. First, the goal was to investigate (a) dimensionality and (b) item characteristics (i.e., item discrimination and difficulty), both of which are fundamental aspects of validity and reliability evidence. However, we did not directly address issues of test fairness. As a key component of psychometric evidence, test fairness is critical for determining whether items function equivalently across different demographic groups (e.g., gender or age, Fung et al., 2019) or across time points (e.g., Jeong & Feldon, 2023), which allows for meaningful between and within group comparisons. Future research should systematically examine the fairness of the OSLQ by testing measurement invariance at the construct level and differential item functioning at the item level.

Next, the psychometric characteristics of the test are sample- and context-dependent (Lovett, 2023). Therefore, our findings can only be generalized to Korean higher education contexts. Furthermore, given that self-regulated learning processes vary substantially depending on context and culture (McInerney, 2008; Purdie et al., 1996), it is necessary to investigate the item characteristics of the OSLQ in other research contexts and to comprehensively compare these characteristics. Such efforts will enable us to develop an in-depth understanding of the SRL instruments, along with measuring students' SRL learning processes.

Furthermore, in the seven-factor model identified in this study, Self-Evaluation consists of two distinct sub-constructs: Self-Evaluation Using Strategies and Self-Evaluation against Peers (Vanslambrouck et al., 2019). In conjunction with the investigation of dimensionality, IFA analyses confirmed that these sub-constructs exhibit different psychometric characteristics. However, as each sub-construct includes only two items, they

are fully identified subparts of the model, which may lead to improving global model fit. To enhance the solid and robust psychometric evidence of OSLQ, future research should develop additional items for these sub-constructs and validate them with larger and more heterogeneous samples.

As pointed out in the SMA gird framework (Molenaar et al., 2023), it cannot be disregarded that self-reported measures remain valid and meaningful resources for assessing students' SRL processes. However, this approach is more suitable for capturing SRL before or after an intervention, rather than over the SRL learning process. Furthermore, response patterns of the self-report survey may be biased and even distorted by personal beliefs, social desirability, and individual's imprecise memory (Veenman, 2011). Therefore, to address the inherent limitations of self-reported measures, the item characteristics of the OSLQ should be triangulated with other objective data sources, such as trace data (e.g., Fan et al., 2021), contextual data in technology-enhanced learning settings (Sobocinski et al., 2024), and physiological data (Malmberg et al., 2021).

## **Conclusion**

The present study revisited the inconsistent factor structures of the OSLQ reported in previous validation studies and confirmed a seven-factor model using data from Korean higher education students. Notably, two new sub-constructs, Self-Evaluation Using Strategies and Self-Evaluation Against Peers, were identified. Item-level analyses using IFA revealed that the OSLQ items demonstrated high discrimination parameters and broad ranges of item difficulty, along with strong marginal reliability for students within a latent ability range of -2.5 to 1.5. These findings are significant in that they offer confirmatory evidence from a different academic context and strengthen prior research by providing robust reliability and validity evidence at the item level through more rigorous analytical approaches.

### ***Conflict of Interest Statement***

No conflict of interest was reported by the authors.

### ***Ethics Statement***

The study was reviewed by the Institutional Review Board at Utah State University. No violation of human research ethics was found during the study.

## References

- Azevedo, R. (2015). Defining and measuring engagement and learning in science: Conceptual, theoretical, methodological, and analytical issues. *Educational Psychologist*, 50(1), 84–94. <https://doi.org/10.1080/00461520.2015.1004069>
- Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S. L. (2009). Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education*, 12(1), 1–6. <https://doi.org/10.1016/j.iheduc.2008.10.005>
- Barnard-Brak, L., Paton, V. O., & Lan, W. Y. (2010). Profiles in self-regulated learning in the online learning environment. *International Review of Research in Open and Distributed Learning*, 11(1), 61–80. <https://doi.org/10.19173/irrodl.v11i1.769>
- Beik, A., & Cho, Y. (2024). Effects of goal orientation on online learning: A meta-analysis of differences in Korea and US. *Current Psychology*, 43(2), 1496–1506. <https://doi.org/10.1007/s12144-023-04389-4>
- Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education*, 27, 1–13. <https://doi.org/10.1016/j.iheduc.2015.04.007>
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185–216. <https://doi.org/10.1177/135910457000100301>
- Cheng, Z., Zhang, Z., Xu, Q., Maeda, Y., & Gu, P. (2025). A meta-analysis addressing the relationship between self-regulated learning strategies and academic performance in online higher education. *Journal of Computing in Higher Education*, 37(1), 195–224. <https://doi.org/10.1007/s12528-023-09390-1>
- Cho, H. J., Costa, E., Menezes, P. R., Chalder, T., Bhugra, D., & Wessely, S. (2007). Cross-cultural validation of the Chalder Fatigue Questionnaire in Brazilian primary care. *Journal of Psychosomatic Research*, 62(3), 301–304. <https://doi.org/10.1016/j.jpsychores.2006.10.018>
- de Mooij, S., Lämsä, J., Lim, L., Aksela, O., Athavale, S., Bistolfi, I., ... & Molenaar, I. (2025). A systematic review of self-regulated learning through integration of multimodal data and artificial intelligence. *Educational Psychology Review*, 37(2), 1–27. <https://doi.org/10.1007/s10648-025-10028-0>
- Dunlosky, J., & Metcalfe, J. (2008). *Metacognition*. Sage Publications.
- Dunn, K., & Hayakawa, T. (2021). Destination irrational procrastination: An exploration of the role of attributional thinking and self-regulation on procrastination in synchronous online graduate studies. *Online Learning*, 25(2), 276–290. <https://doi.org/10.24059/olj.v24i4.2205>
- Fan, Y., van der Graaf, J., Lim, L., Raković, M., Singh, S., Kilgour, J., ... & Gašević, D. (2022). Towards investigating the validity of measurement of self-regulated learning

- based on trace data. *Metacognition and Learning*, 17(3), 949–987.  
<https://doi.org/10.1007/s11409-022-09291-1>
- Ferrando, P. J. (2009). Difficulty, discrimination, and information indices in the linear factor analysis model for continuous item responses. *Applied Psychological Measurement*, 33(1), 9–24. <https://doi.org/10.1177/014662160831460>
- Funa, A. A., Gabay, R. A. E., Deblois, E. C. B., Lerios, L. D., & Jetomo, F. G. J. (2023). Exploring Filipino preservice teachers' online self-regulated learning skills and strategies amid the COVID-19 pandemic. *Social Sciences & Humanities Open*, 7(1), 100470. <https://doi.org/10.1016/j.ssaho.2023.100470>
- Fung, J. J., Yuen, M., & Yuen, A. H. (2018). Validity evidence for a Chinese version of the online self-regulated learning questionnaire with average students and mathematically talented students. *Measurement and Evaluation in Counseling and Development*, 51(2), 111–124. <https://doi.org/10.1080/07481756.2017.1358056>
- Guntur, M., & Purnomo, Y. W. (2024). A meta-analysis of self-regulated learning interventions studies on learning outcomes in online and blended environments. *Online Learning*, 28(3), 563–584. <https://doi.org/10.24059/olj.v28i3.4025>
- Hacker, D. J., & Bol, L. (2019). Calibration and self-regulated learning: Making the connections. In J. Dunlosky & K. A. Rawson (Eds.), *The Cambridge handbook of cognition and education* (pp. 647–677). Cambridge University Press.
- Hayes, S., Smith, S. U., & Shea, P. (2015). Expanding learning presence to account for the direction of regulative intent: self-, co-and shared regulation in online learning. *Online Learning*, 19(3), 15–31. <https://doi.org/10.24059/olj.v19i3.530>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.  
<https://doi.org/10.1080/10705519909540118>
- Järvelä, S., Nguyen, A., & Molenaar, I. (2023). Advancing SRL research with artificial intelligence. *Computers in Human Behavior*, 147, 107847.  
<https://doi.org/10.1016/j.chb.2023.107847>
- Jeong, S., & Feldon, D. F. (2023). Changes in self-regulated learning profiles during an undergraduate peer-based intervention: A latent profile transition analysis. *Learning and Instruction*, 83, 101710. <https://doi.org/10.1016/j.learninstruc.2022.101710>
- Joo, Y. J., Joung, S., & Kim, J. (2014). Structural relationships among self-regulated learning, learning flow, satisfaction, and learning persistence in cyber universities. *Interactive Learning Environments*, 22(6), 752–770.  
<https://doi.org/10.1080/10494820.2012.745421>
- Kilis, S., & Yıldırım, Z. (2018). Online self-regulation questionnaire: Validity and reliability study of Turkish translation. *Cukurova University Faculty of Education Journal*, 47(1), 233–245. <https://doi.org/10.14812/cuefd.298791>

- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Computers & Education*, 104, 18–33.  
<https://doi.org/10.1016/j.compedu.2016.10.001>
- Lau, K. L. (2022). Adaptation and validation of a Chinese online self-regulated learning questionnaire. *Journal of Psychoeducational Assessment*, 40(3), 438–444.  
<https://doi.org/10.1177/07342829211059979>
- Lai, C. L., & Hwang, G. J. (2016). A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course. *Computers & Education*, 100, 126–140. <https://doi.org/10.1016/j.compedu.2016.05.006>
- Lee, H. J., Lee, J., Makara, K. A., Fishman, B. J., & Teasley, S. D. (2017). A cross-cultural comparison of college students' learning strategies for academic achievement between South Korea and the USA. *Studies in Higher Education*, 42(1), 169–183.  
<https://doi.org/10.1080/03075079.2015.1045473>
- Li, Q., Baker, R., & Warschauer, M. (2020). Using clickstream data to measure, understand, and support self-regulated learning in online courses. *The Internet and Higher Education*, 45, 100727. <https://doi.org/10.1016/j.iheduc.2020.100727>
- Lin, F., Lim, L., Ho, Y. Y., Tan, B. Z., & Lim, W. Y. (2023). Validating and applying an adapted OSLQ to examine adult learners' online self-regulation. *Higher Education Research & Development*, 42(7), 1684–1699.  
<https://doi.org/10.1080/07294360.2023.2183938>
- Lovett, B. J. (2023). *Practical psychometrics: A guide for test users*. The Guilford Press.
- Malmberg, J., Fincham, O., Pijeira-Díaz, H. J., Järvelä, S., & Gašević, D. (2021). Revealing the hidden structure of physiological states during metacognitive monitoring in collaborative learning. *Journal of Computer Assisted Learning*, 37(3), 861–874.  
<https://doi.org/10.1111/jcal.12529>
- Martinez-Lopez, R., Yot, C., Tuovila, I., & Perera-Rodríguez, V. H. (2017). Online self-regulated learning questionnaire in a Russian MOOC. *Computers in Human Behavior*, 75, 966–974. <https://doi.org/10.1016/j.chb.2017.06.015>
- McInerney, D. M. (2008). The motivational roles of cultural differences and cultural identity in self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 369–400). Lawrence Erlbaum Associates Publishers.
- McManus, T. F. (2000). Individualizing instruction in a web-based hypermedia learning environment: Nonlinearity, advance organizers, and self-regulated learners. *Journal of Interactive Learning Research*, 11(2), 219–251.  
<https://www.learntechlib.org/primary/p/8486>
- Miles, J., & Shevlin, M. (2001). *Applying regression and correlation: A guide for students and researchers*. Sage Publications.

- Molenaar, I., de Mooij, S., Azevedo, R., Bannert, M., Järvelä, S., & Gašević, D. (2023). Measuring self-regulated learning and the role of AI: Five years of research using multimodal multichannel data. *Computers in Human Behavior*, 139, 107540. <https://doi.org/10.1016/j.chb.2022.107540>
- Muthén, L. K., & Muthén, B. O. (1998-2017). Mplus User's Guide (Version 8) [Computer Software]. Muthén & Muthén.
- Na, C., Jeong, S., Clarke-Midura, J., & Shin, Y. (2024). Linking self-regulated learning to community of inquiry in online undergraduate courses: A person-centered approach. *Educational Technology Research & Development*, 72(6), 2895–2920. <https://doi.org/10.1007/s11423-024-10380-y>
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50043-3>
- Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16, 385–407. <https://doi.org/10.1007/s10648-004-0006-x>
- Purdie, N., Hattie, J., & Douglas, G. (1996). Student conceptions of learning and their use of self-regulated learning strategies: A cross-cultural comparison. *Journal of Educational Psychology*, 88(1), 87–100. <https://doi.org/10.1037/0022-0663.88.1.87>
- Rhemtulla, M., Brosseau-Liard, P. É., & Savalei, V. (2012). When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological Methods*, 17(3), 354–373. <https://doi.org/10.1037/a0029315>
- Roth, A., Ogrin, S., & Schmitz, B. (2016). Assessing self-regulated learning in higher education: A systematic literature review of self-report instruments. *Educational Assessment, Evaluation and Accountability*, 28, 225–250. <https://doi.org/10.1007/s11092-015-9229-2>
- Rufini, S. É., Fernandes, J. G., Bianchini, L. G. B., & Alliprandini, P. M. Z. (2021). Brazilian version of Online Self-Regulated Learning Questionnaire (OSLQ): Evidence of validity. *Psicologia: Teoria e Pesquisa*, 37, e37547. <https://dx.doi.org/10.1590/0102.3772e37547>
- Samejima, F. (2016). Graded response models. In W. J. van der Linden (Ed.), *Handbook of item response theory* (Vol. 1, pp. 123–136). Chapman and Hall/CRC. [https://doi.org/10.1007/978-1-4757-2691-6\\_5](https://doi.org/10.1007/978-1-4757-2691-6_5)
- Satorra, A., & Bentler, P. M. (2010). Ensuring positiveness of the scaled difference chi-square test statistic. *Psychometrika*, 75(2), 243–248. <https://doi.org/10.1007/s11336-009-9135-y>
- Sharma, K., Nguyen, A., & Hong, Y. (2024). Self-regulation and shared regulation in collaborative learning in adaptive digital learning environments: A systematic review of empirical studies. *British Journal of Educational Technology*, 55(4), 1398–1436. <https://doi.org/10.1111/bjet.13459>

- Sobocinski, M., Dever, D., Wiedbusch, M., Mubarak, F., Azevedo, R., & Järvelä, S. (2024). Capturing self-regulated learning processes in virtual reality: Causal sequencing of multimodal data. *British Journal of Educational Technology*, 55(4), 1486–1506. <https://doi.org/10.1111/bjet.13393>
- The jamovi project (2025). Jamovi (Version 2.5) [Computer Software]. <https://www.jamovi.org>.
- Topping, K. J. (2009). Peer assessment. *Theory into Practice*, 48(1), 20–27. <https://doi.org/10.1080/00405840802577569>
- Turingan, J. P., & Yang, Y. C. (2009). A cross-cultural comparison of self-regulated learning skills between Korean and Filipino college students. *Asian Social Science*, 5(12), 3–10. <https://doi.org/10.5539/ass.v5n12p3>
- Vanslambrouck, S., Zhu, C., Pynoo, B., Lombaerts, K., Tondeur, J., & Scherer, R. (2019). A latent profile analysis of adult students' online self-regulation in blended learning environments. *Computers in Human Behavior*, 99, 126–136. <https://doi.org/10.1016/j.chb.2019.05.021>
- Veenman, M. V. J. (2011). Alternative assessment of strategy use with self-report instruments: A discussion. *Metacognition and Learning*, 6(2), 205–211. <https://doi.org/10.1007/s11409-011-9080-x>
- Winne, P. H., & Perry, N. E. (2000). Measuring self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 531–566). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50045-7>
- Wirth, R. J., & Edwards, M. C. (2007). Item factor analysis: current approaches and future directions. *Psychological Methods*, 12(1), 58–79. <https://doi.org/10.1037/1082-989X.12.1.58>
- Yeh, Y. C., Kwok, O. M., Chien, H. Y., Sweany, N. W., Baek, E., & McIntosh, W. A. (2019). How college students' achievement goal orientations predict their expected online learning outcome: The mediation roles of self-regulated learning strategies and supportive online learning behaviors. *Online Learning*, 23(4), 23–41. <https://doi.org/10.24059/olj.v23i4.2076>
- Yoo, S., Jeong Kim, H., & Young Kwon, S. (2014). Between ideal and reality: A different view on online-learning interaction in a cross-national context. *Journal for Multicultural Education*, 8(1), 13–30. <https://doi.org/10.1108/JME-09-2013-0043>
- Zhao, Y., Li, Y., Ma, S., Xu, Z., & Zhang, B. (2025). A meta-analysis of the correlation between self-regulated learning strategies and academic performance in online and blended learning environments. *Computers & Education*, 230, 105279. <https://doi.org/10.1016/j.compedu.2025.105279>
- Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50031-7>

## Appendix

### Item Parameters

**Table A1**

*Standardized Factor Loadings of CFA model With the Seven-Factor Model*

| <i>Items</i>                            | Standardized<br>Factor loadings | <i>SE</i> | <i>z-scores</i> | <i>p-value</i> |
|-----------------------------------------|---------------------------------|-----------|-----------------|----------------|
| <i>Goal Setting</i>                     |                                 |           |                 |                |
| Q1                                      | 0.75                            | 0.03      | 29.96           | < .001         |
| Q2                                      | 0.75                            | 0.03      | 27.59           | < .001         |
| Q3                                      | 0.79                            | 0.02      | 33.54           | < .001         |
| Q4                                      | 0.81                            | 0.02      | 37.58           | < .001         |
| Q5                                      | 0.79                            | 0.02      | 33.09           | < .001         |
| <i>Environment Structuring</i>          |                                 |           |                 |                |
| Q6                                      | 0.79                            | 0.04      | 21.43           | < .001         |
| Q7                                      | 0.83                            | 0.03      | 33.98           | < .001         |
| Q8                                      | 0.75                            | 0.03      | 24.54           | < .001         |
| Q9                                      | 0.78                            | 0.03      | 30.60           | < .001         |
| <i>Task Strategies</i>                  |                                 |           |                 |                |
| Q10                                     | 0.67                            | 0.03      | 21.21           | < .001         |
| Q11                                     | 0.66                            | 0.03      | 21.62           | < .001         |
| Q12                                     | 0.64                            | 0.03      | 20.27           | < .001         |
| Q13                                     | 0.74                            | 0.03      | 25.68           | < .001         |
| <i>Time Management</i>                  |                                 |           |                 |                |
| Q14                                     | 0.81                            | 0.02      | 34.04           | < .001         |
| Q15                                     | 0.71                            | 0.03      | 23.13           | < .001         |
| Q16                                     | 0.74                            | 0.03      | 26.67           | < .001         |
| <i>Help-Seeking</i>                     |                                 |           |                 |                |
| Q17                                     | 0.76                            | 0.03      | 25.52           | < .001         |
| Q18                                     | 0.84                            | 0.02      | 35.95           | < .001         |
| Q19                                     | 0.52                            | 0.04      | 12.99           | < .001         |
| Q20                                     | 0.63                            | 0.03      | 18.72           | < .001         |
| <i>Self-Evaluation using Strategies</i> |                                 |           |                 |                |
| Q21                                     | 0.84                            | 0.02      | 45.08           | < .001         |
| Q22                                     | 0.87                            | 0.02      | 44.00           | < .001         |
| <i>Self-Evaluation against Peers</i>    |                                 |           |                 |                |
| Q23                                     | 0.93                            | 0.01      | 84.79           | < .001         |
| Q24                                     | 0.93                            | 0.01      | 68.10           | < .001         |



**Table A2***Item Discrimination and Item Difficulty Parameters*

| Item                             | Item           | Item Difficulty |                 |                 |                 |
|----------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|
|                                  | Discrimination | Threshold 1     | Threshold 2     | Threshold 3     | Threshold 4     |
|                                  | $a$            | $(b_1: 1/2345)$ | $(b_2: 12/345)$ | $(b_3: 123/45)$ | $(b_4: 1234/5)$ |
| Goal Setting                     |                |                 |                 |                 |                 |
| Q1                               | 1.54           | -2.68           | -2.06           | -0.93           | 0.50            |
| Q2                               | 1.43           | -2.75           | -1.76           | -0.68           | 0.52            |
| Q3                               | 1.54           | -1.93           | -0.91           | 0.13            | 1.04            |
| Q4                               | 1.51           | -2.48           | -1.44           | -0.38           | 0.83            |
| Q5                               | 1.92           | -2.43           | -1.18           | -0.29           | 0.80            |
| Environment Structuring          |                |                 |                 |                 |                 |
| Q6                               | 1.38           | -3.04           | -2.24           | -1.11           | 0.43            |
| Q7                               | 1.74           | -3.11           | -2.31           | -1.27           | 0.28            |
| Q8                               | 1.70           | -2.50           | -1.78           | -0.68           | 0.52            |
| Q9                               | 1.85           | -2.70           | -1.86           | -0.95           | 0.44            |
| Task Strategies                  |                |                 |                 |                 |                 |
| Q10                              | 1.15           | -2.24           | -1.36           | -0.44           | 0.84            |
| Q11                              | 0.96           | -1.63           | -0.27           | 0.60            | 1.50            |
| Q12                              | 0.96           | -2.28           | -1.06           | 0.14            | 1.31            |
| Q13                              | 1.20           | -2.65           | -1.50           | -0.21           | 1.06            |
| Time Management                  |                |                 |                 |                 |                 |
| Q14                              | 1.69           | -2.40           | -1.35           | -0.23           | 0.90            |
| Q15                              | 1.21           | -2.22           | -1.29           | -0.37           | 0.85            |
| Q16                              | 1.27           | -2.43           | -1.35           | -0.18           | 0.98            |
| Help-Seeking                     |                |                 |                 |                 |                 |
| Q17                              | 1.37           | -1.95           | -1.25           | -0.40           | 0.99            |
| Q18                              | 1.71           | -1.84           | -0.98           | -0.17           | 0.96            |
| Q19                              | 0.73           | -2.90           | -1.94           | -0.54           | 1.01            |
| Q20                              | 1.09           | -2.46           | -1.26           | 0.07            | 1.22            |
| Self-Evaluation using Strategies |                |                 |                 |                 |                 |
| Q21                              | 1.94           | -2.22           | -1.45           | -0.25           | 0.83            |
| Q22                              | 1.92           | -2.19           | -1.25           | -0.06           | 0.99            |
| Self-Evaluation against Peers    |                |                 |                 |                 |                 |
| Q23                              | 2.87           | -1.61           | -0.86           | -0.06           | 0.90            |
| Q24                              | 2.76           | -1.52           | -0.76           | 0.01            | 0.97            |

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# Developing Confidence, Developing Skills: The Perceived Effect of Professional Development on Online Teaching

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## Abstract

A large body of research has documented weaker student performance in online courses relative to face-to-face courses across multiple outcomes, including grades, course completion, and persistence. These gaps are particularly pronounced for underserved students. In response, colleges and universities have sought to improve the quality of online instruction by providing technology resources, student and faculty technical support, and, the focus of this study, professional development for faculty teaching online. However, despite the increasing popularity of professional development for online instructors, evidence on its effectiveness in shaping faculty practices and confidence remains limited. This study used survey data from 82 faculty at two Southern California community colleges following

participation in structured professional development programs designed to improve online teaching. The professional development programs focused on core learning theories and practical strategies for engaging virtual learners. We find that the majority of faculty reported adopting techniques related to the creation of a supportive and welcoming environment, recorded video introductions and lectures, and increased student-student interaction. In addition, instructors reported increased confidence in adopting teaching methods in almost all assessed areas. In technical areas, most respondents reported increased confidence in skills related to building an online course, creating online assignments and materials, and interacting with students. In soft skill areas, most respondents reported increased confidence in skills related to development of a welcoming, equitable online environment. These survey results underscore the critical role of professional development in shaping instructors' online teaching confidence and practices.

*Keywords:* Professional development; Training; Online teaching; Pedagogy; Postsecondary education; Fully-online classes

Hill, M. S., Hart, C. M. D., Baker, R. B., Xu, D., Alonso, E., Nguyen, A., d'Arcy, K., Bailey, C., VanNorman, T., Nguyen, V., & Pakula, J. (2025). Developing confidence, developing skills: The perceived effect of professional development on online teaching. *Online Learning*, 29(4), 199-236. <https://doi.org/10.24059/olj.v29i4.5208>

## Introduction

Online education is often seen as a means to expand access and promote equity in higher education, particularly for historically underserved students and nontraditional learners (Means et al., 2010; Seaman et al., 2018). For instance, online courses can offer greater scheduling flexibility for working students or caregivers and expand geographic access for students in remote and rural locations (Hill & Hart, in press; Jaggars, 2014). However, the impact of online education on student outcomes has been mixed. A robust body of research has found poorer student performance in online courses compared to face-to-face courses along multiple outcomes, including student grades, probability of course completion, and probability of overall persistence (e.g., Bettinger et al., 2017; Hart et al., 2018; Johnson & Mejia, 2014; Xu & Jaggars, 2011; Xu & Xu, 2019; Xu & Xu, 2020). The gaps in student outcomes tend to be more pronounced for students typically underserved in higher education, such as Black and Hispanic students (Hart et al., 2018; Xu & Jaggars, 2014). However, other studies point to specific settings and instructional strategies that may reduce performance gaps between online and traditional instruction (e.g., Johnson & Mejia-Cuellar, 2014; Paul & Jefferson, 2019). In response, colleges and universities have sought to improve the quality of online instruction through strategies such as providing technology resources, providing student and faculty technical support, and offering professional development for faculty who are teaching online (Brooks & Grajek, 2020; Scherer et al., 2021).

Online teaching differs from face-to-face instruction in several ways (Dennen et al., 2022; Rovai, 2004; Xu & Xu, 2019), suggesting the need for specific professional development. First, online teaching requires a set of technology skills related to the design of the class, delivery of instruction, and management of the class in the learning management system (Brinkley-Etz Korn, 2018; Rovai, 2004). In addition, online course design and delivery both require distinct strategies and planning to provide effective instruction (Philipsen et al., 2019). In addition, building a sense of community and social presence for both instructors and students can be challenging (Garrison et al., 1999; Garrison & Arbaugh, 2007; Rovai, 2004; Shea & Bidjerano, 2010). Despite these unique challenges to online teaching, research conducted in California Community Colleges suggested that immediately prior to the COVID-19 pandemic, most faculty teaching online were not trained in skills such as fostering student-to-student interaction or class organization (Hart et al., 2021a). A lack of training specific to online instruction may result in substantial learning costs for faculty when they first teach online, regardless of prior teaching experience (Brooks & Grajek, 2020; Scherer et al., 2021).

Historically, many professional development offerings for online instruction have targeted the technology skills necessary to design and deliver learning online (Lewis & Abdul-Hamid, 2006; Segrave et al., 2005). However, a growing number of colleges have begun offering comprehensive professional development that incorporates practical instructional strategies related to online teaching as well as an explanation of the theoretical basis for these approaches (Bailey & Card, 2009; Baran & Correia, 2014; Borup & Evmenova, 2019; Segrave et al., 2005). Strategies can include the application of best practices focused on online classroom management; the development of a humanized, welcoming and inclusive learning environment; and the facilitation of active and applied learning activities (Mohr & Shelton, 2017; Xu et al., 2025). Despite institutional and faculty investments in training, there is limited empirical evidence related to the influence of professional development on faculty behavior when teaching online.

This study uses survey data from faculty at two Southern California community colleges, Saddleback College and Irvine Valley College, that offered structured professional development programs for faculty to improve online teaching. This training focused on several key theoretical learning concepts and practical online best practices, particularly related to making meaningful connections with virtual learners. The purpose of this study is to better understand instructors' perceptions of the extent to which such training exposed them to new areas of skill, as well as the extent to which instructors reported changes in practices and confidence in online teaching following the training. Insights gleaned from this study may help administrators at other colleges who are considering implementing professional development to hone faculty online teaching skills.

## **Literature Review**

### ***Professional Development in Higher Education***

There has been a substantial increase in the professional development opportunities for postsecondary instructors focusing on online teaching and learning (Lay et al., 2020; Leary et al., 2020). This growth has been particularly pronounced since the COVID-19 pandemic, which forced institutions to rapidly adopt remote instruction (Hart et al., 2021a) and develop professional development opportunities for faculty and staff (Chan et al., 2021). Colleges and universities across the country have expanded their professional development offerings, signaling a broader recognition of the importance of faculty training in improving online education (Allen & Seaman, 2010; Brooks & Grajek, 2020). For instance, there are several organizations—like the Online Learning Consortium (Online Learning Consortium, n.d.) and Quality Matters (Quality Matters, n.d.)—that provide training and certifications in online teaching that are built following best practices to improve student engagement and success in both online and blended learning environments.

Improving online course quality is important because while online courses offer flexibility and broad access, research consistently shows that successful online learning often imposes greater challenges on community college students, particularly among groups of students typically underserved in higher education, such as Black and Hispanic students (Hart et al., 2018; Xu & Jaggars, 2014). These students often face not only technological and logistical barriers but also a lack of connection and engagement in virtual classrooms (Pacansky-Brock et al., 2020).

In response, many researchers and practitioners have called for a shift toward “humanizing online teaching,” a pedagogical approach that emphasizes empathy, trust, equity, and authentic instructor-student relationships as a foundation to online learning success (Pacansky-Brock et al., 2020; Xu et al., 2025). By creating stronger instructor presence, using more inclusive language, providing personalized and empathetic feedback, and designing spaces for student voices, humanized practices have the potential to foster student sense of belonging, confidence, and engagement, especially among students from historically marginalized groups (Garrison et al., 1999; Garrison & Arbaugh, 2007; Pacansky-Brock et al., 2020; Rovai, 2004; Xu et al., 2025). Yet, to implement humanizing practices, as well as other effective online instructional techniques, faculty must develop new pedagogical skills and mindsets through targeted training for online instruction (Powell & Bodur, 2019; Rovai & Downey, 2010; Wolf, 2006).

Other aspects of online courses demand unique approaches as well. For instance, course content in online courses must be presented thoughtfully. The use of modules within learning management systems can make course organization clearer, while using a variety of presentation methods (e.g., using video and audio as well as text) can help improve student engagement (Rovai, 2004; Jaggars et al., 2013). Advances in educational technology, such as learning management systems and multimedia tools, have created a pressing need for faculty to adopt new methods and tools effectively (Brinkley-Etz Korn, 2018). To address these unique demands to online teaching, many institutions now offer professional development programs for online instruction (Hart et al., 2025), underscoring their growing importance in higher education.

Professional development programs for online teaching encompass a variety of formats and focuses (Powell & Bodur, 2019). Programs may be delivered in-person, online, or in hybrid formats, with content ranging from basic technical training to comprehensive instruction on pedagogy, accessibility, and student engagement. Among these options, structured programs that integrate theoretical frameworks with practical strategies have gained prominence, with many of these programs aiming to provide faculty with not only the tools to teach online but also the pedagogical foundations necessary to foster meaningful classroom interactions and equitable learning environments (Darling-Hammond et al., 2017; Garrison et al., 1999; Garrison & Arbaugh, 2007; Guilbaud et al., 2021). As described below, the type of professional development examined in this study was intended to provide such a comprehensive approach, making it highly relevant to ongoing discussions about effective faculty training (Bailey & Card, 2009; Scherer et al., 2021).

A small but growing number of studies have examined the potential impact of online teaching-focused professional development on faculty perceptions and behaviors (Borup & Evmenova, 2019; Dede et al., 2009, Xu et al., 2025). Research has shown that professional development participation often increases instructors' confidence in designing online courses, engaging students, and incorporating accessibility features (Brinkley-Etz Korn, 2018; Guilbaud et al., 2021; Richards & Thompson, 2023). Faculty trained in online teaching are more likely to adopt best practices such as using multimedia tools, facilitating collaborative learning, and creating equitable course environments (Bailey & Card, 2009). However, there is significant variation in the extent to which these practices are implemented (Leary et al., 2020), and instructors' implementation of online instructional skills and techniques taught in professional development may languish if insufficient follow-up support is offered (Brinkley-Etz Korn, 2020). While many instructors adopt practices such as accessibility tools and asynchronous interaction strategies, others underuse tools like video feedback, highlighting the uneven impact of professional development programs (Scherer et al., 2021). Mixed-methods research suggests that instructors who go through professional development do not always transfer skills learned in professional development programs to their subsequent teaching, resulting in limited impacts on student outcomes (Zhou et al., 2025). As detailed in the methods section, the professional development programs reviewed in this study provide practical opportunities to implement these skills in a real-world context, encouraging the subsequent transfer of these practices to future courses (Zhou et al., 2025).

### ***Online Professional Development in California Community Colleges***

California's community college system is the largest system of higher education in the United States, and the system has recognized the role of online courses in providing students with access to courses that provide flexibility in scheduling (California Community Colleges

Chancellor's Office, 2017). In California, statewide initiatives such as the California Virtual Campus-Online Education Initiative (CVC-OEI) and the Online Network of Educators (@ONE) program have been instrumental in providing structured professional development to enhance online teaching practices (California Virtual Campus-Online Education Initiative, 2020). The CVC-OEI, funded by the California Community Colleges Chancellor's Office, seeks to increase the number of students obtaining associate degrees and transferring to four-year institutions by expanding access to high-quality online courses and support services (Nguyen, 2017). These initiatives aim to improve course quality and accessibility, addressing the unique challenges faced by community college students in the online learning environment. As part of this effort, the CVC-OEI created an online course design rubric to provide colleges with guidelines around online teaching quality indicators such as accessibility, collaboration, and interaction strategies, reflecting institutional goals for online education (California Virtual Campus-Online Education Initiative, 2020).

Complementing this effort, the Online Network of Educators (@ONE) initiative, supported by the California Community Colleges Chancellor's Office, was established to equip California community college faculty with skills intended to improve online teaching effectiveness (Online Network of Educators, n.d.a.). @ONE provides training and resources specifically developed to help educators create online learning experiences that are accessible, student-centered, and effective (California Virtual Campus-Online Education Initiative, 2020). The @ONE program offers several foundational courses and workshops on topics such as online course design, accessibility, and equity (Online Network of Educators, n.d.b).

The programs offered by @ONE have also influenced the in-house professional development offered by California Community Colleges, including the programs featured in this paper. While some California Community Colleges lacked dedicated, in-house professional development in online learning pre-COVID, most colleges—including the two focal colleges in our study—had such programs in place (Hart et al., 2025), and the availability of such in-house programs may have expanded further given intensified efforts at training faculty during the pandemic (Hart et al., 2021b). Colleges' integration of these system-level initiatives has resulted in professional development programs that provide guidance that aligns with statewide standards, aiming to foster faculty proficiency in online instruction and enhance student success.

### ***Research Questions***

To better understand instructors' perceptions of how professional development shaped their online teaching experiences, and the extent to which the training exposed instructors to new skills, we ask the following questions:

1. What online teaching skills did faculty report receiving previous training in before participating in the focal online teaching professional development?
2. What practices do faculty report changing after participating in the focal online teaching professional development?
3. How has faculty confidence in their online teaching skills changed after participating in the focal online teaching professional development?

Below, we describe the training offered by the two colleges in our study, as well as the survey methods used to answer these questions.

## Methods

### *Study Context*

This study employed surveys to investigate instructor experiences with professional development for online instruction in two focal colleges: Saddleback College and Irvine Valley College. The professional development programs at Saddleback College and Irvine Valley College focused on strategies and skills that instructors can use to improve overall online course quality. Courses were facilitated by instructional designers and expert faculty with extensive online teaching experience. Both colleges delivered professional development in an asynchronous format, though the specific structure of training differed across campuses. Each college offered multiple versions of courses across the periods studied as course topics were refined over time and new courses were created. For instance, in 2019 and 2020, Irvine Valley College created the Canvas Challenge Camps. These were run for three days for each session, offering eight hours each day of facilitated learning based on the CVC-OEI Course Design Rubric. In the Challenge Camp, faculty were required to create a Canvas shell that aligned with this rubric, in order to obtain the Online Teaching Certificate. While Irvine Valley College also offered an earlier, asynchronous version of training with some overlap in topics, the vast majority of participants in our sample (described below) participated in the Challenge Camp version of professional development. Similarly, Saddleback offered several different asynchronous training programs, including a popular 8–10 week program that required up to 10 hours of engagement each week. Like Irvine Valley's, the Saddleback training was built to help faculty design courses aligned with the Course Design Rubric and required faculty to create Canvas shells aligned with the rubric in order to earn an Online Educator Certificate. While neither college mandated training, individual departments could require instructors to obtain training before being staffed in online classes.

The professional development curricula at both colleges were designed to align with the rubric designed by the CVC-OEI to guide online course quality, as well as @ONE training courses (Online Network of Educators, n.d.b). The CVC-OEI course design rubric provides a standardized framework for instructors to design online courses that foster accessibility, inclusivity, and engagement. Additionally, key components of the colleges' professional development programs were inspired by several @ONE courses, specifically "Introduction to Course Design," "Humanizing Online Teaching," "Assessment in Digital Learning," "10-10-10: Communication Matters," and "Introduction to Teaching with Canvas." Curricular elements inspired by these courses related to overall course design and focused on the principles of backward and universal design as they apply to online instruction. Using backward design techniques, professional development participants practiced beginning the design process with the course and unit-level objectives in mind, designing content specifically around meeting those objectives (Wiggins & McTighe, 2005). Concurrently, participants were exposed to basic concepts of universal design for learning that encourages the use of multiple means of student engagement, expression, and representation (CAST, 2024). Universal design for learning also places emphasis on accessibility for all students, particularly those with unique learning needs. These units were designed to help participants apply evidence-based design principles to create courses that are both accessible and pedagogically sound, focusing on clarity, structure, and engagement. For instance, participants learned how to establish a foundational course outline and design learning units with measurable outcomes.



Curricular elements related to humanizing instruction focused on creating a sense of community and fostering meaningful student interactions. Recognizing the importance of empathy and instructor presence, particularly for underserved students, training elements in this vein offered strategies for developing inclusive and supportive online learning environments by effectively communicating instructor presence, empathy, and support for students. Elements related to assessment in digital learning focused on how to create effective assessments. For example, participants at both colleges learned to apply the “assessment loop,” a framework for designing clear, equitable, and goal-aligned assessments that support student learning and engagement. The training guided participants in developing both formative and summative assessments that reflect the learning objectives and incorporate timely, meaningful feedback. Finally, curricular elements of the training focused on communication addressed the impact of first impressions and early interactions on student engagement and retention, emphasizing the importance of designing online courses that resonate with students within the first 10 minutes, 10 hours, and 10 days of instruction.

### ***Survey Administration***

To explore online instructors’ experiences with professional development for online teaching in these two colleges, we sent survey invitations to 207 potential participants who had completed professional development courses on online teaching at Irvine Valley College or Saddleback College, and who taught online in the colleges after fall 2016.<sup>2</sup> Participation in professional development was voluntary during this period, and our survey sample represents fewer than half of all faculty who taught online at the two colleges. The surveys were conducted in spring 2023 at Saddleback College and fall 2023 at Irvine Valley College.

We undertook several measures to provide potential respondents with clear information and boost participation rates. First, research partners associated with the offices that provided training at each college sent prenotification emails to potential participants. These prenotification emails provided information about the survey and included a link to a video in which research team members described the purpose of the study and what study participation would entail. About a week after the prenotification emails, we sent initial email invitations. We sent weekly reminders for five weeks until the survey closed to boost response rates (Cook et al., 2000). Respondents were offered a \$100 Amazon gift card for study participation, which included both survey completion and permission for the research team to access Canvas data for up to two courses that they taught; this Canvas data will be analyzed in future work. We ultimately received responses from 82 participants, a 39.6% response rate; this response rate is roughly in line with response rates typically reported for online surveys (Cook et al., 2000), including studies of faculty in higher education settings (Kaplowitz et al., 2012). Drawing from administrative data on instructor characteristics, we show that respondents and non-respondents were not significantly different from each other in terms of demographics, faculty type (e.g., full-time academic faculty, associated faculty), or experience (Appendix Table A1).

Survey questions incorporated information unique to each respondent. For instance, we asked respondents to answer questions with respect to a specific professional development training that college records showed they had taken. We also asked about instructional practices in a specific online class taught by each respondent that had been identified in

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<sup>2</sup> The requirement that instructors teach after fall 2016 was due to our interest in collecting data from Canvas course shells, which we describe below; Canvas was adopted as the learning management system for both colleges in 2016.

administrative data as having been taught online between 2016 and 2019. This helped respondents focus on instructional practices in one class rather than more broadly changes that may have occurred in various classes, improving the internal consistency of responses.

Because we asked for information about a personalized set of courses—and in order to facilitate linking to administrative data for comparisons of participants to non-participants—Qualtrics survey links were personalized for each potential participant.

### ***Survey Content and Measures***

To understand the extent to which engagement in the professional development programs changed instructor practices and confidence in online teaching skills, we designed the survey to include five main blocks of questions: (1) instructors' teaching and professional development history, (2) course management practices before and after the focal professional development training, (3) confidence using various instructional strategies, (4) sources of information influencing practice, and (5) participant characteristics. These categories and the underlying questions (included in Appendix B) were developed based on a validated survey used to assess behavioral changes in a similar online professional development program (see Xu et al., 2025) and refined through consultation with leaders in distance education and professional development course instructors at the focal colleges.

Our tables and graphs present the share of respondents who endorsed different mutually exclusive responses to questions asked about teaching practices and confidence in online courses, as detailed below. In some cases, as described below, we combine categories where appropriate.

#### **Prior Training and Professional Development History**

To contextualize participants' backgrounds and the possible influence of prior professional development on confidence and changes in practice, respondents were asked about their history of taking professional development for online education. In addition, we confirmed that respondents recalled enrolling in the professional development program that focal college records indicated that they had completed and the term of completion. All respondents confirmed their participation in accordance with college records. We also asked whether respondents had received other professional development focused specifically on online pedagogy, aside from the focal professional development course, and where respondents had received prior training (e.g., other courses at the focal college, courses at other community colleges, courses through the @ONE program, etc.). For instructors who had taken other professional development, we also drilled down into the specific skills that they had received instruction on through other providers (e.g., organizing online course content, course pacing, etc.) We created a binary measure capturing whether respondents reported being trained in each area specifically for online instruction prior to the focal training.

#### **Course Management Practices**

We used several approaches to probe for information on participants' course practices in online instruction and how they may have changed as a result of professional development. To answer these questions, we asked that respondents consider a specific class that they had taught online between 2016 and 2019 according to administrative records. We included a question confirming with respondents that they had, in fact, taught the online class in

question; the vast majority reported having taught the course we asked about during that time frame. For the few respondents who had not taught the identified course online but had taught other online courses ( $n = 3$ ), we asked them to choose one of those online courses to serve as the reference course for the following questions and to provide us with the course number. Similarly, if a respondent had not taught online during 2016–2019 ( $n = 6$ ), we asked them to reference an online course taught in a different term and to report the course number and term. This approach ensured that all respondents focused on one concrete online course, even if it differed from the course identified in our records.

Key questions in this block asked respondents about when they first started using different recommended practices in online instruction: before taking the target professional development, within one year of the target professional development, more than one year after taking the professional development, or never. Sample practices included sending a welcome email prior to the start of the course; including specific grading criteria/rubrics for course assignments; and leaving video or voice feedback for students, which are considered best-practice strategies for high-quality online classes (Rovai, 2004; Jaggars et al., 2013) and are highlighted by the CVC-OEI Course Design Rubric (California Virtual Campus-Online Education Initiative, 2020). For each practice, we coded instructors' implementation timing based on whether they reported never having instituted the practice, having instituted it prior to the focal professional development program, or having instituted it after taking the focal professional development program (either within one year of the target professional development or more than one year afterwards).

We also asked whether participants' use of certain practices in online pedagogy increased, decreased, or stayed the same after taking the target professional development course. For instructors who did not report teaching online prior to professional development, we simply asked them whether they engaged in the sample practices of interest. Participants were also given the option to state they had never engaged in a particular practice. In this report, we focus only on results for faculty who taught online pre-professional development ( $n = 48$ ) and who can therefore report meaningfully on changes in their practices.

We asked about changes in practices to two broad domains of online teaching skills: promoting student-to-student engagement in online courses and promoting student engagement with course content. Sample practices related to promoting student engagement with other students in the course included having students interact asynchronously with each other (e.g., via Canvas or iLearn discussions); having students interact synchronously with each other (e.g., over Zoom) and providing collaborative work for students. Sample practices related to student engagement with course content included providing formative assessments; asking students to reflect on their learning; providing tools such as closed captions or alt-text to improve the accessibility of the course; and providing lecture content through different formats such as video, audio (e.g., voice integrated with PowerPoint), slides without accompanying video or audio, and text only (e.g., written lecture notes).

For each practice, we grouped instructors into three categories: those whose use of a practice increased post-professional development, those whose use of a practice decreased post-professional development, and those whose use stayed the same. The latter category included those who never used the practice, since non-use both before and after professional development constitutes a lack of change in level of use.

## Comfort and Confidence in Online Teaching

Our survey asked about instructors' changes in confidence after taking the professional development course in several domains. For instance, we asked about confidence executing different practices in Canvas or other Learning Management Systems to achieve course goals. Sample practices we asked about included building an online course, uploading course content, interacting with students, and recording grades in Canvas. We also asked about confidence in other specific domains of online pedagogy, such as facilitating meaningful student-student interaction, facilitating meaningful instructor-student interaction, providing an equitable online learning environment for all learners, designing a welcoming environment for students, etc. Respondents could report that their confidence increased, decreased, or stayed the same; or that they "did not do" the domain in question. Responses were dropped for instructors who reported that they "did not do" the domain in question, since analyzing changes in confidence did not make sense for respondents who did not use a particular pedagogical practice.

## Influences on Online Teaching

In our final block of our questions on online teaching, we named several potential sources of influence on online teaching practices and asked respondents to rate how influential each had been for them personally. These questions were not analyzed for this study, but more detail on these question is available in Appendix B.

## Participant Characteristics

The survey closed by requesting background information for each participant, including their age, gender identity, race/ethnic identity, and their highest degree earned.

## *Analytic Approach*

We present results from the survey descriptively, using descriptive tables and bar graphs. Each item is analyzed separately; that is, we do not combine items to form scales. This is because items asked in the same question block were not necessarily expected to be correlated in predictable directions. For instance, we might expect training to increase some types of course practices (e.g., the use of self-recorded video to present course content) while decreasing others (e.g., use of static text to present course materials).

While the two colleges had separate professional development programs, many of the core topics overlapped (e.g., providing welcoming environments, facilitating interaction and collaboration in online classes) and they had qualitatively very similar patterns of findings. We therefore pool results from both colleges to improve clarity of presentation.

We present unweighted results in this paper. As a robustness test, we also generated a set of results that weighted responses by the calculated propensity to respond (using demographic characteristics, faculty type and experience variables drawn from administrative data that were available for both respondents and non-respondents; see Appendix Table A2). Those results were not qualitatively different from the unweighted estimates. We therefore present the unweighted estimates, with propensity-score weighted results available upon request.

## Results

Of the 82 instructors who responded to the survey, nearly three quarters (73.1%) identified as female and about a quarter (25.0%) as male (Table 1). While the majority of instructors (73.1%) identified as White, 6.2% identified as Latina/o and 11.1% identified as one of several other race/ethnic groups (Asian, Black, Middle Eastern, Native American, and Hawaiian/Pacific Islander respondents) that were combined into a single category due to small cell sizes. Roughly half of respondents had only 1–5 years of experience teaching online (53.8%), and 46.2% had six or more years of experience teaching online. While just over a quarter of participants (26.3%) reported having taken no prior professional development specific to online instruction, the majority had taken some kind of professional development focused on online teaching prior to the focal training.

**Table 1**

*Descriptive Statistics of Survey Sample*

|                                                  | %    |
|--------------------------------------------------|------|
| Gender                                           |      |
| Female                                           | 73.1 |
| Male                                             | 25.0 |
| Prefer not to say                                | 1.9  |
| Race                                             |      |
| White                                            | 73.1 |
| Latino/a                                         | 6.2  |
| Other groups                                     | 11.1 |
| Prefer not to say                                | 0.7  |
| Experience Teaching Online at Home College       |      |
| 1–3 Years                                        | 26.9 |
| 4–5 Years                                        | 26.9 |
| 6–9 Years                                        | 32.7 |
| 10+ Years                                        | 13.4 |
| Academic Year of Training                        |      |
| 2016–17                                          | 7.3  |
| 2017–18                                          | 17.1 |
| 2018–19                                          | 39.0 |
| 2019–20                                          | 20.7 |
| 2020–21                                          | 12.2 |
| 2021–22                                          | 3.7  |
| Sources of Prior Professional Development        |      |
| Other at focal college                           | 44.4 |
| Through another provider                         | 77.8 |
| No other online-focused professional development | 26.3 |
| N (Respondents)                                  | 82   |

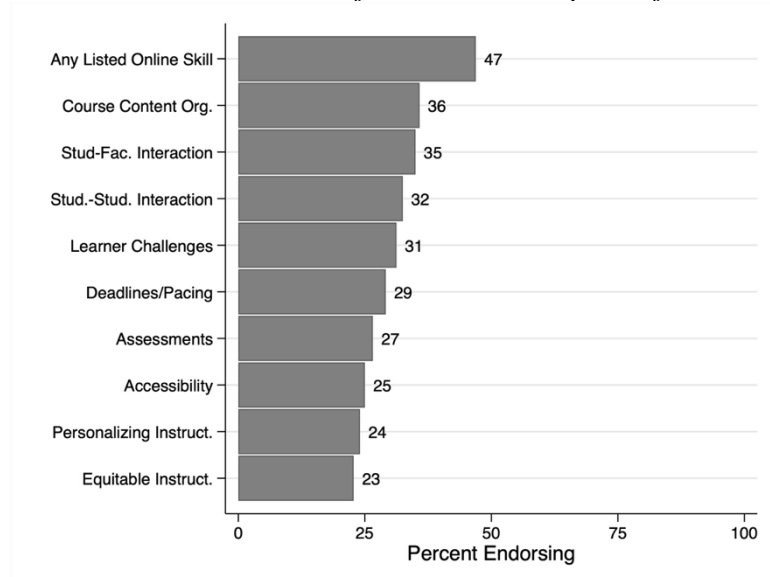
*Note.* Sources of other professional development are not mutually exclusive.

### ***Faculty's Prior Training in Online Teaching***

Figure 1 provides the types of skills respondents received training on prior to the focal professional development; respondents with no prior professional development related to online learning were presumed not to have been trained on the skills in question. Respondents reported having received prior training on a variety of online instruction topics, including course content organization (36%), interaction between students and faculty (35%) and among students (32%), learner challenges (31%), and deadlines/pacing practices (29%). We also aggregated responses into an indicator for whether respondents had training in any of the skills listed (top bar in Figure 1). Notably, there were no skills that a majority of respondents reported received training on through prior professional development. For some areas, such as accessibility and equitable instruction, no more than a quarter of respondents had received prior training in providing online instruction with respect to those areas. Nearly half of respondents (47%) reported no prior training in any of the skills listed. This suggests that there was considerable room for the professional development to introduce online instructors to new areas of skill that they had not previously been trained in.

**Figure 1**

#### ***Skills Learned in Prior Professional Development for Online Learning***



*Note.* Respondents allowed to select multiple options. Respondents reporting no prior training are assumed not to be trained on each skill. Org. = Organization, Stud. = Student, Fac. = Faculty, Instruct = Instruction. “Any Listed Online Skill” bar is an indicator for whether respondents reported training in any of the listed skills.

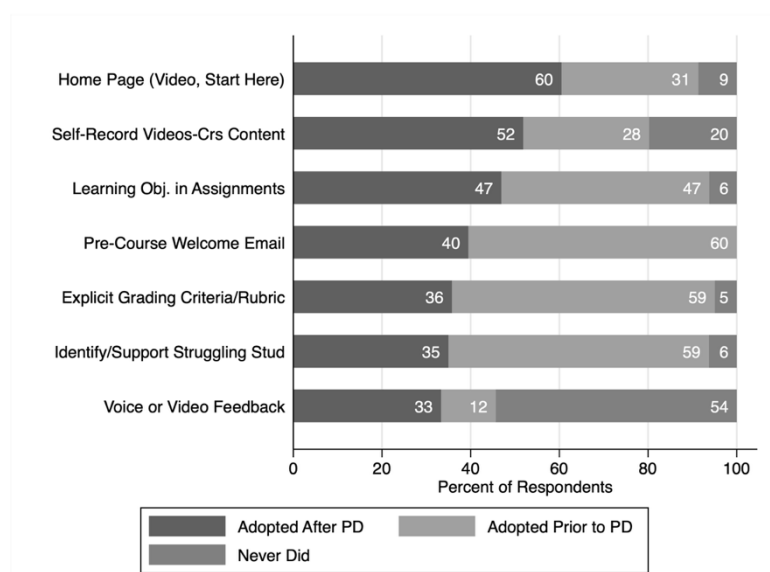
### ***Changes in Teaching Practices after Professional Development***

Consistent with our findings that participants reported that there were many areas in which they had not received prior training, we find that instructors report a notable uptake of many new activities introduced during training. Figure 2 reports results for timing of adoption of different online teaching practices. Three main takeaways emerge from the data. First, there were notable variations in online teaching practices that had already been adopted prior to training (as indicated by the lightest gray bars). While 59% of instructors had already adopted explicit grading criteria rubrics and 59% already identified and offered support to struggling students, only 12% used video or voice feedback prior to professional development training. Second, some practices increased substantially post-training, as

indicated in the darkest gray bars. These included the adoption of a course home page (60% adopting post-professional development) and the use of self-recorded videos to deliver course content (52% adopting post-professional development). Even practices that were relatively less commonly adopted after professional development, such as the use of voice or video feedback, were adopted by about a third of instructors. Finally, certain areas still showed room for increased adoption (as indicated by the medium-gray bars). For example, despite increased adoption post-professional development, 54% of instructors never used video or voice feedback, even after the professional development. These findings highlight how instructors' reported teaching practices changed following participation in the professional development programs, while also indicating areas for further enhancement.

**Figure 2**

*Timing of Adoption of Different Instructional Practices*



*Note.* Respondents chose one category within each instructional practice. Respondents reporting no prior training are assumed not to be trained on each skill. Crs = Course, Obj = Objectives.

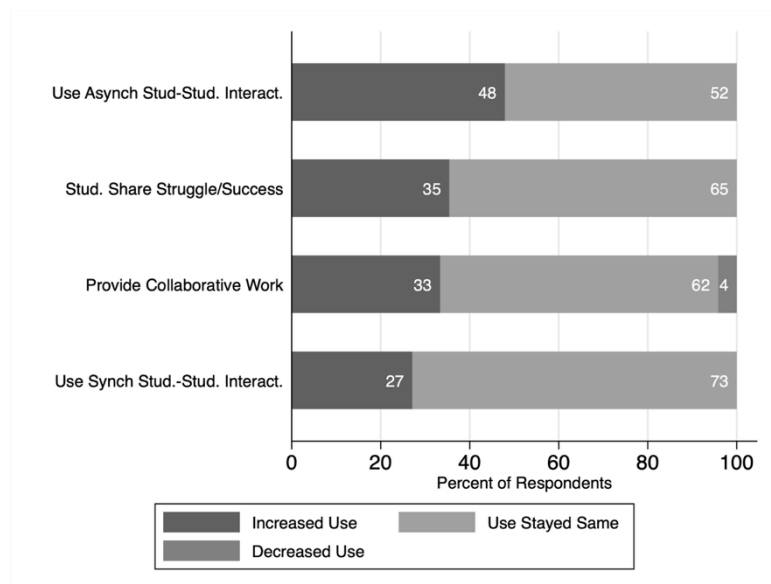
We further probed into the adoption of new practices by asking the 48 instructors who had taught online prior to taking the professional development whether they changed the extent to which they used different pedagogical strategies in courses, following the PD. Results regarding changes in practices to promote student interaction are reported in Figure 3. The darkest gray bars indicate the share of participants who increased their use of a given practice, while the lightest gray bars indicate the share whose use of a practice stayed the same. The medium gray bar indicates decreased use. The student interaction type that had the largest increase in use following professional development was asynchronous student interaction (48%), while about a third of the sample reported increases in the use of having students share their struggles with each other and in providing collaborative work.

In addition, instructors changed several other pedagogical practices related to the presentation of course content (shown in Figure 4). Most notably, a strong majority (70%) of instructors reported increasing their use of techniques to promote accessibility post-professional development (e.g., providing closed captions for video or attaching alt-text to images). Other pedagogical practices that increased included lectures through video and promoting student reflection (50% and 48%, respectively). Most instructors indicated that the

use of formative assessments; opportunities for student leadership; and the use of lectures via audio, PowerPoint slides, and text stayed the same after the professional development.

**Figure 3**

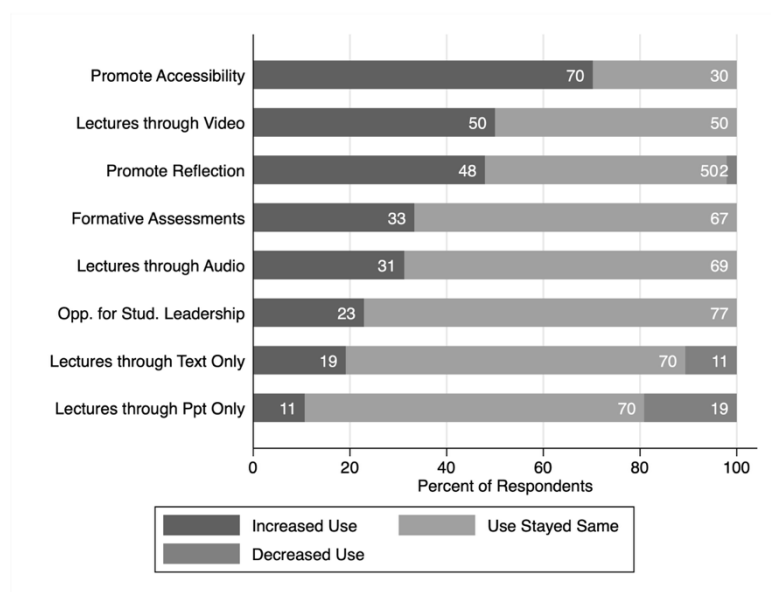
*Changes in Student Interaction Practices Post-professional Development*



*Note.* Respondents chose one category within each instructional practice. Asked among instructors who taught online pre-professional development ( $n = 48$ ). Responses of “Don’t Do” were combined into “Use Stayed Same” category.

**Figure 4**

*Changes in Course Content Practices Post-professional Development*



*Note.* Respondents chose one category within each instructional practice. Asked among instructors who taught online pre-professional development ( $n = 48$ ). Responses of “Don’t Do” were included in “Use Stayed Same” category. Opp. = Opportunity, Stud. = Student, Ppt = PowerPoint.

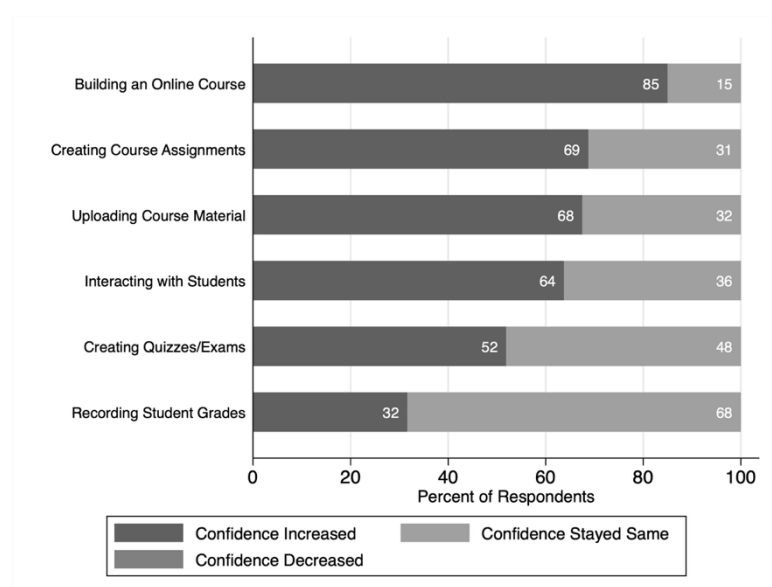


### *Shifts in Confidence Across Online Teaching Skills after Professional Development*

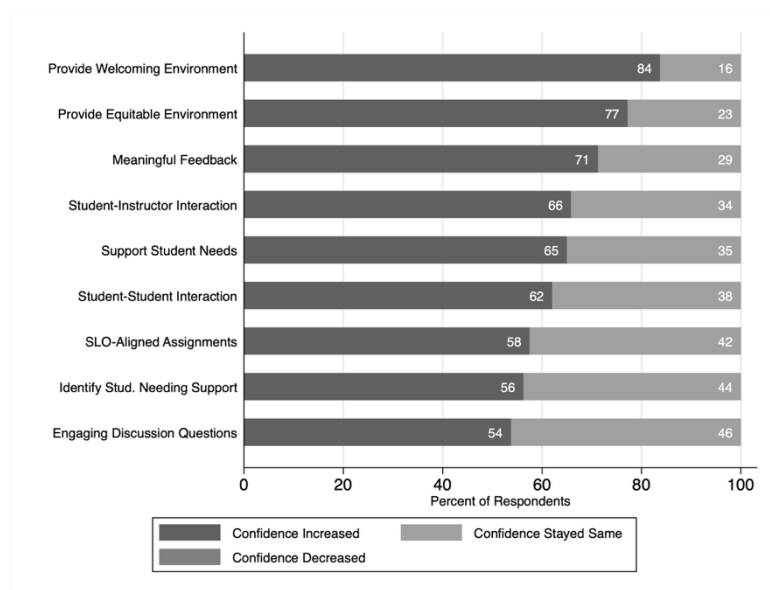
We find that instructors typically reported an increase in confidence in their online teaching skills in various domains post-professional development. The majority of instructors reported that professional development increased their confidence (indicated by the darkest gray bars) in five areas related to the technical side of using Canvas (Figure 5): building online courses (85%), creating course assignments (69%), uploading course materials (68%), interacting with students (64%), and creating quizzes/exams (52%). Similarly, large majorities of instructors reported increased confidence in skills related to domains related to student support, including providing both welcoming (84%) and equitable (77%) course environments, as well as providing meaningful feedback (71%) (Figure 6). While those three domains had especially strong increases in instructor confidence, it is notable that majorities reported improved confidence in skills related to student interaction and support across all domains featured in Figure 6. Taken together, Figures 5 and 6 strongly suggest that the professional development improved instructor confidence in skills important to online instruction.

**Figure 5**

#### *Changes in Confidence with Online Practices Post-professional Development*



*Note.* Respondents chose one category within each skill. We excluded responses of “Don’t Do,” since changes in confidence cannot be meaningfully assessed for practices that instructors reported never using. Note that while “Confidence Decreased” was an option, no participants selected it.

**Figure 6***Changes in Confidence in Skills Post-professional Development*

*Note.* Respondents chose one category within each skill. Responses of “Don’t Do” ( $n = 1$  for some answers) were excluded.

## Discussion

Overall, these survey results underscore the role of professional development in shaping instructors’ online teaching confidence and practices. The professional development filled an important gap in training, as most instructors had not received formal training in many key pedagogical skills relevant to online instruction prior to the focal professional development. Our findings provide an important addition to other studies that have shown positive impacts of professional development on online instructors’ confidence and practices (Lewis & Abdul-Hamid, 2006; Brinkley-Etzkorn, 2018), as well as continued room for growth in particular instructional practices such as video feedback even post-professional development (Scherer et al., 2021).

Instructors reported improvements in their confidence and the adoption of various online teaching methods following professional development. This was particularly noted in the areas related to humanization of online courses (Pacansky-Brock et al., 2020), including respondents’ increased confidence in their ability to provide welcoming and equitable online learning environments. This was also reflected in a reported change in practices, as a strong majority of professional development participants reported adopting practices to improve accessibility of their online courses, as well as incorporating practices to improve student engagement in classes (e.g., use of video lectures and promoting student reflection) and interaction with other students (e.g., using new approaches to student interaction, encouraging students to share struggles). Such changes to course practices to improve interaction, organization, and engagement have long been identified as important elements of online teaching (Garrison et al., 1999; Garrison & Arbaugh, 2007; Jaggars et al., 2013; Rovai, 2004; Shea & Bidjerano, 2010).

Design elements within the professional development curriculum that encouraged engagement with peers and instructors, and the sharing of personal experiences may have contributed to this increased confidence by increasing engagement (Darling-Hammond et al., 2017; Sentance & Humphreys, 2018). Prior research suggests that institutional policies that encourage collaborative learning and the sharing of best practices among faculty after professional development may help reinforce and sustain changes in teaching practice (Lave & Wenger, 1991; Sentance & Humphreys, 2018). Institutions may consider fostering a culture of collaboration and providing platforms for instructors to connect and learn from each other through formal and informal communities of practice. Looking at these avenues to sustain improvements in practice made after PD is an important area for future work.

### ***Conclusions and Limitations***

Our study makes several key contributions to the literature. First, much of the existing research has been conducted at four-year institutions (e.g., Brinkley-Etz Korn, 2018, 2020; Borup & Evmenova, 2019; Jarvie-Eggart et al., 2023), with limited attention to community colleges (but see Zhou, Li, & Xu, 2025). This is a significant gap given the critical role community colleges play in serving diverse and nontraditional student populations, who often face greater challenges in online learning environments. Community colleges operate under unique resource constraints and often have different institutional priorities, making it essential to understand how professional development functions in these settings. Our study focuses explicitly on community colleges, examining structured professional development programs at two institutions in Southern California. By exploring how faculty report changes to their teaching practices as a result of professional development in these contexts, we contribute to the understanding of professional development in resource-constrained settings.

Second, many studies rely on small sample sizes, which limits their generalizability. For example, many studies rely on qualitative data, which provides rich detail and nuance but generally allows for fewer participants (e.g., <30; see Borup & Evmenova, 2019; Brinkley-Etz Korn, 2018, 2020). Prior studies often include only a handful of faculty from a single institution, reducing their ability to capture variations in faculty experiences or outcomes. Our study surveys 82 faculty members across a variety of departments at two community colleges, which allows us to capture meaningful variation in faculty experiences and outcomes, providing a stronger empirical foundation for understanding how professional development influences online teaching practices for instructors from different backgrounds.

Finally, our study design allows us to look at specific pedagogical practices and examine pre- and post-professional development adoption rates. The use of surveys to collect this rich data provides a detailed and actionable understanding of how professional development influences teaching practices, highlighting areas where faculty have made significant changes and where further support may be needed.

We note that while this survey provides valuable insights into how instructors' approaches to online teaching have evolved, the direct impact of professional development training on student outcomes remains largely unknown. Our study is limited by the use of instructors' self-reported changes in practice. Future research should consider using more objective measures, such as course observations or learning-management-system clickstream data, to measure behavioral changes. Additionally, an important avenue for future research lies in examining whether the changes in instructors' beliefs and practices resulting from professional development programs translate into improved student performance and reduced equity gaps in online coursework.

Additionally, we note that these findings come from two colleges with particularly extensive professional development around online learning, representing dozens of hours of engagement. It is uncertain whether similar results would be achieved with more cursory approaches to professional development; future work should examine how variability in implementation of professional development is associated with differences in instructor responses. Moreover, while our sample size is larger than in many past studies, future work should look at larger samples across a wider range of institutions to be able to better capture generalizable trends associated with professional development in online learning.

Finally, the skills covered in the professional development offered by our two focal colleges represent specific approaches to quality online teaching favored by the California Virtual Campus-Online Education Initiative (CVC-OEI) and Online Network of Educators (@ONE). While these approaches are commonly used in California Community Colleges, they may not align perfectly with approaches and professional development offered by national organizations such as Quality Matters (Quality Matters, n.d.) and the Online Learning Consortium (Online Learning Consortium, n.d.), or with independently validated measures of online teaching effectiveness (e.g., Jaggars & Xu, 2016; Xu et al., 2020). Looking at experiences and evaluations by participants in professional development offered by national organizations may offer one promising avenue for future work. In addition, more exploration of how PD has changed post-pandemic—and how impacts of PD on instructor practices have changed post-pandemic—are both important areas for future research.

As online learning continues to expand in postsecondary institutions post-COVID, questions around how to improve student outcomes in online courses will likely become increasingly pressing. Our work suggests that professional development may serve as one avenue to improve faculty practices and comfort with online teaching.

## **Declarations**

### ***Acknowledgements***

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A210455 to the University of California, Davis. The opinions expressed are those of the authors and do not represent views of the Institute, the U.S. Department of Education, or any other people or institutions named in this acknowledgement.

### ***Ethics Board Approval***

This study was conducted with approval by the University of California, Irvine IRB (#412) and the University of California, Davis IRB (#1771808-3).

### ***Conflicts of Interest***

Authors Kim d'Arcy, Cheryl Bailey, Tim VanNorman, Vivian Nguyen, and Jennifer Pakula are employees of the colleges where the study was conducted, with work connected to the professional development programs described here.

## References

- Allen I. E., & Seaman, J. (2010). *Class differences: Online education in the United States*. Babson Survey Research Group. <https://files.eric.ed.gov/fulltext/ED529952.pdf>
- Bailey, C. J., & Card, K. A. (2009). Effective pedagogical practices for online teaching: Perception of experienced instructors. *Internet and Higher Education*, 12(3–4), 152–155. <https://doi.org/10.1016/j.iheduc.2009.08.002>
- Baran, E., & Correia, A.-P. (2014). A professional development framework for online teaching. *TechTrends*, 58(5), 95–101. <https://doi.org/10.1007/s11528-014-0791-0>
- Bettinger, E. P., Fox, L., Loeb, S., & Taylor, E. (2017). Changing distributions: How online college classes alter student and professor performance. *American Economic Review*, 107(9), 2855–2875. <https://doi.org/10.1257/aer.20151193>
- Borup, J., & Evmenova, A. (2019). The effectiveness of professional development in overcoming obstacles to effective online instruction in a college of education. *Online Learning*, 23(2), <https://doi.org/10.24059/olj.v23i2.1468>
- Brinkley-Etz Korn, K. E. (2018). Learning to teach online: Measuring the influence of faculty development training on teaching effectiveness through a TPACK lens. *Internet and Higher Education*, 38, 28–35. <https://doi.org/10.1016/j.iheduc.2018.04.004>
- Brinkley-Etz Korn, K. E. (2020). The effects of training on instructor beliefs about and attitudes toward online teaching. *American Journal of Distance Education*, 34(1), 19–35. <https://doi.org/10.1080/08923647.2020.1692553>
- Brooks, D. C., & Grajek, S. (2020). Faculty readiness to begin fully remote teaching. *Educause Review*. <https://er.educause.edu/blogs/2020/3/faculty-readiness-to-begin-fully-remote-teaching>
- California Community Colleges Chancellor's Office. (2017). *Distance education report*. <https://www.cccco.edu/-/media/CCCCO-Website/docs/report/2017-DE-Report-Final-ADA.pdf>
- California Virtual Campus-Online Education Initiative. (2020). *Course Design Rubric*. California Community Colleges. [https://onlinenetworkofeducators.org/wp-content/uploads/2021/05/CVC\\_OEI\\_Course\\_Design\\_Rubric\\_rev\\_April\\_2020\\_ACC\\_520\\_21.pdf](https://onlinenetworkofeducators.org/wp-content/uploads/2021/05/CVC_OEI_Course_Design_Rubric_rev_April_2020_ACC_520_21.pdf)
- CAST. (2024). *Universal design for learning guidelines version 3.0*. <https://udlguidelines.cast.org/static/udlg3-graphicorganizer-digital-numbers-a11y.pdf>
- Chan, R. Y., Bista, K., & Allen, R. M. (2021). Is online and distance learning the future in global higher education? In R. Y. Chan, K. Bista, & R. M. Allen, *Online Teaching and Learning in Higher Education during COVID-19* (1st ed., pp. 3–12). Routledge. <https://doi.org/10.4324/9781003125921-2>

- Cook, C., Heath, F., & Thompson, R.L. (2000). A meta-analysis of response rates in web- or internet-based surveys. *Educational and Psychological Measurement*, 60(6), 821–836. <https://doi.org/10.1177/00131640021970934>
- Darling-Hammond, L., Hyler, M., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. <https://doi.org/10.54300/122.311>
- Dede, C., Ketelhut, D. J., Whitehouse, P., Breit, L., & McCloskey, E. M. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education*, 60(1), 8–19. <https://doi.org/10.1177/0022487108327554>
- Dennen, V. P., Bagdy, L. M., Arslan, Ö., Choi, H., & Liu, Z. (2022). Supporting new online instructors and engaging remote learners during COVID-19: A distributed team teaching approach. *Journal of Research on Technology in Education*, 54(sup1), S182–S202. <https://doi.org/10.1080/15391523.2021.1924093>
- Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2–3), 87–105. [https://doi.org/10.1016/S1096-7516\(00\)00016-6](https://doi.org/10.1016/S1096-7516(00)00016-6)
- Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10(3), 157–172. <https://doi.org/10.1016/j.iheduc.2007.04.001>
- Guilbaud, T. C., Martin, F., & Newton, X. (2021). Faculty perception on accessibility in online learning: Knowledge, practice and professional development. *Online Learning*, 25(2), 6–35. <https://doi.org/10.24059/olj.v25i2.2233>
- Hart, C. M. D., Freidmann, E., & Hill, M. (2018). Online course-taking and student outcomes in California Community Colleges. *Education Finance and Policy*, 13(1), 42–71. [https://doi.org/10.1162/EDFP\\_a\\_00218](https://doi.org/10.1162/EDFP_a_00218)
- Hart, C. M. D., Xu, D., Alonso, E. & Hill, M. (2025). COVID-19 in California Community Colleges: College responses, college resources, and student outcomes. *Research in Higher Education*, 66(1), 1–28. <https://doi.org/10.1007/s11162-024-09819-1>
- Hart, C. M. D., Xu, D., Hill, M., & Alonso, E. (2021a). COVID-19 and community college instructional responses. *Online Learning*, 25(1), 41–69. <https://doi.org/10.24059/olj.v25i1.2568>
- Hart, C. M. D., Xu, D., Hill, M., & Alonso, E. (2021b). *Everybody pulling in the same direction. The COVID-19 shift to online delivery of instruction and student services* [Research Brief 6(6)]. Wheelhouse: The Center for Community College Leadership and Research. [https://education.ucdavis.edu/sites/main/files/wheelhouse\\_research\\_brief\\_vol\\_6\\_no\\_6\\_final\\_0.pdf](https://education.ucdavis.edu/sites/main/files/wheelhouse_research_brief_vol_6_no_6_final_0.pdf)
- Hill, M. & Hart, C.M.D. (in press). Going online: Decision processes of students enrolling in online degree programs. *Online Learning*.

- Jaggars, S. S. (2014). Choosing between online and face-to-face courses: Community college student voices. *American Journal of Distance Education*, 28(1), 27–38.  
<https://doi.org/10.1080/08923647.2014.867697>
- Jaggars, S. S., Edgecombe, N., & Georgia West, S. (2013). *Creating an effective online instructor presence*. Community College Research Center.  
<https://eric.ed.gov/?id=ED542146>
- Jaggars, S. S. & Xu, D. (2016). How do online course design features influence student performance? *Computers & Education*, 95, 270–284.  
<https://doi.org/10.1016/j.compedu.2016.01.014>
- Jarvie-Eggart, M., Freeman, T., Woerner, J.S., Benjamin, M., & Fernandez-Arcay, L. (2023). Learning to teach well in any format: Examining the effects of online teachers’ training on university faculty teaching. *Journal of Higher Education Theory and Practice*, 23(2), 52–69. <https://doi.org/10.33423/jhetp.v23i2.5808>
- Johnson, H., & Mejia, M. C. (2014). *Online learning and student outcomes in California’s community colleges*. Public Policy Institute of California. [https://www.ppic.org/wp-content/uploads/content/pubs/report/R\\_514HJR.pdf](https://www.ppic.org/wp-content/uploads/content/pubs/report/R_514HJR.pdf)
- Kaplowitz, M. D., Lupi, F., Couper, M. P., & Thorp, L. (2012). The effect of invitation design on web survey response rates. *Social Science Computer Review*, 30(3), 339–349.  
<https://doi.org/10.1177/0894439311419084>
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.
- Lay, C. D., Allman, B., Cutri, R. M., & Kimmons, R. (2020). Examining a decade of research in online teacher professional development. *Frontiers in Education*. 5, 1–10.  
<https://doi.org/10.3389/educ.2020.573129>
- Leary, H., Dopp, C., Turley, C., Cheney, M., Simmons, Z., Graham, C. R., & Hatch, R. (2020). Professional development for online teaching: A literature review. *Online Learning*, 24(4). <https://doi.org/10.24059/olj.v24i4.2198>
- Lewis, C. C., & Abdul-Hamid, H. (2006). Implementing effective online teaching practices: Voices of exemplary faculty. *Innovative Higher Education*, 31(2), 83–98.  
<https://doi.org/10.1007/s10755-006-9010-z>
- Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. U.S. Department of Education. <http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf>
- Mohr, S., & Shelton, K. (2017). Best practices framework for online faculty professional development: A Delphi study. *Online Learning*, 21(4), 123–140.  
<https://doi.org/10.24059/olj.v21i4.1273>
- Nguyen, A. (2017). *The Online Education Initiative: Access and quality of online education in California’s Community Colleges 2015–2016*. The RP Group. <https://cvc.edu/wp-content/uploads/2015/09/2015-16OEIDisseminationBriefFINAL.pdf>

- Online Learning Consortium. (n.d.) *Workshops with one focus: Excellence in online learning*. <https://onlinelearningconsortium.org/professional-learning/workshops/>
- Online Network of Educators. (n.d.a.). *About us*. <https://onlinenetworkofeducators.org/about/>
- Online Network of Educators. (n.d.b.). *Catalog of courses and workshops*. California Community Colleges Chancellor's Office—California Virtual Campus Online Network of Educators. <https://catalog.onlinenetworkofeducators.org/>
- Pacansky-Brock, M., Smedshammer, M., & Vincent-Layton, K. (2020). Humanizing online teaching to equitize higher education. *Current Issues in Education*, 21(2), 1–21. <https://cie.asu.edu/ojs/index.php/cieatasu/article/view/1905>
- Paul, J., & Jefferson, F. (2019). A comparative analysis of student performance in an online vs. face-to-face environmental science course from 2009–2016. *Frontiers in Computer Science*, 12. <https://doi.org/10.3389/fcomp.2019.00007>
- Philipsen, B., Tondeur, J., Pareja Roblin, N., Vanslambrouck, S., & Zhu, C. (2019). Improving teacher professional development for online and blended learning: A systematic meta-aggregative review. *Educational Technology Research and Development*, 67(5), 1145–1174. <https://doi.org/10.1007/s11423-019-09645-8>
- Powell, C. G., & Bodur, Y. (2019). Teachers' perceptions of an online professional development experience: Implications for a design and implementation framework. *Teaching and Teacher Education*, 77, 19–30. <https://doi.org/10.1016/j.tate.2018.09.004>
- Quality Matters (n.d.). *Higher Ed Teaching Online Certificate*. <https://www.qualitymatters.org/professional-development/toc>
- Richards, K., & Thompson, B. M. W. (2023). Challenges and instructor strategies for transitioning to online learning during and after the COVID-19 pandemic: A review of literature. *Frontiers in Communication*, 8, 1–7. <https://doi.org/10.3389/fcomm.2023.1260421>
- Rovai, A. P. (2004). A constructivist approach to online college learning. *The Internet and Higher Education*, 7(2), 79–93. <https://doi.org/10.1016/j.iheduc.2003.10.002>
- Rovai, A. P., & Downey, J. R. (2010). Why some distance education programs fail while others succeed in a global environment. *The Internet and Higher Education*, 13(3), 141–147. <https://doi.org/10.1016/j.iheduc.2009.07.001>
- Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning in higher education: Who's ready? *Computers in Human Behavior*, 118. <https://doi.org/10.1016/j.chb.2020.106675>
- Seaman, J. E., Elaine Allen, I., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Babson Research Group. <https://files.eric.ed.gov/fulltext/ED580852.pdf>
- Segrave, S., Holt, D., & Farmer, J. (2005). The power of the 6<sup>th</sup> model for enhancing academic teachers' capacities for effective online teaching and learning: Benefits,



- initiatives and future directions. *Australasian Journal of Educational Technology*, 21(1), 118–135. <https://ajet.org.au/index.php/AJET/article/view/1346/716>
- Sentance, S., & Humphreys, S. (2018). Understanding professional learning for Computing teachers from the perspective of situated learning. *Computer Science Education*, 28(4), 345–370. <https://doi.org/10.1080/08993408.2018.1525233>
- Shea, P. & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers and Education*, 55, 1721–1731. <https://doi.org/10.1016/j.compedu.2010.07.017>
- Wolf, P. D. (2006). Best practices in the training of faculty to teach online. *Journal of Computing in Higher Education*, 17(2), 47–78. <https://doi.org/10.1007/BF03032698>
- Xu, D., & Jaggars, S. S. (2011). The effectiveness of distance education across Virginia's community colleges: Evidence from introductory college-level math and English courses. *Educational Evaluation and Policy Analysis*, 33(3), 360–377. <https://doi.org/10.3102/0162373711413814>
- Xu, D., & Jaggars, S. S. (2014). Performance gaps between online and face-to-face courses: Differences across types of students and academic subject areas. *The Journal of Higher Education*, 85(5), 633–659. <https://doi.org/10.1353/jhe.2014.0028>
- Xu, D., Li, Q., & Zhou, X. (2020). *Online course quality rubric: A tool box*. Online Learning Research Center, University of California, Irvine. [https://www.olrc.us/uploads/1/2/7/1/127107452/rubric\\_full\\_version\\_0414.pdf](https://www.olrc.us/uploads/1/2/7/1/127107452/rubric_full_version_0414.pdf)
- Xu, D., Liu, Y., Shea, Z. M., Vincent-Layton, K., White, J., & Pacansky-Brock, M. (2025). Humanizing college online instruction: The effects of professional development on faculty perceptions and instructional practices. *The Internet and Higher Education*, 65, 100998. <https://doi.org/10.1016/J.IHEDUC.2025.100998>
- Xu, D., & Xu, Y. (2019). *The promises and limits of online higher education: understanding how distance education affects access, cost, and quality*. American Enterprise Institute. <https://files.eric.ed.gov/fulltext/ED596296.pdf>
- Xu, D., & Xu, Y. (2020). The ambivalence about distance learning in higher education: Challenges, opportunities, and policy implications. In L. W. Perna (Ed.), *Higher education: Handbook of theory and research* (Vol. 35). [https://doi.org/10.1007/978-3-030-11743-6\\_10-1](https://doi.org/10.1007/978-3-030-11743-6_10-1)
- Wiggins, G., & McTighe, J. (2005). *Understanding by design* (2nd ed.). Association for Supervision and Curriculum Development.
- Zhou, X., Li, Q., & Xu, D. (2025). Does professional development for online instruction improve student course outcomes? *The Internet and Higher Education*, 65, <https://doi.org/10.1016/j.iheduc.2025.100993>

## Appendix A

### Statistics Tables

**Appendix Table A1**

*Descriptive Statistics of Survey Non-Respondents vs. Respondents*

|                                             | Non-Respondents |     | Respondents |    | P-value,<br>Diff |
|---------------------------------------------|-----------------|-----|-------------|----|------------------|
|                                             | Mean            | N   | Mean        | N  |                  |
| <b>College</b>                              |                 |     |             |    |                  |
| College 1                                   | 0.656           | 125 | 0.646       | 82 | 0.887            |
| College 2                                   | 0.344           | 125 | 0.354       | 82 | 0.887            |
| <b>Instructor Demographics</b>              |                 |     |             |    |                  |
| Employee Female                             | 0.706           | 119 | 0.744       | 82 | 0.557            |
| White                                       | 0.629           | 124 | 0.683       | 82 | 0.430            |
| Asian/Pacific Islander                      | 0.161           | 124 | 0.110       | 82 | 0.300            |
| Hispanic                                    | 0.145           | 124 | 0.085       | 82 | 0.200            |
| Other Race/Ethnic Group                     | 0.065           | 124 | 0.122       | 82 | 0.155            |
| <b>Instructor Type</b>                      |                 |     |             |    |                  |
| Academic Faculty: Full-Time                 | 0.303           | 119 | 0.378       | 82 | 0.267            |
| Associate Faculty                           | 0.697           | 119 | 0.610       | 82 | 0.198            |
| Classified and Admin.                       | 0.000           | 119 | 0.012       | 82 | 0.229            |
| <b>Years of Experience (All Modalities)</b> |                 |     |             |    |                  |
| Years Experience: <5                        | 0.200           | 125 | 0.122       | 82 | 0.144            |
| Years Experience: 5–10                      | 0.416           | 125 | 0.476       | 82 | 0.401            |
| Years Experience: >10                       | 0.384           | 125 | 0.402       | 82 | 0.792            |
| <b>N (Unique Faculty)</b>                   | <b>207</b>      |     |             |    |                  |

*Note.* Authors' calculations from administrative data. Mismatches in demographics compared to Table 1 arise from differences in reporting across data sources. One observation/faculty member selected, in term of survey or nearest prior term.

**Appendix Table A2***Propensity to Respond*

|                                         | <b>b</b><br><b>(se)</b>         |
|-----------------------------------------|---------------------------------|
| College 2                               | 0.021<br>(0.075)                |
| <b>Instructor Demographics</b>          |                                 |
| Employee Female                         | 0.061<br>(0.078)                |
| Asian/Pacific Islander                  | -0.113<br>(0.102)               |
| Hispanic                                | -0.150<br>(0.111)               |
| Other Race/Ethnic Group                 | 0.156<br>(0.131)                |
| <b>Associate Faculty</b>                | <b>-0.079</b><br><b>(0.077)</b> |
| <b>Years Experience, All Modalities</b> |                                 |
| Years Experience: <5                    | -0.071<br>(0.111)               |
| Years Experience: 5–10                  | 0.025<br>(0.080)                |
| Constant                                | 0.429***<br>(0.093)             |
| <b>Observations</b>                     | <b>201</b>                      |

*Source.* Author's calculation from colleges' administrative data. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Coefficient (standard error). Classified staff grouped in omitted category with Academic Full-Time faculty because classified status predicted response perfectly.

## Appendix B

### Survey Instrument

Note: All respondents provided consent before starting the survey below. Text in {brackets} was piped in to reflect the college, course, PD training, etc. relevant to each participant.

#### Block 1: Teaching, Training, and Professional Development History

The following questions ask about your teaching experience, both in general and online.

Q1. Which of the following types of institutions have you taught in during your career? Include both teaching done both online and face-to-face. Exclude any teaching done as a graduate student assistant or TA. (Please check all that apply.)

- ☐ {Partner College}
- ☐ Other college in {Partner College}'s District
- ☐ Other college in California Community College (CCC) system
- ☐ Other colleges outside of the CCC system
- ☐ Schools at another level of education (not college)

*Carry Forward Selected Choices from “Which of the following types of institutions have you taught in during your career? Include both teaching done both online and face-to-face. Exclude any teaching done as a graduate student assistant or TA. (Please check all that apply.)”*

Q2. In which of the following types of institutions have you taught **online** during your career? Exclude any teaching done as a graduate student assistant or TA. (Please check all that apply.)

- ☐ {Partner College}
- ☐ Other college in {Partner College}'s District
- ☐ Other college in California Community College (CCC) system
- ☐ Other colleges outside of the CCC system
- ☐ Schools at another level of education (not college)

Q3. For roughly how many years have you taught at {Partner College}? Choose the response that applies best, including teaching done online AND face-to-face. Exclude any teaching done as a graduate teaching assistant. Choose the response that applies best.

- ☐ 1 (first year teaching)
- ☐ 2-3 years
- ☐ 4-5
- ☐ 6-10
- ☐ 10-15
- ☐ 16 or more

*Display this question:*

*If In which of the following types of institutions have you taught online during your career? Exclud... {Partner College} Is Selected*

Q4. For roughly how many years have you taught **online** at {Partner College}? Choose the response that applies best for online teaching specifically.

- ☐ 1 (first year teaching)
- ☐ 2-3 years
- ☐ 4-5
- ☐ 6-10
- ☐ 10-15
- ☐ 16 or more

*Display this question:*

*If Which of the following types of institutions have you taught in during your career? Include both... = Other college in {Partner College}'s District*

*Or Which of the following types of institutions have you taught in during your career? Include both... = Other college in California Community College (CCC) system*

*Or Which of the following types of institutions have you taught in during your career? Include both... = Other colleges outside of the CCC system*

Q5. For roughly how many years have you taught at the college level (including both online and face-to-face classes)? Please consider your experience in ALL institutions (including {Partner College}). Exclude any teaching done as a graduate teaching assistant. Choose the response that applies best.

- ☐ 1 (first year teaching)
- ☐ 2-3
- ☐ 4-5
- ☐ 6-10
- ☐ 10-15
- ☐ 16 or more

*Display this question:*

*If If In which of the following types of institutions have you taught online during your career? Exclud... Other college in {Partner College}'s District Is Selected*

*Or Or In which of the following types of institutions have you taught online during your career? Exclud... Other college in California Community College (CCC) system Is Selected*

*Or Or In which of the following types of institutions have you taught online during your career? Exclud... Other colleges outside of the CCC system Is Selected*

Q6. For roughly how many years have you taught **online** at the college level (including both online and face-to-face classes)? Please consider your experience in ALL institutions (including {Partner College}). Exclude any teaching done as a graduate teaching assistant. Choose the response that applies best.

- ☐ 1 (first year teaching)
- ☐ 2-3
- ☐ 4-5
- ☐ 6-10
- ☐ 10-15
- ☐ 16 or more

The following questions ask about your past experiences with professional development (PD) **for online teaching specifically**.

Q7. {Partner College} records indicate that you completed the {PD Name} in {PD Completion Term}. Is this correct? (Choose one).

- ☐ Yes, that is correct
- ☐ No, I never completed {PD Name}
- ☐ No, I completed {PD Name} at a different time

*Display this question:*

*If {Partner College} records indicate that you completed the {PD Name} in ... = No, I completed {PD Name} at a different time*

Q8. To the best of your memory, when did you complete {PD Name}?

---

Q9. **Before you** completed the {PD Name} course at {Partner College}, had you taught any online courses? (Select the answer that applies best.)

- ☐ No, I had not taught online prior to completing the {PD Name} course

- Yes, I had taught online before completing the {PD Name} course
- I was teaching online for the first time during the term I completed the {PD Name} course

*Display this question:*

*If Before you completed the {PD Name} course at {Partner College}, had you taught... = Yes, I had taught online before completing the {PD Name} course*

Q10. Where had you taught online **before completing** the {PD Name} course? (Select all that apply.)

- {Partner College}
- Other college in {Partner College}'s district
- Other California Community College (CCC)
- Other colleges outside of the CCC system
- Schools at another level of education (not college)

Q11. Have you ever taken any other professional development course specifically **focused on online teaching skills** aside from the {PD Name} course?

No

- Yes, through {Partner College}
- Yes, through another California Community College
- Yes, through @ONE (California Virtual College-Online Education Initiative)
- Yes, through another provider
- Not sure

*Display this question:*

*If Have you ever taken any other professional development course specifically focused on online teaching... != No*

Q12. We are interested in whether/when instructors may have received training in the following areas **for online teaching** from other professional development courses besides {PD Name}. Please select all that apply for each skill listed.

|                                                    | Other Training<br>Prior to {PD<br>Name} | Other Training<br>While Taking {PD<br>Name} | Other Training<br>After {PD Name} | No Training<br>Outside of {PD<br>Name} |
|----------------------------------------------------|-----------------------------------------|---------------------------------------------|-----------------------------------|----------------------------------------|
| Learner challenges<br>in online courses            | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |
| Organizing course<br>content                       | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |
| Deadlines/pacing<br>assignments                    | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |
| Student-student<br>interaction                     | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |
| Student-instructor<br>interaction                  | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |
| Writing valid<br>assessments                       | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |
| Accessibility for<br>students with<br>disabilities | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |
| Personalizing<br>student learning                  | <input type="radio"/>                   | <input type="radio"/>                       | <input type="radio"/>             | <input type="radio"/>                  |

Equitable  
instruction

○ ○ ○ ○

---

## Block 2: Course Management Practices

Q13. The next set of questions will ask about a number of different practices that you use in instruction. {Partner College} records show that you taught {Class Name} online at least once between 2016-2019. Is this correct?

- Correct
- Incorrect. I taught online during that period, but it was a *different* class
- Incorrect, I did not teach any classes online during that period

*Display this question:*

*If The next set of questions will ask about a number of different practices that you use in instruct... = Incorrect. I taught online during that period, but it was a different class*

Q14. Thank you for letting us know. We would like you to answer the following questions with respect to a course that you taught online from 2016-2019. Could you please specify a course that you taught online that you will keep in mind for the following questions? (You can provide a course name or number, e.g., “Bio 101” or “Introduction to Biology”). Please consider this course in the following questions instead of {Class Name}, even though the prompts will refer to {Class Name}.

---

*Display this question:*

*If The next set of questions will ask about a number of different practices that you use in instruct... = Incorrect, I did not teach any classes online during that period*

Q15. Thank you for letting us know. We would like you to answer the following questions with respect to a course that you taught online at some point. Could you please specify a course that you taught online that you will keep in mind for the following questions? (You can provide a course name or number, e.g., “Bio 101” or “Introduction to Biology”). Please consider this course in the following questions instead of {Class Name}, even though the prompts will refer to {Class Name}.

---

*Display this question:*

*If The next set of questions will ask about a number of different practices that you use in instruct... = Incorrect, I did not teach any classes online during that period*

Q16. Please list at least one academic term when you taught that course.

---

Q17. Consider your {Class Name} course. The **first time you taught the course online**, did you build the site for the course in Canvas (or the equivalent learning management system), or did you build off of a pre-existing course site offered or shared by a publisher or another instructor?

- Built the course shell entirely myself
- A pre-existing course was shared with me and I used that course site with little alteration
- A pre-existing course was shared with me and I customized the course content substantially
- I did not use a learning management system the first time I taught the course online

Q18. Consider your {Class Name} course. When would you say you **first** used the following practices in online sections of this course? (Choose best answer for each row).

|                                                                                                                                               | Prior to Starting<br>{PD Name} | Within 1 Year of<br>Taking {PD Name} | More than 1 Year<br>after Taking {PD<br>Name} | I Have Never Done This |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------|-----------------------------------------------|------------------------|
| Sending a welcome email to students prior to the start of the course                                                                          | <input type="radio"/>          | <input type="radio"/>                | <input type="radio"/>                         | <input type="radio"/>  |
| Using a course homepage with a brief video or photo of me and a clear “start here” cue                                                        | <input type="radio"/>          | <input type="radio"/>                | <input type="radio"/>                         | <input type="radio"/>  |
| Including learning objectives for course assignments                                                                                          | <input type="radio"/>          | <input type="radio"/>                | <input type="radio"/>                         | <input type="radio"/>  |
| Providing explicit grading criteria (e.g., a rubric) for course assignments                                                                   | <input type="radio"/>          | <input type="radio"/>                | <input type="radio"/>                         | <input type="radio"/>  |
| Identifying struggling students and proactively providing additional support (e.g., study tips, advice, encouragement, referrals to tutoring) | <input type="radio"/>          | <input type="radio"/>                | <input type="radio"/>                         | <input type="radio"/>  |
| Creating self-recorded videos to introduce new content                                                                                        | <input type="radio"/>          | <input type="radio"/>                | <input type="radio"/>                         | <input type="radio"/>  |
| Leaving voice or video feedback for students                                                                                                  | <input type="radio"/>          | <input type="radio"/>                | <input type="radio"/>                         | <input type="radio"/>  |

*Display this question:*

*If Before you completed the {PD Name} course at {Partner College}, had you taught... = Yes, I had taught online before completing the {PD Name} course*

*Or Before you completed the {PD Name} course at {Partner College}, had you taught... = I was teaching online for the first time during the term I completed the {PD Name} course*

Q19. We are interested in your instructional practices in structuring student engagement with other students in your online {Class Name} course. Did your use of each practice listed in your online courses increase, decrease, or stay the same after you took {PD Name}? (Choose the best answer for each row).

|                                                                     | Increased             | Decreased             | Stayed the same       | I don't do this       |
|---------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Providing collaborative work (e.g., group assignments, peer review) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



|                                                                                                                                     |                       |                       |                       |                       |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Having students interact asynchronously with each other (e.g., Canvas/iLearn discussions, Flipgrid, VoiceThread, Google Docs, etc.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Having students interact synchronously with each other (e.g., Zoom, Skype or video conferencing tools)                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Having students share their struggles and successes with each other                                                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

*Display this question:*

*If Before you completed the {PD Name} course at {Partner College}, had you taught... = No, I had not taught online prior to completing the {PD Name} course*

Q20. We are interested in your instructional practices in structuring student engagement with other students in your online {Class Name} course. Which of the practices below do you use in your online courses? (Choose all that apply.)

- ☐ Providing collaborative work (e.g., group assignments, peer review)
- ☐ Having your students interact asynchronously with each other (e.g., Canvas/iLearn discussions, Flipgrid, VoiceThread, Google Docs, etc.)
- ☐ Having students interact synchronously with each other (e.g., Zoom, Skype or video conferencing tools)
- ☐ Having students share their struggles and successes with each other

*Display this question:*

*If Before you completed the {PD Name} course at {Partner College}, had you taught... = Yes, I had taught online before completing the {PD Name} course*

*Or Before you completed the {PD Name} course at {Partner College}, had you taught... = I was teaching online for the first time during the term I completed the {PD Name} course*

Q21. We are interested in your instructional practices in structuring student engagement with course content in your online {Class Name} course. Did your use of each instructional practice listed in your online courses increase, decrease, or stay the same after you took {PD Name}? (Choose the best answer for each row).

|                                                                                  | Increased             | Decreased             | Stayed the Same       | I Don't Do This       |
|----------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Providing formative assessments (e.g., quizzes, problem-sets, other assignments) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Asking students to reflect on their                                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                                                                                                                                                                               |                       |                       |                       |                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| learning (e.g., on their personal learning goals, on their study strategies, on their progress)                                                                               |                       |                       |                       |                       |
| Providing opportunities for students to take leadership in the learning process (e.g., teaching others, choosing topics of interest, guiding the direction of the coursework) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing lectures through video (e.g., videos of yourself solving problems/lecturing)                                                                                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing lectures through audio (e.g., voice integrated within PowerPoint slides, etc.)                                                                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing lecture content through PowerPoint slides only (no accompanying videos or audio)                                                                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing lecture content through text only (e.g., written lecture notes, pdf, etc., without accompanying videos or audio)                                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing closed captions, writing alt-text and other tools to improve the accessibility of content                                                                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

*Display this question:*

*If Before you completed the {PD Name} course at {Partner College}, had you taught... = No, I had not taught online prior to completing the {PD Name} course*

Q22. We are interested in your instructional practices in structuring student engagement with course content in your online {Class Name} course after taking {PD Name}. Which of the practices below do you use in your online courses? (Choose all that apply.)

- ☐ Providing formative assessments (e.g., quizzes, problem-sets, other assignments)

- Asking students to reflect on their learning (e.g., on their personal learning goals, on their study strategies, on their progress)
- Providing opportunities for students to take leadership in the learning process (e.g., teaching others, choosing topics of interest, guiding the direction of the coursework)
- Providing lectures through video (e.g., videos of yourself solving problems/lecturing)
- Providing lectures through audio (e.g., voice integrated within PowerPoint slides, etc.)
- Providing lecture content through PowerPoint slides only (no accompanying videos or audio)
- Providing lecture content through text only (e.g., written lecture notes, pdf, etc., without accompanying videos or audio)
- Providing closed captions, writing alt-text and other tools to improve the accessibility of content

---

**Block 3: Comfort and Confidence in Online Teaching**

Q23. In this question, we ask about changes in your confidence using Canvas or other Learning Management Systems (LMS) for particular course goals. Did your confidence in the following areas increase, decrease, or stay the same after you took {PD Name}? (Choose the best answer for each row).

|                             | Increased             | Decreased             | Stayed the same       | I don't do this       |
|-----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Building an online course   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Uploading course material   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Creating course assignments | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Interacting with students   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Creating quizzes and exams  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Recording student grades    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q24. In this question, we ask about changes in your confidence in the following domains of online teaching. Did your confidence in the following areas increase, decrease, or stay the same after you took {PD Name}? (Choose the best answer for each row).

|                                                                          | Increased             | Decreased             | Stayed the same       | I don't do this       |
|--------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Facilitating meaningful student-student interaction                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Facilitating meaningful instructor-student interaction                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Writing discussion questions that promote engagement with course content | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Designing course assignments aligned with                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                                                                      |                       |                       |                       |                       |
|----------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| student learning objectives                                          |                       |                       |                       |                       |
| Providing meaningful feedback for students                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing an equitable online learning environment for all learners  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Supporting the needs of individual students                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Identifying individual students who could benefit from extra support | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Designing a welcoming environment for students                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

#### Block 4: Influences on Online Teaching

Q25. How influential have the following been in affecting your online teaching practices in general? (We ask separately about your experiences during COVID in the next question.) (Please choose one answer in each row.)

|                                       | Highly Influential    | Somewhat Influential  | Slightly Influential  | Not Influential       | Have Not Done This    |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| {PD Name}                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other PD at {Partner College}         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other PD outside of {Partner College} | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Collaboration with Colleagues         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Professional Learning Communities     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My Own Trial and Error                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q26. How influential have the following been in affecting your online teaching practices **during COVID** specifically?

|                                       | Highly Influential    | Somewhat Influential  | Slightly Influential  | Not Influential       | Have Not Done This    |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| {PD Name}                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other PD at {Partner College}         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other PD outside of {Partner College} | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Collaboration with Colleagues         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Professional Learning Communities     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My Own Trial and Error                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Display this question:

If How influential have the following been in affecting your online teaching practices in general? (... = Other PD at {Partner College} [ Highly Influential ]

Or How influential have the following been in affecting your online teaching practices in general? (... = Other PD at {Partner College} [ Somewhat Influential ]

Or How influential have the following been in affecting your online teaching practices in general? (... = Other PD at {Partner College} [ Slightly Influential ]

Or How influential have the following been in affecting your online teaching practices in general? (... = Other PD at {Partner College} [ Not Influential ]

Or How influential have the following been in affecting your online teaching practices in general? (... = Other PD outside of {Partner College} [ Highly Influential ]

Or How influential have the following been in affecting your online teaching practices in general? (... = Other PD outside of {Partner College} [ Somewhat Influential ]

Or How influential have the following been in affecting your online teaching practices in general? (... = Other PD outside of {Partner College} [ Slightly Influential ]

Or How influential have the following been in affecting your online teaching practices in general? (... = Other PD outside of {Partner College} [ Not Influential ]

Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD at {Partner College} [ Highly Influential ]

Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD at {Partner College} [ Somewhat Influential ]

Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD at {Partner College} [ Slightly Influential ]

Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD at {Partner College} [ Not Influential ]

Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD outside of {Partner College} [ Highly Influential ]

Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD outside of {Partner College} [ Somewhat Influential ]

*Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD outside of {Partner College} [ Slightly Influential ]*

*Or How influential have the following been in affecting your online teaching practices during COVID... = Other PD outside of {Partner College} [ Not Influential ]*

Q27. Your response indicated you had an “other” PD experience that you considered above. Please let us know which “other” PD you had in mind.

---

### **Block 5: Participant Characteristics**

Q28. Which range below best describes your age?

- ☐ 22-25
- ☐ 26-30
- ☐ 31-45
- ☐ 46-55
- ☐ 56+
- ☐ Prefer not to say

Q29. What is your gender identity?

- ☐ Male
- ☐ Female
- ☐ Non-binary / third gender
- ☐ Prefer not to say

Q30. What is your racial/ethnic identity? Check all that apply.

- ☐ American Indian/Alaskan Native
- ☐ Asian (e.g., East Asian, Southeast Asian, South Asian)
- ☐ Black (e.g., African American, African, Caribbean)
- ☐ Latino/a (e.g., Mexican or Chicano, Puerto Rican, Central or South American)
- ☐ Middle Eastern
- ☐ Native Hawaiian/Pacific Islander
- ☐ White
- ☐ Other
- ☐ Prefer not to say

Q31. What is your highest degree earned?

- ☐ Professional degree (e.g., M.D., D.D.S., J.D., D.V.M.)
- ☐ Doctoral degree (e.g., Ph.D., Ed.D.)
- ☐ Master's degree
- ☐ Bachelor's degree
- ☐ Other

Q32. Is there anything you else you would like us to know with respect to how your professional development experiences prepared you for online teaching?

---

*Display this question:*

*If {Partner College} records indicate that you completed the {PD Name} in ... = Yes, that is correct*

*Or {Partner College} records indicate that you completed the {PD Name} in ... = No, I completed {PD Name} at a different time*

Q33. We may conduct additional interviews to learn more about participants' experiences in the {PD Name} Interviews would likely be conducted in the spring semester. Would you be willing for us to contact you about additional interview opportunities? (Answering yes does not obligate you to participate; it just allows us to contact you with more information.)

- ☐ Yes

- No

*Display this question:*

*If We may conduct additional interviews to learn more about participants' experiences in the ... = Yes*

Q34. Thank you. If we conduct additional interviews, we will contact you at that time.

Q35. Would you like to receive updates about the results of this study?

- Yes
- No

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# Designing a Valid and Reliable Measure of Trauma-Informed Online Teaching Practices for Asynchronous Undergraduate Courses

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## Abstract

The majority of U.S. college students have experienced a traumatic event that could impact their health, social life, and academic success. While faculty are encouraged to implement trauma-informed teaching practices, rigorously studied resources do not exist for online courses. We address this gap by presenting findings from an initial study of 129 undergraduate students at a mid-Atlantic Historically Black University. We contribute a valid and reliable student-facing survey of Trauma-Informed Online Teaching practices. Our model and survey can be easily deployed by faculty or instructional designers who seek to understand how to best support students who are navigating the effects of a traumatic event or circumstance.

*Keywords:* Online teaching, trauma-informed teaching, student evaluations of teaching

Byrne, V. L., Mondrey, M., Folami, A. O., Moeyaert, M., & Licata-Hoang, C. (2025). Designing a valid and reliable measure of trauma-informed online teaching practices for asynchronous undergraduate courses, *Online Learning*, 29(4), 237-256.  
<https://doi.org/10.24059/olj.v29i4.5176>



## Introduction

Across all institution types, the majority of today's college students are likely to have survived some form of traumatic event or adverse experience that could negatively impact their health, happiness, and academic success (Aruguete & Edman, 2019; Frazier et al., 2009; Read et al., 2011; Smyth et al., 2008; Thompson & Carello, 2022). A traumatic event is a single or series of events experienced by an individual or community as being “physically or emotionally harmful or life threatening” and has lasting negative effects on a person's “functioning and mental, physical, social, emotional, or spiritual well-being” (SAMHSA, 2022). For many, the dual pandemics of the COVID-19 pandemic and systemic racism have been traumatic (e.g., Williams et al., 2024). Trauma can also be collective, historical, or systemic (i.e., a multigenerational experience of trauma shared by a racial group [Comas-Diaz & Hall, 2019; Williams et al., 2024]). Exposure to traumatic events and experiences can cause a *trauma response* that redirects body and brain functions toward surviving instead of thriving and can cause stress that results in issues with learning, memory, self-regulation, and executive functioning (e.g., Boyraz et al., 2016).

To counteract the negative impact of this traumatic stress, higher education faculty are encouraged to implement trauma-informed teaching practices that aim to support students in effort regulation and executive functioning, feeling a sense of control, avoiding retraumatization, and building trusting relationships (Thompson & Carello, 2022). Trauma-informed teaching has been found to meaningfully improve the outcomes of learners who are struggling with healthy decision making (e.g., Venet, 2021). Unfortunately, the implementation of trauma-informed teaching practices has not been rigorously studied for higher education courses where students and instructors are geographically distant and do not meet in real time (i.e., asynchronous online courses). This gap in the literature is particularly troubling because the independent design of asynchronous courses may place greater demands on students' time management and executive functioning skills (Broadbent, 2017; Broadbent et al., 2021; Zhang et al., 2023). For students navigating traumatic stress, whether due to systemic inequities, personal experiences, or broader societal events, these skills may be significantly diminished as students route their energies elsewhere. From the broader trauma-informed teaching literature (e.g., Venet, 2021), we know that some of the best ways to support students' success is through strong trusting relationships with their instructors, clarity of expectations, and easy access to support services like counseling and study groups. Ironically, these are the very supports that may be lacking in asynchronous learning environments because of the transactional distance (e.g., Moore, 2013) between students, the instructor, and their peers. This makes it all the more urgent to explore how trauma-informed practices can be integrated into asynchronous course design and teaching.

While higher education faculty may want to adopt trauma-informed course design and teaching practices in their asynchronous online courses, there is little empirical evidence of which practices to prioritize (Byrne & Hollingsworth, 2024). To address this gap, we embarked on a three-year, mixed methods project to explore *Trauma-Informed Online Teaching* (TIOT; Byrne & Hollingsworth, 2024) in undergraduate asynchronous online courses at a public Historically Black College or University (HBCU). In this paper, we present findings from the first year of our study in which we explore TIOT practices in five undergraduate asynchronous online courses. The purpose of this paper is present the development of a valid and reliable instrument for measuring students' perceptions of the seven principles of the TIOT model and answer the following research question: *In alignment*

*with the Trauma-Informed Online Teaching theoretical model, to what extent do the seven latent factors fit the underlying structure of the student survey data?*

## Literature Review

Research suggests that most college students have experienced one or more traumatic events (e.g., Frazier et al., 2009; Smyth et al., 2008), not including the collective trauma of the COVID-19 pandemic. Most education research on the prevalence of trauma fails to account for the racialized traumatic experiences common among Black and African American students both in-person and online (Becker-Blease, 2017; Venet, 2021). Students of minoritized and marginalized groups (e.g., Black and Latinx students, first-generation college students, low-income students) are more likely to have been exposed to trauma or a traumatic event before and since enrolling in college (Aruguete & Edman, 2019). Of particular importance to this study is that Black and African American students are more likely to experience trauma stemming from the U.S.'s systemic racism that structures limited access to safe neighborhoods, safe schools, financial security, and a life free from violence and discrimination (López et al., 2017; McGruder-Johnson et al., 2000; Simmons, 2020; Voisin et al., 2011).

After experiencing trauma, people may have a *trauma response*, which is an embodied physical, mental, and/or spiritual reaction that redirects the body and brain's functions toward surviving instead of thriving (Shalka, 2020). While not everyone experiences a trauma response and each person's experience and duration are unique, common trauma responses can include emotional dysregulation, substance abuse, depression, lack of motivation, suppressed immune system, difficulty concentrating, loss of self-efficacy, and executive functioning issues (e.g., Venet, 2021). Trauma responses can contribute to practices and attitudes that hinder academic success including poor academic performance and thoughts of leaving college (Boyratz et al., 2013; Duncan, 2000; Varjas et al., 2009). There is a negative relationship between students' trauma experiences and their academic achievement (Boyratz et al., 2016; Jordan et al., 2014).

These challenges might be especially pronounced in asynchronous courses where the independent design and structure can amplify the negative effects of trauma on learning and academic success. Without scheduled class meetings or regular real-time interactions with instructors and peers, asynchronous students must draw upon their self-regulation and executive functioning skills, which might be depleted as they navigate trauma (Boyratz et al., 2016). For example, feeling isolated from peers and the instructor may be intensified in an asynchronous environment. Additionally, the lack of immediate support for content-related or procedural questions can increase stress for students. As a result, the affordances of asynchronous courses, while offering flexibility, may also pose barriers for students whose trauma responses disrupt the very skills that are needed.

### ***Trauma-Informed Online Teaching***

To ensure that trauma-affected students can thrive in college, educators are encouraged to adopt trauma-informed teaching practices (Thompson & Carello, 2022). A trauma-informed approach consists of shifts in educational practices, pedagogies, and policies as faculty learn about the role of trauma in students' lives and how classrooms can perpetuate trauma (Venet, 2021). For example, disorganized courses with unclear policies can cause students undue stress and perpetuate harm by consistently setting up students to miss

deadlines and fail. Trauma-informed teaching focuses on supporting students in executive functioning, practicing self-care, avoiding retraumatization, and building trusting relationships (Costa & Dutill, 2021). Trauma-informed teaching emphasizes an anti-racist, asset-based approach to provide all students with trauma-informed care, not just those with documented experiences (Venet, 2021). Trauma-informed practices are adopted as a universal approach—not simply for those students who choose to identify as having experienced trauma.

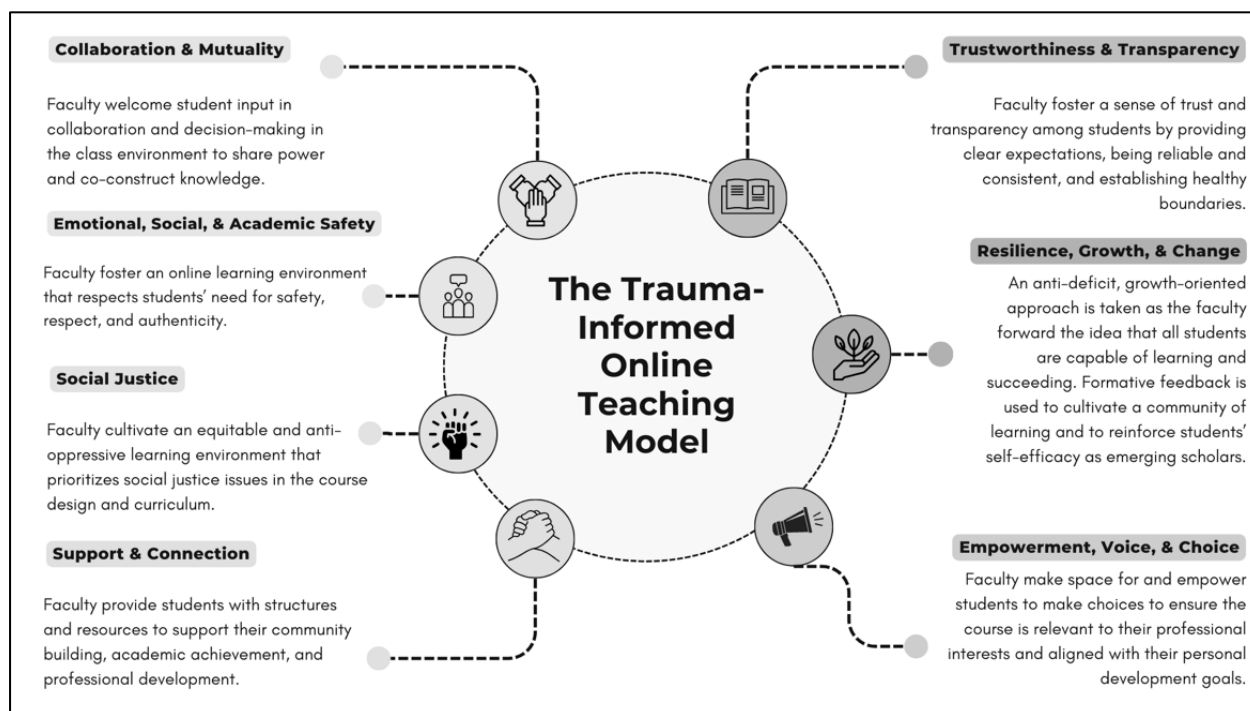
While research exists on the value of trauma-informed teaching in face-to-face K–12 classrooms and, to a lesser extent, university contexts, the impact of trauma-informed practices on undergraduates in online courses has yet to be rigorously explored (Thompson & Carello, 2022). This gap is concerning considering how the COVID-19 pandemic caused colleges to pivot to online instruction faster than we could study how to adapt trauma-informed teaching to online classes. During the pandemic, scholars published instructional guides promoting trauma-informed practices in online classes (Carello, 2020; Costa, 2020; Ebenfield et al., 2022; Imad, 2022; Valenzuela, 2020; Thompson & Carello, 2022). We conducted a literature review to create a literature-based model of *Trauma-Informed Online Teaching* (TIOT; Byrne & Hollingsworth, 2024) to align with the trauma-informed teaching literature as well as some of the leading theories and frameworks for high quality online teaching and course design (e.g., Byrne & Donlan, 2020, Online Learning Consortium, 2019, Garrison & Arbaugh, 2007). Our original TIOT model consisted of seven principles of synchronous and asynchronous course design and teaching practices that are within the locus of control of the instructor and align with the design constraints of most modern Learning Management Systems (LMSs) such as Blackboard and Canvas.

For this study, we adapted the seven TIOT principles (see Figure 1) to focus only on asynchronous undergraduate courses which, at the University of interest in this study, are conducted via an LMS with no required synchronous meetings on Zoom or in person, however traditional synchronous practices like faculty office hours or student-led group project meetings are still included. In an effort to make this TIOT model relevant to instructors of all disciplines, we focused not on the course content but instead on how the course is designed and enacted by the instructor. We see these TIOT course design principles as the foundation by which any asynchronous course can uphold the seven principles of trauma-informed teaching. The principles are interconnected, non-linear, and, at this time, we do not have evidence that one is more important than the others.

**Figure 1**  
*The Trauma-Informed Online Teaching Model*

| Principle                            | Description                                                                                                                                                    |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resilience, Growth, & Change         | Faculty restructure the classroom with an anti-deficit mindset, embedding opportunities for students to succeed through multiple attempts                      |
| Social Justice                       | Faculty embed themes and elements of social justice, equality, and accessibility within the course and classroom environment                                   |
| Support & Connection                 | Faculty create a structured learning environment where students can build community and share interests                                                        |
| Trustworthiness & Transparency       | Faculty establishes clear and consistent expectations, and classroom norms from the beginning of the course                                                    |
| Emotional, Social, & Academic Safety | Faculty provide a supportive and respectful holistic environment that meets students' needs                                                                    |
| Collaboration & Mutuality            | Faculty recognize that they are partners with students in creating classroom knowledge                                                                         |
| Empowerment, Voice, & Choice         | Faculty encourage students to be authentic by offering options for course assignments and allowing students to incorporate their interests into course content |

As seen in Figure 2, the principles are arranged in circular form, implying that there is no beginning or end to how these principles present themselves in the asynchronous classroom. The principles also appear in varying degrees depending on the professor and the descriptions under each principal serve as a guide for the definition. While the current TIOT model is based on a review of the literature, this paper is the first exploration into its validity and relationship to other measures of a supportive asynchronous learning environment. We recognize that the TIOT principles may be relevant across multiple course modalities. However, we chose to focus on asynchronous courses because these practices (e.g., fostering trusting relationships, offering emotional support) may be especially challenging to enact when there is no regular, real-time interaction. In such classes, these TIOT practices are not only harder to enact but may also have an outsized impact on student success and well-being.

**Figure 2***The Trauma-Informed Online Teaching Model—Visualized***Method**

We present quantitative results from the first year of a three-year mixed methods study aimed at exploring the impact of TIOT practices on the academic success of undergraduates in online courses. Our work is funded by the Institute of Education Sciences, U.S. Department of Education, through grant R305B230015, *The Learning and Engaging at a Distance (LEAD) Initiative*.

**Site Selection**

Our HBCU site selection was purposeful for two reasons: Black and African American students are disproportionality exposed to traumatic events (López et al., 2017), HBCUs have created a legacy for providing high-touch and high-quality teaching and are likely already enacting the TIOT principles but discuss it using other terms (e.g., Williams et al., 2022). Additionally, some institutional policies are also inherently aligned with TIOT practices. For example, asynchronous courses at this institution are limited to 30 students—a low student-faculty ratio is a cornerstone of HBCU instruction (e.g., Kim & Conrad, 2006; Williams et al., 2022). We think operationalizing and norming TIOT practices at an HBCU is important because of these existing best-practices in student support (e.g., Stewart & Nicolazzo, 2018). We recognize that our site selection may limit the generalizability of our findings to non-HBCU contexts.

### ***Data Collection***

Our project explores the enactment of the TIOT model within undergraduate asynchronous courses at an HBCU in the mid-Atlantic U.S. Students were recruited due to their enrollment in an asynchronous online, three-credit undergraduate course taught by a participating faculty member. First, we recruited faculty volunteers from a university-provided list of all asynchronous courses. We chose faculty partners based on the following criteria: (1) faculty must be tenured or tenure-track with prior experience teaching online, (2) the faculty must have previously taught the course of interest online, and (3) their course must meet the QualityMatters essential expectations (2021). We saw these criteria as important because we wanted faculty who had authority over the course, were already familiar with the content and context, and had a demonstrated foundation in effective online course design. We selected five faculty to participate.

The five faculty we selected taught courses in education and liberal arts. The courses that we studied were three-credit undergraduate courses designed and advertised as asynchronous courses, but targeting residential students, e.g., the courses were situated within a department and major that was primarily taught in-person. These courses were intentionally designed to be online, unrelated to the COVID-19 pandemic remote teaching policies. Across all five courses, 196 undergraduate students were enrolled.

We partnered with faculty to recruit students to complete our mid-semester online survey. Following the model of Donlan and Byrne (2019) and Byrne and Donlan (2020), we intentionally collected students' perspectives of the course mid-semester or two-thirds through the semester, after midterms had been returned but before the university course evaluation was distributed (March 2024). Over the course of three weeks, the faculty shared written ads from the researchers via their LMS course announcements. Students were then taken to an anonymous survey link. The faculty were not informed who completed the survey. Students were incentivized with a raffle for \$20 and, for some classes, extra credit if a percentage of the class completed the survey.

**Table 1***Undergraduate Student Participant Demographics*

| Variables         | Value                                      | Frequency | Percent |
|-------------------|--------------------------------------------|-----------|---------|
| Expected Grade    | A                                          | 73        | 56.59%  |
|                   | B                                          | 37        | 28.68%  |
|                   | C                                          | 12        | 9.30%   |
|                   | D                                          | 0         | 0.00%   |
|                   | F                                          | 0         | 0.00%   |
|                   | Did not respond                            | 7         | 5.43%   |
| Race or Ethnicity | American Indian or Alaska Native           | 1         | 0.78%   |
|                   | Asian or Asian-American                    | 0         | 0.00%   |
|                   | Black or African American                  | 104       | 80.62%  |
|                   | Latinx or Hispanic                         | 2         | 1.55%   |
|                   | Multiple Races or Multiracial              | 12        | 9.30%   |
|                   | Native Hawaiian or Other Pacific Islander  | 0         | 0.00%   |
|                   | White or European American                 | 3         | 2.33%   |
|                   | Other                                      | 0         | 0.00%   |
|                   | Prefer not to disclose or did not respond  | 7         | 5.43%   |
| Gender            | Genderqueer                                | 0         | 0.00%   |
|                   | Non-Binary                                 | 1         | 0.78%   |
|                   | Man                                        | 34        | 26.36%  |
|                   | Transgender                                | 0         | 0.00%   |
|                   | Woman                                      | 87        | 67.44%  |
|                   | Do not identify as a man, woman, or trans  | 0         | 0.00%   |
|                   | Did not respond                            | 7         | 5.43%   |
| Age               | 18–19 years old                            | 44        | 34.11%  |
|                   | 20–29                                      | 61        | 47.29%  |
|                   | 30–39                                      | 8         | 6.20%   |
|                   | 40–49                                      | 7         | 5.43%   |
|                   | 50–59                                      | 2         | 1.55%   |
| Class             | First year                                 | 30        | 23.26%  |
| Rank              | Sophomore                                  | 29        | 22.48%  |
|                   | Junior                                     | 21        | 16.28%  |
|                   | Senior                                     | 42        | 32.56%  |
|                   | Did not respond                            | 7         | 5.43%   |
| Major College     | Engineering                                | 8         | 6.20%   |
|                   | Interdisciplinary & Continuing Studies     | 10        | 7.75%   |
|                   | Business & Management                      | 22        | 17.05%  |
|                   | Liberal Arts                               | 23        | 17.83%  |
|                   | Architecture & Planning                    | 4         | 3.10%   |
|                   | Community Health & Policy                  | 13        | 10.08%  |
|                   | Computer, Mathematical, & Natural Sciences | 11        | 8.53%   |
|                   | Education                                  | 16        | 12.40%  |
|                   | Journalism & Communication                 | 5         | 3.88%   |
|                   | Graduate School                            | 0         | 0.00%   |
|                   | Social Work                                | 7         | 5.43%   |

|                 |    |       |
|-----------------|----|-------|
| Did not respond | 10 | 7.75% |
|-----------------|----|-------|

### Participants

After removing duplicates (i.e., when students accidentally took the survey multiple times) and one graduate student, we collected 129 undergraduate student responses including partial responses—a 65.82% response rate. Table 1 contains the student demographic information. The majority of student participants identified as Black or African American (80.62%,  $N = 104$ ), women (67.44%,  $N = 87$ ), between 18–19 (34.11%,  $N = 44$ ) and 20–29 years old (47.29%,  $N = 61$ ) split across all four years of an undergraduate degree and across many different majors. Our sample is approximately representative of the University’s undergraduate population. The University’s Institutional Review Board approved this study.

### Survey Overview

The online survey collected information about the students’ demographic information, their course, and their perspective on the course as measured by the TIOT instrument associated with the seven principles of the TIOT model. While outside of scope for this paper, the end of the survey asked students about their persistence goals at the University and some more traditional online course evaluation questions.

### TIOT Survey Design

We designed the TIOT instrument to align with our theoretical model which is based on an extensive review of both peer-reviewed and practitioner-oriented literature on trauma-informed teaching for online courses and distance education (Byrne & Hollingsworth, 2024). For each of the seven principles, we generated an initial list of ten items. The following were our design criteria. First, we focused on aspects of the course that instructors could reasonably control (e.g., how they communicated their office hours to students), instead of aspects that they cannot control (e.g., the choice of LMS). We tried to prevent framing a question as an evaluation of the quality of teaching or soliciting opinions about the instructor (which existing research has found to be biased based on the instructor’s race and gender [Basow, 1995; Chisadza et al., 2019, Smith & Hawkins, 2011; Spooren, 2017]). We avoided asking about students’ feelings about the course or if they enjoy the course—which could introduce bias against general education courses or particularly difficult courses (Marsh & Roche, 2000). Instead, we crafted items about the extent to which a student had seen a particular practice. A higher score meant the student was more certain that they had seen their instructor enact this practice.

We then iteratively refined the instrument to remove items and focused the phrasing on the enactment of the teaching practice, not on the students’ value of the practice. We solicited feedback from experts in trauma-informed practices in higher education. We refined the instrument and piloted internally with graduate students. The full survey was 36 items across the seven principles. The items used a 7-point scale in which 1 = “Not at all like my class” to 7 = “Very much like my class.” There was no “Not Applicable” option, but students were not required to respond to each item.

### ***Data Analysis***

Using R 4.4.1 (2024), RStudio (2024), and the lavaan package (Rosseel, 2012), we cleaned the data and explored missing data; with under 9% missing per item we were



satisfied to move forward. We conducted reliability testing to determine if we could reduce the number of items per TIOT principle to improve the associated Cronbach's alpha. We engaged in an iterative reduction of each scale considering both the statistical and theoretical interpretations and reduced the number of items for each principle while either increasing or maintaining the Cronbach's alpha (see Table 2). This process reduced the full survey length from 36 to 24 items.

Using both the original 36-item and the reduced 24-item version of the survey, we conducted a series of Confirmatory Factor Analyses (CFA). The CFA determined the extent to which participants' responses aligned with our theoretical seven principle TIOT model—confirming that the latent factor structure reflects our TIOT model rather than exploring a different factor structure. In our testing, we used different rotations, expectations for robustness, and considerations for covariance between items both within and across latent constructs to evaluate whether the items loaded onto the appropriate constructs. Our decision making was informed by the factor loadings and factor covariance statistics, as well as multiple Goodness-of-Fit indices such as a statistically nonsignificant chi square test statistic, comparative fit index (CFI), and Tucker Lewis index (TLI) values near .95, a root mean square error of approximation (RMSEA) score lower than .06, and a standardized root mean square residual (SRMR) value lower than .08 (Hu & Bentler, 1999; Thompson, 2004). While meeting each of these criteria is not necessary, they provided meaningful guidance. We then reassessed factor reliability using Cronbach's alpha (Raykov & Marcoulides, 2011).

We created variables to represent the mean response to the latent TIOT principles that were used for descriptive and correlation testing. Because the TIOT data was not normally distributed, we used the nonparametric Kendall's Tau-b correlation tests (dplyr package; Wickham et al., 2023).

**Table 2**

*Reliability of Original and Reduced TIOT Scales Associate with the Seven Principles*

| Principle Construct                  | Original Number of Items | Alpha of Original Scale | Reduced Number of Items | Alpha of Reduced Scale |
|--------------------------------------|--------------------------|-------------------------|-------------------------|------------------------|
| Resilience, Growth, & Change         | 5                        | 0.75                    | 3                       | 0.75                   |
| Social Justice                       | 5                        | 0.84                    | 3                       | 0.85                   |
| Support & Connection                 | 5                        | 0.86                    | 4                       | 0.86                   |
| Trustworthiness & Transparency       | 5                        | 0.80                    | 4                       | 0.88                   |
| Emotional, Social, & Academic Safety | 6                        | 0.82                    | 4                       | 0.84                   |
| Collaboration & Mutuality            | 5                        | 0.86                    | 3                       | 0.87                   |
| Empowerment, Voice, & Choice         | 5                        | 0.82                    | 3                       | 0.85                   |

|                    |           |           |
|--------------------|-----------|-----------|
| <i>Total Items</i> | <i>36</i> | <i>24</i> |
|--------------------|-----------|-----------|

## Results

In this section, we present how we determined that the TIOT survey instrument is a valid and reliable measure of the enactment of the seven principles of the TIOT model. We conducted several CFAs using different approaches. In Table 3, we present the Goodness-of-Fit Indicators for the four models: a model with all original items, a model with the reduced items, a model with reduced items and covariances considered, and a robust model with reduced items and covariances considered. Reducing the number of items and adding covariances between key items decreased the number of parameters needed in our model. We added covariances iteratively based on the R modification indices (see Figure 3 for inter-item covariances).

**Table 3**

*Goodness-of-Fit Indicators of Models of Trauma-Informed Online Teaching*

| Model                                                            | Number of<br>Observations | Number of<br>Model<br>Parameters | Chi-square<br>test statistic | df  | P-<br>value | CFI   | TLI   | RMSEA | SRMR  |
|------------------------------------------------------------------|---------------------------|----------------------------------|------------------------------|-----|-------------|-------|-------|-------|-------|
| Model with All Original<br>Items                                 | 114                       | 129                              | 1652.66                      | 573 | 0.000       | 0.675 | 0.643 | 0.129 | 0.140 |
| Model with Reduced<br>Items                                      | 118                       | 93                               | 510.602                      | 231 | 0.000       | 0.870 | 0.844 | 0.101 | 0.081 |
| Model with Reduced<br>Items and Covariances<br>Considered        | 118                       | 76                               | 419.861                      | 224 | 0.000       | 0.909 | 0.887 | 0.086 | 0.085 |
| Robust Model with<br>Reduced Items and<br>Covariances Considered | 118                       | 76                               | 2419.823                     | 276 | 0.000       | 0.909 | 0.887 | 0.086 | 0.085 |

*Note.* Indices are for standard not scaled model.

**Figure 3***Covariances in Final Robust CFA Model*

| Covariances in Robust Model |                 |
|-----------------------------|-----------------|
| Resilience_2                | Support_2       |
| SocialJustice_2             | Collaboration_3 |
| Resilience_1                | Trust_4         |
| Support_2                   | Support_4       |
| Safety_2                    | Collaboration_2 |
| Trust_1                     | SocialJustice_1 |
| Collaboration_1             | Empowerment_1   |

**Figure 4***Final TIOT Items by Principle*

| Principle Construct                  | Item Number     | Item Text Presented to Student                                                                                                            |
|--------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| RESILIENCE, GROWTH, & CHANGE         | Resilience_1    | Students can submit a draft of an assignment for feedback.                                                                                |
|                                      | Resilience_2    | My instructor provides video or audio feedback on assignments in addition to written feedback.                                            |
|                                      | Resilience_2    | My instructor encourages me to reflect on my growth in the course.                                                                        |
| SOCIAL JUSTICE                       | SocialJustice_1 | Required readings and course content reflect the voices, experiences, and truths of people from marginalized and minoritized communities. |
|                                      | SocialJustice_2 | My instructor incorporates discussions of diversity and justice.                                                                          |
|                                      | SocialJustice_3 | My instructor includes discussions of power and privilege related to the course content.                                                  |
| SUPPORT & CONNECTION                 | Support_1       | My instructor encourages students to get to know each other via group discussions and projects.                                           |
|                                      | Support_2       | My instructor led an activity about what constitutes appropriate behavior in group discussions.                                           |
|                                      | Support_3       | My instructor provides information about relevant campus or community events and organizations.                                           |
|                                      | Support_4       | My instructor refers students to campus resources such as the counseling center, the writing center, tutoring, etc.                       |
| TRUSTWORTHINESS & TRANSPARENCY       | Trust_1         | Course deadlines are posted on Canvas and the syllabus.                                                                                   |
|                                      | Trust_2         | The syllabus includes written policies for late work and missed classes.                                                                  |
|                                      | Trust_3         | Assignment descriptions include rubrics and examples.                                                                                     |
|                                      | Trust_4         | My instructor consistently updates my grades on Canvas.                                                                                   |
| EMOTIONAL, SOCIAL, & ACADEMIC SAFETY | Safety_1        | The online course content is only available to registered students.                                                                       |
|                                      | Safety_2        | My instructor encourages students to meet with them if we are struggling with the structure of the online course.                         |
|                                      | Safety_3        | I feel confident that my instructor can and will address inappropriate behavior in the online course.                                     |
|                                      | Safety_4        | My instructor shared information about academic integrity beyond the University policy.                                                   |

|                              |                 |                                                                                                                                          |
|------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|
| COLLABORATION & MUTUALITY    | Collaboration_1 | My instructor provides clear instructions on how to contact them.                                                                        |
|                              | Collaboration_2 | My instructor is available for one-on-one student meetings.                                                                              |
|                              | Collaboration_3 | Students have a role in evaluating their own learning.                                                                                   |
| EMPOWERMENT, VOICE, & CHOICE | Empowerment_1   | Students pick their own topics for course assignments or activities.                                                                     |
|                              | Empowerment_2   | Students have multiple modality options for submitting assignments (e.g., written essays, podcast recordings, PowerPoint presentations). |
|                              | Empowerment_3   | My instructor provides a warning before covering possibly retraumatizing content.                                                        |

While none of the models were perfect, the model with the best fit was a seven-factor solution using the reduced item scales and covariances considered using Robust Maximum Likelihood (MLR), which is presented in the final row of Table 3. The Chi-square test was not statistically significant, and the Root Mean Square Error of Approximation (RMSEA) was 0.086 (with a 90% confidence interval from 0.073–0.099), which suggests that the model does not fit the data perfectly. This is common in models, like ours, that are complex with several factors and many parameters. However, the CFI, TLI, and SRMR indices suggest the model has acceptable fit. In Figure 4, we present the full text of the survey items included in the model organized by the TIOT principles. A power analysis given the robust model parameters returned a high value of .977—indicating that our model is well-powered and does not require additional piloting.

We created mean variables for the TIOT principles and ran exploratory descriptive and normality tests (Table 4). While these cross-course findings are difficult to interpret, we note that responses fall on the full range, and the data has some non-normality. We ran Kendall's Tau-b nonparametric correlation tests and found that all TIOT principles were statistically significantly correlated with one another ( $p < .000$ ). As presented in Table 5, the strongest correlation was between *Collaboration* and *Emotional, Social, and Academic Safety*.

**Table 4**

*Descriptive Statistics of TIOT Principles*

| Principle Construct            | <i>n</i> | mean | sd   | median | min  | max  | range | skew  | kurtosis | se   |
|--------------------------------|----------|------|------|--------|------|------|-------|-------|----------|------|
| Resilience, Growth, & Change   | 125      | 4.49 | 1.63 | 4.33   | 1.00 | 7.00 | 6.00  | 0.05  | -0.95    | 0.15 |
| Social Justice                 | 126      | 4.99 | 1.59 | 5.00   | 1.00 | 7.00 | 6.00  | -0.44 | -0.50    | 0.14 |
| Support & Connection           | 124      | 4.74 | 1.58 | 4.75   | 1.00 | 7.00 | 6.00  | -0.23 | -0.71    | 0.14 |
| Trustworthiness & Transparency | 125      | 5.81 | 1.30 | 6.25   | 2.25 | 7.00 | 4.75  | -0.76 | -0.71    | 0.12 |

|                                      |     |      |      |      |      |      |      |       |       |      |
|--------------------------------------|-----|------|------|------|------|------|------|-------|-------|------|
| Emotional, Social, & Academic Safety | 121 | 5.63 | 1.25 | 5.75 | 2.25 | 7.00 | 4.75 | -0.63 | -0.56 | 0.11 |
| Collaboration & Mutuality            | 124 | 5.57 | 1.43 | 6.00 | 1.00 | 7.00 | 6.00 | -0.85 | -0.12 | 0.13 |
| Empowerment, Voice, & Choice         | 125 | 4.17 | 1.79 | 4.33 | 1.00 | 7.00 | 6.00 | -0.17 | -0.89 | 0.16 |

**Table 5**

*Kendall's Tau-b Correlations Matrix of TIOT Principles*

|                                         | 1 | 2   | 3    | 4    | 5    | 6    | 7    |
|-----------------------------------------|---|-----|------|------|------|------|------|
| 1. Resilience, Growth, & Change         | 1 | 0.5 | 0.49 | 0.34 | 0.41 | 0.41 | 0.5  |
| 2. Social Justice                       |   | 1   | 0.57 | 0.3  | 0.38 | 0.38 | 0.57 |
| 3. Support & Connection                 |   |     | 1    | 0.36 | 0.51 | 0.52 | 0.6  |
| 4. Trustworthiness & Transparency       |   |     |      | 1    | 0.62 | 0.66 | 0.25 |
| 5. Emotional, Social, & Academic Safety |   |     |      |      | 1    | 0.71 | 0.38 |
| 6. Collaboration & Mutuality            |   |     |      |      |      | 1    | 0.35 |
| 7. Empowerment, Voice, & Choice         |   |     |      |      |      |      | 1    |

## Discussion

We present the first valid and reliable instrument for measuring students' perceptions of the extent to which an asynchronous undergraduate course aligns with trauma-informed online teaching (TIOT) practices. Our survey instrument, based on the seven principles of the TIOT model, is grounded in the empirical literature of trauma-informed teaching, as well as the leading research on supportive and meaningful online asynchronous teaching in higher education (Byrne & Hollingsworth, 2024). By using this student-facing survey, faculty can gather actionable student feedback on how their course design and teaching practices align with the expectations of trauma-informed pedagogy. Doing so can identify gaps and areas for improvement but also provide valuable documentation of the labor put into designing a trauma-informed online course. In the current higher education landscape, it is essential for instructors to have reliable data of the quality of their teaching beyond that of the institutional summative student course evaluations.

This paper focuses on the development and validation of the TIOT survey instrument itself. We do not examine the relationship between students' trauma histories and their perceptions of trauma-informed practices but will do so in a future paper. Instead, our aim was to create a tool that can be used among all students, regardless of the trauma histories. We intentionally adopt a universal approach grounded in the belief that all students can

benefit from the implementation of trauma-informed practices that reduce stress and barriers for learning.

Our universal approach to the adoption of trauma-informed practices is particularly important given the independent design of asynchronous courses which can place greater demands on students' executive functioning and self-regulation skills (Broadbent, 2017; Broadbent et al., 2021; Zhang et al., 2023). For students navigating trauma whether due to systemic inequities, personal experiences or societal events like the COVID-19 pandemic, these essential skills for learning may be particularly compromised. While recognizing that the TIOT principles are relevant for many course modalities, we hope that those designing and teaching asynchronous courses will consider how the mere course structure may inadvertently amplify the effects of trauma and contribute to disengagement and academic stress.

Our survey items were intentionally designed so that they only asked about course design and teaching decisions within the control of the instructor. For example, we did not include items asking about the students' feelings about the institution's LMS choice or enrollment policies. Doing so ensures that the feedback faculty receive is directly tied to their teaching practices and can inform their own professional development. We also avoided framing items as direct evaluations of the instructor's personality or likability. Survey items were intentionally designed to *not* be about students' perspectives on or evaluations of the instructors' asynchronous teaching decisions, which have been found to contribute to biased evaluations that disproportionately targets Black and Brown faculty—particularly Black women (Perry et al., 2015; Rockquemore & Laszloffy, 2008; Smith & Hawkins, 2011; Young et al., 2023). We iteratively refined our survey to be as concise as possible in an effort to lessen participant completion time, thus increasing the utility for faculty seeking feedback from already over-surveyed students.

We contribute the TIOT survey instrument as a valid and reliable tool for gauging students' perceptions of the extent to which their online course aligns with trauma-informed principles. We encourage researchers, faculty, and faculty developers to use the TIOT instrument to gather course feedback and identify trends in what students notice and do not notice about their course design and teaching practices. Seeing the course through the students' eyes might shed light on how clear or accessible a course really is. For example, if many students respond to the survey that an instructor does not use rubrics, but the instructor has indeed created rubrics, that may signal to reorganize the LMS so that students can more quickly and easily access them. These small changes can make a course easier to navigate and thus less stressful for students who are navigating other stressors in their lives.

### ***Limitations to Generalizability***

Recognizing the importance of considering limitations when interpreting findings, we first note that the instructors who participated in our study were excited about gaining feedback from their students—potentially more than the faculty who chose not to participate. The participating faculty's interest in gaining feedback and how they communicated this wish to their students might have positively biased the students' responses. Second, critics of survey-based student evaluations of teaching often raise the concern that students are not meaningfully reading and responding to survey items but are instead clicking similar answers throughout the survey. While this could offer an alternate explanation for why all TIOT principles are strongly correlated, we choose to trust that the students were thoughtful when

they completed the survey. Third, we acknowledge that the survey included a mix of item structures, and we wonder whether student responses may have differed had all items followed a consistent phrasing format (e.g., all items beginning with “students can...”).

Additionally, because all courses were screened to meet the expectations of QualityMatters, these courses may not reflect the average asynchronous course offered at the institution. We wonder if our prescreening may have inadvertently limited the variance in our data because we did not include courses that did not meet basic expectations of accessibility.

Because our study was conducted at an HBCU, the findings reflect the strengths and values of the HBCU learning environments. Thus, the results may not be directly transferable to institutions with different cultures, priorities, and histories. Rather than viewing HBCUs as exceptions, future research should recognize HBCUs’ leadership in fostering equity-driven, student-centered teaching and explore how their practices might inform broader improvements in higher education. Researchers should consider how the institutional context shapes students’ perceptions of asynchronous teaching.

Finally, we do not yet have evidence that one TIOT principle is more important than another or the extent to which each matter to the success of college students in online courses. Our future work will explore this using a mixed methods approach and a large student population.

## **Conclusion**

We live in a stressful time in which students’ attention is diverted from their learning experiences. While many faculty feel helpless in supporting students who are navigating hardships, adopting the TIOT practices is an easy way to help. In this paper, we present a valid and reliable survey instrument that allows faculty to assess the extent to which their course aligns with trauma-informed principles from a students’ perspective. We encourage faculty, graduate student instructors, and faculty developers to adopt this survey instrument.

### ***Acknowledgements***

The research reported here was supported, in whole or in part, by the Institute of Education Sciences, U.S. Department of Education, through grant R305B230015 to Morgan State University. The opinions expressed are those of the authors and do not represent the views of the Institute or the U.S. Department of Education.

### ***Conflicts of Interest***

The authors have no conflict of interest.

### ***Human Subject***

The authors have received IRB approval.

## References

- Aruguete, M. S., & Edman, J. L. (2019). Trauma exposure and academic performance in African American college students. *North American Journal of Psychology*, 21(3).
- Basow, S. A. (1995). Student evaluations of college professors: When gender matters. *Journal of Educational Psychology*, 87(4), 656–665.  
<https://doi.org/10.1037/00220663.87.4.656>
- Becker-Blease, K. A. (2017). As the world becomes trauma-informed, work to do. *Journal of Trauma & Dissociation*, 18(2), 131–138.  
<https://doi.org/10.1080/15299732.2017.1253401>
- Boyratz, G., Granda, R., Baker, C. N., Tidwell, L. L., & Waits, J. B. (2016). Posttraumatic stress, effort regulation, and academic outcomes among college students: A longitudinal study. *Journal of Counseling Psychology*, 63(4), 475–486.  
<https://doi.org/10.1037/cou0000102>
- Boyratz, G., Horne, S. G., Owens, A. C., & Armstrong, A. P. (2013). Academic achievement and college persistence of African American students with trauma exposure. *Journal of Counseling Psychology*, 60(4), 582–592. <https://doi.org/10.1037/a0033672>
- Broadbent, J. (2017). Comparing online and blended learner's self-regulated learning strategies and academic performance. *The Internet and Higher Education*, 33, 24–32.  
<https://doi.org/10.1016/j.iheduc.2017.01.004>
- Broadbent, J., Sharman, S., Panadero, E., & Fuller-Tyszkiewicz, M. (2021). How does self-regulated learning influence formative assessment and summative grade? Comparing online and blended learners. *The Internet and Higher Education*, 50, 100805.  
<https://doi.org/10.1016/j.iheduc.2021.100805>
- Byrne, V. L., & Donlan, A. E. (2020). A mid-semester evaluation of college teaching to improve online teaching effectiveness. *Online Learning Journal*, 24(2).  
<https://doi.org/10.24059/olj.v24i2.2126>
- Byrne, V. L., & Hollingsworth, J. (2024). A model for trauma-informed online teaching in higher education. In R. A. González & Ş. Orakçı (Eds.), *Innovation and educational technology trends in higher education*. Information Age Publishing.
- Carello, J. (2020, March). Trauma-informed teaching and learning principles. *Trauma informed teaching blog*.  
[traumainformedteachingblog.files.wordpress.com/2020/04/titl-general-principles-3.20.pdf](https://traumainformedteachingblog.files.wordpress.com/2020/04/titl-general-principles-3.20.pdf)
- Chisadza, C., Nicholls, N., & Yitbarek, E. (2019). Race and gender biases in student evaluations of teachers. *Economics Letters*, 179, 66–71.
- Comas-Díaz, L., & Hall, G. N. (2019). Racial trauma: Theory, research, and healing: Introduction to the special issue. *American Psychological Association*, 74(1), 1–15.  
<https://doi.org/10.1037/amp0000442>



- Costa, K., & Dutil, J. (2021, July 20). Trauma fundamentals for higher educators [Webinar]. *Online Learning Toolkit*. <https://www.onlinelearningtoolkit.com/>
- Costa, K., (2020). Trauma-aware teaching checklist. *100 faculty*. <https://bit.ly/traumachecklist>
- Donlan, A. E., & Byrne, V. L. (2020). Confirming the factor structure of a research-based mid-semester evaluation for college teaching. *Journal of Psychoeducational Assessment*, 38(7), 866–881. <https://doi.org/10.1177/0734282920903165>
- Duncan, R. D. (2000). Childhood maltreatment and college drop-out rates. *Journal of Interpersonal Violence*, 15(9), 987–995. <https://doi.org/10.1177/088626000015009005>
- Ebenfield, M. N., Clarke, L. W., Doshi, A., Gorrivan, K., LaBonte, G., Leclerc, C., ... & Stevenson, G. (2022). Application of trauma-informed teaching and learning principles in a blended learning environment. In U. G. Singh, C. S. Nair, C. Blewett, & T. Shea (Eds.), *Academic Voices: A conversation on new approaches to teaching and learning in the post-COVID world*. (pp. 185–196). Chandos Publishing. <https://doi.org/10.1016/B978-0-323-91185-6.00038-0>
- Frazier, P., Anders, S., Perera, S., Tomich, P., Tennen, H., Park, C., & Tashiro, T. (2009). Traumatic events among undergraduate students: Prevalence and associated symptoms. *Journal of Counseling Psychology*, 56(3), 450–460. <https://doi.org/10.1037/a0016412>
- Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10(3), 157–172.
- Imad, M. (2022). Trauma-informed education for wholeness: Strategies for faculty & advisors. *New Directions for Student Services*, 2022(177), 39–47. <https://doi.org/10.1002/ss.20413>
- Jordan, C. E., Combs, J. L., & Smith, G. T. (2014). An exploration of sexual victimization and academic performance among college women. *Trauma, Violence, & Abuse*, 15(3), 191–200. <https://doi.org/10.1177/1524838014520637>
- Kim, M. M., & Conrad, C. F. (2006). The impact of historically Black colleges and universities on the academic success of African-American students. *Research in Higher Education*, 47, 399–427. <https://doi.org/10.1007/s11162-005-9001-4>
- López, C. M., Andrews, A. R., Chisolm, A. M., de Arellano, M. A., Saunders, B., & Kilpatrick, Dean. G. (2017). Racial/ethnic differences in trauma exposure and mental health disorders in adolescents. *Cultural Diversity and Ethnic Minority Psychology*, 23(3), 382–387. <https://doi.org/10.1037/cdp0000126>
- Marsh, H. W., & Roche, L. A. 2000. Effects of grading leniency and low workload on students' evaluations of teaching: Popular myth, bias, validity, or innocent bystanders? *Journal of Educational Psychology*, 92(1), 202–28. <https://doi.org/10.0.4.13/0022-0663.92.1.202>

- McGruder-Johnson, A. K., Davidson, E. S., Gleaves, D. H., Stock, W., & Finch, J. F. (2000). Interpersonal violence and posttraumatic symptomatology: The effects of ethnicity, gender, and exposure to violent events. *Journal of Interpersonal Violence*, 15(2), 205–221. <https://doi.org/10.1177/088626000015002006>
- Moore, M. G. (2013). The theory of transactional distance. In M. G Moore (Ed.), *Handbook of distance education: Second Edition* (pp. 66–85). Routledge. <https://doi.org/10.4324/9780203803738>
- Online Learning Consortium. (2019). *OLC quality scorecard*. <https://onlinelearningconsortium.org/consult/olc-quality-scorecard-suite/>
- Perry, A. R., Wallace, S. L., Moore, S. E., & Perry-Burney, G. D. (2015). Understanding student evaluations: a Black faculty perspective. *Narratives of Professional Helping*, 20(1), 29–35. <https://reflections narratives of professional helping.org/index.php/Reflections/article/view/143>
- QualityMatters (2021). *Higher education rubric* (6th ed). <https://www.qualitymatters.org>
- R Core Team (2024). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>.
- Raykov, T., & Marcoulides, G. (2011). Classical item analysis using latent variable modeling: A note on a direct evaluation procedure. *Structural Equation Modeling*, 18(2), 315–324.
- Read, J. P., Ouimette, P., White, J., Colder, C., & Farrow, S. (2011). Rates of DSM–IV–TR trauma exposure and posttraumatic stress disorder among newly matriculated college students. *Psychological Trauma: Theory, Research, Practice and Policy*, 3(2), 148–156. <https://doi.org/10.1037/a0021260>
- Rockquemore, A. K., & Laszloffy, T. (2008). *The Black academic's guide to winning tenure without losing your soul*. Lynne Rienner Publishers.
- Rosseel, Y. (2012). “lavaan: An R package for structural equation modeling.” *Journal of Statistical Software*, 48(2), 1–36. <https://doi.org/10.18637/jss.v048.i02>
- RStudio Team (2024). *RStudio: Integrated development for R*. Rstudio. PBC. <http://www.rstudio.com/>
- Shalka, T. R. (2020). (Re)membering the body: Identity development and college student trauma. *Journal of College Student Development*, 61(4), 456–473.
- Simmons, D., (2020, June 5). *If we aren't addressing racism, we aren't addressing trauma*. ASCD. [www.ascd.org/blogs/if-we-arent-addressing-racism-we-arent-addressing-trauma](http://www.ascd.org/blogs/if-we-arent-addressing-racism-we-arent-addressing-trauma)
- Smith, B. P., & Hawkins, B. (2011). Examining student evaluations of black college faculty: Does race matter? *The Journal of Negro Education*, 80(2), 149–162. <https://www.jstor.org/stable/41341117>

- Smyth, J. M., Hockemeyer, J. R., Heron, K. E., Wonderlich, S. A., & Pennebaker, J. W. (2008). Prevalence, type, disclosure, and severity of adverse life events in college students. *Journal of American College Health*, 57(1), 69–76. <https://doi.org/10.3200/JACH.57.1.69-76>
- Spooren, P., Vandermoere, F., Vanderstraeten, R., & Pepermans, K. (2017). Exploring high impact scholarship in research on student's evaluation of teaching (SET). *Educational Research Review*, 22, 129–141.
- Substance Abuse and Mental Health Services Administration [SAMHSA]. (2022). *Trauma and violence*. <https://www.samhsa.gov/trauma-violence>
- Thompson, P., & Carello, J. (Eds.). (2022). *Trauma-informed pedagogies: A guide for responding to crisis and inequality in higher education*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-92705-9>
- Valenzuela, J., (2020, July 10). *Bringing trauma-informed strategies into the (online) classroom*. Teacher2Teacher. [www.teacher2teacher.education/2020/07/10/bringing-trauma-informed-strategies-into-the-online-classroom/](http://www.teacher2teacher.education/2020/07/10/bringing-trauma-informed-strategies-into-the-online-classroom/)
- Varjas, K., Henrich, C. C., & Meyers, J. (2009). Urban middle school students' perceptions of bullying, cyberbullying, and school safety. *Journal of School Violence*, 8(2), 159–176. <https://doi.org/10.1080/15388220802074165>
- Venet, A. S. (2021). *Equity-centered trauma-informed education*. W.W. Norton & Company.
- Voisin, D. R., Neilands, T. B., & Hunnicutt, S. (2011). Mechanisms linking violence exposure and school engagement among African American adolescents: Examining the roles of psychological problem behaviors and gender. *The American Journal of Orthopsychiatry*, 81(1), 61–71. <https://doi.org/10.1111/j.1939-0025.2010.01072.x>
- Williams, K. L., Mobley, S. D., Campbell, E., & Jowers, R. (2022). Meeting at the margins: culturally affirming practices at HBCUs for underserved populations. *Higher Education*, 84, 1067–1087. <https://doi.org/10.1007/s10734-022-00816-w>
- Williams, T. R., Bass, J. E., Swain, M., Jennings, D., Wyatt, W. N., & Foster, S. (2024). Unpacking the stress of 2020: Black Americans cope with systemic trauma. *Clinical Psychology & Psychotherapy*, 31(1), e2944. <https://doi.org/10.1002/cpp.2944>
- Wickham, H., François, R., Henry, L., Müller, K., & Vaughan, D. (2023). *dplyr: A grammar of data manipulation*. R package version 1.1.4, <https://github.com/tidyverse/dplyr>, <https://dplyr.tidyverse.org>.
- Young, J., Farinde-Wu, A., & Sibanda, L. (2023). Teaching and learning in black and white: Unpacking students' perceptions of Black faculty teaching at a predominantly white institution. *Studying Teacher Education*, 20(1), 21–42. <https://doi.org/10.1080/17425964.2023.2240327>
- Zhang, Z., Xu, Q., Koehler, A., & Newby, T. (2023). Comparing blended and online learners' self-efficacy, self-regulation, and actual learning in the context of educational technology. *Online Learning*, 27(4). <https://doi.org/10.24059/olj.v27i4.4039>

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# Investigating Parental Perspectives on Young Learners' Social Presence in Online Learning: A Mixed Methods Approach

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## Abstract

This study used an explanatory mixed-method approach to understand Chinese parents' perceived social presence in their children's online learning and the relationship among parents' perceived social presence, perceived learning, and satisfaction with their children's online instructor. In the quantitative phase, 53 Chinese parents of young learners were surveyed to determine the relationship across perceived social presence, perceived learning, and satisfaction with their child's online instructor. Results highlighted the significant relationships between parents' perceived social presence and both their perceived learning ( $r = 0.517$ ) and satisfaction with the instructor ( $r = 0.518$ ) in their children's online learning, with social presence accounted for 26.7% of the variance in their perceived learning. Qualitative interviews were conducted to further explore parents' perceptions of social presence—its definition, importance, the instructor's roles, parental involvement, and factors impacting perceived social presence. Findings emphasized the importance of parental roles, the interplay of social and teaching presence, and learners' cultural background when designing effective online learning experiences with young learners.

**Keywords:** Online learning; Young learners; Parents' perceived social presence; Perceived learning; Perceived satisfaction with instructor

Song, J., Koehler, A. A., Richardson, J. C., & Zui, C. (2024). Investigating parental perspectives on young learners' social presence in online learning: A mixed methods approach. *Online Learning*, 29(4), 258-291. <https://doi.org/10.24059/olj.v29i4.5068>

## Introduction

Online K–12 enrollment has steadily increased in the past decade (Archambault et al., 2022; Borup et al., 2019), with the COVID-19 outbreak forcing millions of young learners to learn online (Archambault et al., 2022; Dong et al., 2020). As online learning with young children has become a reality due to the pandemic (Maslin et al., 2023), exploring viable solutions to foster effective online learning experiences for young learners is crucial.

Most research in K–12 online learning has focused on secondary school children (Bond, 2021; Borup et al., 2013; Borup, 2016; Borup et al., 2019; Maslin et al., 2023), with young learners receiving little attention until the COVID-19 pandemic. Studies during the pandemic revealed many challenges resulting from young learners participating in online educational settings (Flynn et al., 2021; Fontenelle-Tereshchuk, 2021). For instance, many young learners, particularly those under the age of 11 or 12, may still be developing key skills such as self-regulation, independence, and motivation, which are considered essential for successful online learning experiences (Manoharan et al., 2022). In addition, young learners' digital literacy levels, psychomotor skills, and social-emotional development are still in a nascent stage (Dong et al., 2020; Kolak et al., 2021; Lau & Lee, 2021). As a result of these challenges, parental involvement (parents' or caregivers' investment in their children's education; Larocque et al., 2011) during online learning with young learners is critical for boosting chances of a meaningful experience (Johnson et al., 2023; Kipp et al., 2023; Song et al., 2022).

Borup et al. (2014) considers parental involvement a key part in the Adolescent Community of Engagement framework in K–12 online learning environments. Parents facilitate interaction through nurturing (offering love and support, providing materials for the virtual learning environment, preparing young learners with basic social and behavioral skills for an academic context), monitoring and motivating to mitigate young learners' lack of autonomy and self-regulation, and volunteering (e.g., parent volunteering activities). Parents also organize young learners' virtual environment and time and engage in various instructional activities to enhance their learning experiences.

As predictors of parental involvement, parents' perspectives toward online learning significantly influence young learners' learning experiences (Erdogan et al., 2019). For example, parents' facilitation of digital technologies and media environments is inseparable from young learners' online learning. Also, parental beliefs and attitudes toward the role and potential of online learning for young children shape the quality and quantity of online education, opportunities, and learning experiences children receive at home (Dong et al., 2020).

In addition to parents' perspectives and involvement, social and emotional interactions within online environments are essential to the success of online learning (Garrison et al., 2000; Garrison, 2003), with social presence considered a significant factor in creating meaningful online learning experiences (Richardson & Swan, 2003; Richardson et al., 2017). Extensive research has shown social presence is essential for student satisfaction and learning outcomes in online learning (Gunawardena & Zittle, 1997; Miao et al., 2022; Richardson & Swan, 2003) and impacts student motivation, participation, actual and perceived learning, and course and instructor satisfaction (Richardson et al., 2017).

However, research has yet to fully explore young learners' social interactions in online learning environments. Given that parents are one of the most important stakeholders in a young learner's education and in supporting membership in an online learning community (Dong et al., 2020), parental involvement is crucial in shaping young learners' home-based online learning (Liu et al., 2022). Despite this, little research has considered parents' perspectives on social presence in their children's online learning. To address this gap, this study explored parents' perceptions of social presence in their children's online learning and the relationships among parents' perceptions of social presence, perceived learning outcomes, and satisfaction with the instructor. Parents' perceived social presence or parents' perceptions of social presence refer to their views on the social presence experienced by their children in online learning, rather than their own social presence within the online learning environment.

## Literature Review

### *Online Learning with Young Learners*

Online learning is typically defined as the process of acquiring knowledge or skills via the internet, where students engage in learning activities with instructors and peers either synchronously or asynchronously, when and wherever convenient (Singh & Thurman, 2019). Young learners generally refer to children under the age of 11 or 12 years, though definitions differ across educational systems and countries (Tao & Xu, 2022). This study primarily focuses on online learning with elementary school aged children (between 7–12 years old).

Research in online learning has predominately considered higher education settings (Bond, 2020). Within K–12 online contexts, middle and high school students have received disproportionately more attention (Bond, 2020; Johnson et al., 2023) and young learners are still underrepresented (Johnson et al., 2023; Maslin et al., 2023; Yuan & Dao, 2025). Prior to the COVID-19 pandemic, research on young learners in online environments was especially limited. A systematic review of K–12 online learning literature underscored the need for further research into the developmental needs and instructional strategies tailored to younger learners (Johnson et al., 2023).

### K–12 Online Learning in China

This lack of research is also evident in the Chinese context, where online learning with K–12 students only became prevalent after the pandemic (Wang et al., 2024; Zuo et al., 2021). In China, parents often seek after-school learning opportunities to supplement their children's formal schooling (Wang et al., 2024). For instance, many enroll their children in English-language classes, as well as math and Chinese tutoring programs. Following the COVID-19 outbreak, K–12 education gradually transformed to online learning (Wang et al., 2024; Zuo et al., 2021), with synchronous learning becoming particularly popular (Zhu et al., 2025).

Research on K–12 online learning in China has explored perspectives of parents (Cui et al., 2021; Dong et al., 2020; Lau & Lee, 2021; Zhang, 2021) and students (Cui et al., 2021; Ma et al., 2022; Wang et al., 2024; Zuo et al., 2021) regarding their experiences amid the pandemic. For example, Dong et al. (2020) highlighted the importance of parental roles in supporting young learners' online learnings, whereas Cui et al. (2021), Lau & Lee (2021), and Zuo et al. (2021) identified key challenges such as technical problems, excessive screen

time, and reduced social interaction students face when learning online. Additionally, some studies have investigated solutions to enhance online learning outcomes (Yuan & Dao, 2025; Zhao et al., 2024; Zuo et al., 2022; Wang et al., 2024). For instance, Yuan and Guo (2025) emphasized the importance of developing a comprehensive understanding of the factors that impact young learners' engagement in online learning.

### Parental Involvement in Young Learners' Online Learning

Across both Chinese and international studies conducted during and after the pandemic, two major themes emerged—most notably, the consistent emphasis on parental involvement. Many studies highlighted parental support (Kolak et al., 2021; Liu et al., 2022; LaRocque et al., 2011), parental perspectives (Cui et al., 2021; Dong et al., 2020; Flynn et al., 2021; Lau & Lee, 2021; Pastori et al., 2021), and related challenges (Abuhammad, 2020; Fontenelle-Tereshchuk, 2023; Harjule et al., 2021; Henderson et al., 2020; Lau & Lee, 2021; Pittas et al., 2022; Pozas et al., 2021) regarding young learners' online learning experiences. Online learning can be less active compared to traditional face-to-face learning, which causes young learners' motivation and attention to decline (Pittas et al., 2022). To mitigate these challenges, meaningfully integrating parental involvement has increased significantly. For example, studies reported parents embracing multiple roles: “shadow teacher” (helping with content instruction and homework supervision); “mediator” (communicating between the child and teacher); and “tech expert” (facilitating young learners' online learning) (Dong et al., 2020; Kolak et al., 2021; Tao & Xu, 2022).

However, the significant involvement in supporting their children's online learning caused parental stress (Dong et al., 2020; Flynn et al., 2021; Fontenelle-Tereshchuk, 2021; Harjule et al., 2021; Pastori et al., 2021; Pozas et al., 2021; Ribeiro et al., 2021; Soltero-Gonzalez & Gillanders, 2021; Sonnenschein & Stites, 2021; Sonnenschein et al., 2021). Parents described main challenges with their children's online learning as additional time required to support online learning and homework, lack of training in online learning, and inadequate content knowledge of school subjects (Cui et al., 2021; Lau & Lee, 2021; Pastori et al., 2021; Ribeiro et al., 2021; Sonnenschein et al., 2021).

Further, many studies reported parents' negative beliefs toward online learning. Those negative beliefs caused by perceived disadvantages of online learning, inadequate professional knowledge of content and technology, young learners' lack of self-regulation, and inadequate support from schools and teachers (Abuhammad, 2020; Cui et al., 2021; Dong et al., 2020; Fontenelle-Tereshchuk, 2021; Günbaş & Gözükcük, 2020; Nusser, 2021; Pastori et al., 2021; Sonnenschein et al., 2021; Yayci & Kendirci, 2021; Çakın & Akyavuz, 2021). For example, parents hoped their children would return to in-person learning to achieve superior learning outcomes and develop of social skills (Günbaş & Gözükcük, 2020; Harjule et al., 2021; Henderson et al., 2020; Mantovani et al., 2021; Çakın & Külekçi Akyavuz, 2021).

### Technology Integration for Enhancing Young Learner Engagement

The second major theme was integrating technology to improve young learners' engagement in online learning. To date, studies have implemented animated videos, artificial intelligence, virtual reality, interactive electronic modules, and web-based songs to improve young learner engagement in online environments (Ho & Nguyen, 2022; Pujiani et al., 2022; Putri et al., 2022; Trilestari & Almunawaroh, 2021; Xu et al., 2022). For example, Ho and



Nguyen (2022) highlighted the importance of implementing various digital resources to stimulate young learners' motivation and engagement. Pujiani et al. (2022), Putri et al. (2022), and Xu et al. (2022) echoed this belief by exploring the use of animated video, online songs, and artificial intelligence, respectively, in teaching English to young learners in online environment.

Two conclusions can be drawn from the above research. One is that parents are an integral part of young learners' learning, and their roles are even more critical in online learning contexts (Liu et al., 2022). Therefore, involving families in education to improve student learning outcomes is important. Furthermore, examining parental perspectives when considering young learners' online experiences is worthwhile. Second, challenges exist with young learners' online learning experiences, and many parents are not pleased with the quality of their children's emergent online learning experiences. Though studies have explored ways to improve learner engagement, parents' unique role remains unexplored. As online learning with young learners has become a norm, including parents when exploring effective and meaningful online learning solutions is key.

### ***Social Presence Theory***

#### Definitions

Social presence was first introduced as a key factor in communication media by Short et al. (1976). It refers to "the degree to which a person is perceived as a 'real person' in a mediated communication" (Gunawardena & Zittle, 1997, p. 9). Short et al. (1976) asserted that social presence is closely related with "intimacy" (e.g., physical distance, eye contact, smiling, personal topics of conversation) and "immediacy" (perceived psychological distance among online participants). Gunawardena (1995) further explained that social presence contributes to the level of intimacy, and immediacy behaviors enhance social presence. Building upon previous research, Garrison and colleagues included social presence as one of the three constructs (i.e., social presence, cognitive presence and teaching presence) in their widely cited Community of Inquiry Framework (CoI). They defined social presence "as the ability of participants in a community of inquiry to project themselves socially and emotionally, as real people (i.e., their full personality) through the communication being used" (Garrison et al., 2000, p. 13). For the purpose of this study, we are defining social presence as the "degree to which a person is perceived as 'real' in mediated communication" (Richardson and Swan, 2003, p. 70).

#### Dimensions of Social Presence

To further explain how social presence is manifested in virtual learning environments, previous studies have identified key dimensions to capture its behavioral and emotional components (Garrison et al., 2000; Rourke et al., 2001; Swan, 2003): emotional expression (e.g., emotions, humor, self-disclosure), open communication (e.g., mutual awareness, recognition), and group cohesion (e.g., group commitment). Rourke et al. (2001) used an iterative process to derive social presence indicators and culminated three broad categories: affective responses (i.e., personal expressions of emotion, feelings, beliefs, and values), interactive responses (i.e., behaviors providing evidence that others are attending), and cohesive responses (i.e., behaviors fostering a sense of group commitment), which directly corresponded to Garrison et al.'s work. It is important to note that two of the social presence categories were later renamed: cohesive was renamed as group cohesion and interactive was

renamed as open communication (Swan & Richardson, 2017). The three key dimensions were embedded in the instrument developed by Richardson and Swan (2003), which was adopted for this study.

### Research on the Impact of Social Presence

Social presence has been extensively studied in higher education over the past 30 years. In a meta-analysis investigating the relationship between social presence and students' satisfaction and learning, Richardson et al. (2017) presented a detailed discussion of existing studies on social presence, highlighting social presence's significant influence on "students' participation and motivation to participate, course and instructor satisfaction, and both actual and perceived learning" (p. 403) and offering implications on course design, student retention, and intentions to enroll in future online courses.

Furthermore, seminal research has established social presence as an essential aspect of online learning. Gunawardena and Zittle (1997) examined the effectiveness of social presence in online learning, finding that it alone explained 60% of the variance when predicting student satisfaction. This finding was confirmed by Richardson and Swan (2003), Swan and Shih (2005), and Russo and Benson (2005). Additionally, Richardson and Swan (2003) and Russo and Benson (2005) identified that student social presence significantly predicts students' overall perceived learning, whereas Swan and Shih (2005) indicated that instructor social presence may be a stronger factor that impacts student satisfaction than student social presence. Using a mixed-method approach, Tu and McIsaac (2002) identified social presence's positive influence on online interaction, which was later echoed by Wise et al. (2004). Notably, Tung and Deng (2006) expanded social presence research to elementary-aged children, finding that greater interactivity enhanced the social presence and appeal of digital environments, thereby fostering children's engagement, intrinsic motivation, and richer learning experiences.

Since the onset of COVID-19, research on social presence has reaffirmed previous findings and advanced the field. Studies have consistently identified a positive association between social presence and student learning across higher education and K–12 contexts (Lee et al., 2025; Stankovska et al., 2021). Scholars have introduced new dimensions to social presence theory, such as social presence divergence and interaction integration (Weidlich et al., 2023), while also extending social presence into K–12 online learning environments (Lee et al., 2025; Tackie, 2022). For instance, Lee et al. (2025) investigated 364 fourth to sixth-grade elementary students to understand the relationship between student's social presence and their perceived learning outcomes.

With the rise of online learning environments over the past two decades, research on social presence continues to increase across contexts and disciplines (Richardson et al., 2017). However, the majority of existing studies on social presence have considered higher education contexts. Research exploring social presence in online learning among young learners remains scarce, with limited attention given to the role of parents in these environments.

Online learning contexts are increasingly used with young learners, with parents playing a critical role in facilitating these experiences. At the same time, research underscores the critical role social presence plays in online learning. Therefore, understanding parental perspectives regarding social presence can help inform best practices for online learning for young learners. To this end, this study aimed to understand Chinese parents' perceptions of

social presence in their children's online learning and the relationship among parents' perceived social presence, perceived learning, and satisfaction with the instructor. Our guiding questions included:

- How does parents' perceived social presence explain their satisfaction with the instructor and perceived learning in their children's online learning?
  - What are parents' perceptions of social presence in their children's online learning experience?
  - Is there a relationship among parents' satisfaction with the instructor, their perceived social presence and perceived learning in their child's online learning?

## **Methods**

### ***Research Design***

A two-phase explanatory mixed method approach was used to explore parents' perceptions of social presence in their children's online learning and the relationships among parents' perceived social presence, perceived learning, and satisfaction with the instructor (Creswell & Clark, 2017). First, quantitative survey data was collected capturing parents' social presence perceptions, and then, qualitative data was collected from interviews with parents to explain and extend the quantitative results (see Figure 1).

### ***Research Context and Participants***

Participants were recruited through the first author's professional network. The first author, an online English instructor, initially distributed the survey link to the parents of her students and requested a colleague, also an online teacher, to disseminate the survey to their respective parent networks. Parents who were invited to participate in the survey had direct and active involvement in supporting their children's online learning at home—including managing schedules, assisting with technology, and providing academic support. Chinese parents often played an important role in supporting their children's learning by helping them submit homework to instructors. There were designated opportunities for direct interaction between parents and instructors throughout an online learning experience, including regular feedback on students' class performance, assignments, and exam results. Parents' responsibilities and interactions with instructors provided them with meaningful engagement in the online learning process, even in the absence of structured training.

Participants were recruited through WeChat, a widely used social media platform in China, by distributing a Qualtrics Survey link during April and May 2023. Participation was voluntary and uncompensated. A total of 66 responses were received, of which 53 were valid and analyzed. All participants were parents of elementary school-aged children (approximately 7–12 years old) with online learning experiences and were asked to reflect on their children's overall online learning—including synchronous and asynchronous formats—during or after the COVID-19 pandemic. See Table 1 for participant demographic information.

**Figure 1**

*A Visual Model for the Sequential Explanatory Mixed Methods Design Procedures*

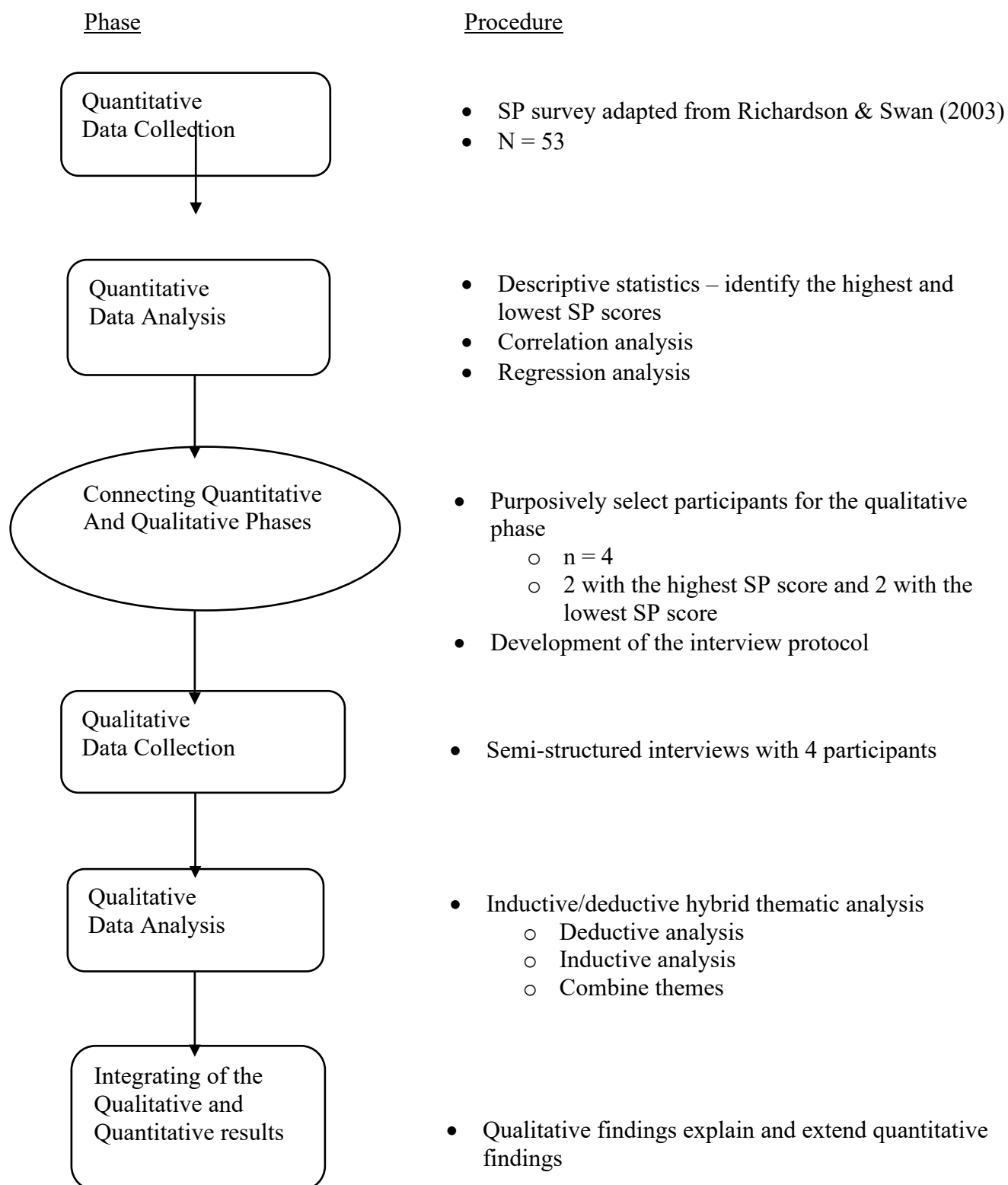


**Table 1***Survey Participant Demographic Information (N = 53)*

| <b>Variables</b>                                                   | <b>Frequency</b> | <b>Percentage</b> |
|--------------------------------------------------------------------|------------------|-------------------|
| <b>Gender</b>                                                      |                  |                   |
| Female                                                             | 50               | 94.3%             |
| Male                                                               | 3                | 5.7%              |
| <b>Age group</b>                                                   |                  |                   |
| 25–34                                                              | 8                | 15.1%             |
| 35–44                                                              | 42               | 79.2%             |
| 46–54                                                              | 3                | 5.7%              |
| <b>Education background</b>                                        |                  |                   |
| Community college                                                  | 10               | 18.9%             |
| Bachelor's degree                                                  | 32               | 60.4%             |
| Master's degree                                                    | 10               | 18.9%             |
| Doctoral degree                                                    | 1                | 1.9%              |
| <b>Child Grade level</b>                                           |                  |                   |
| Grade 1                                                            | 7                | 13.2%             |
| Grade 2                                                            | 18               | 34%               |
| Grade 3                                                            | 10               | 18.9%             |
| Grade 4                                                            | 8                | 15.1%             |
| Grade 5                                                            | 6                | 11.3%             |
| Grade 6                                                            | 4                | 7.5%              |
| <b>Child online learning experience before COVID-19 Pandemic</b>   |                  |                   |
| Yes                                                                | 38               | 73.1%             |
| No                                                                 | 14               | 26.9%             |
| <b>Average child online learning hours in the past three years</b> |                  |                   |
| 0–3 hours per week                                                 | 16               | 30.8%             |
| 4–10 hours per week                                                | 19               | 36.5%             |

|                             |    |      |
|-----------------------------|----|------|
| 11–20 hours per week        | 4  | 7.7% |
| More than 20 hours per week | 13 | 25%  |

---

*Note:* Due to school closure and the zero-COVID policy, schools across all levels in China experienced intermittent periods of online learning from spring 2021 to December 2022.

## ***Materials***

### **Instrument**

The online survey consisted of demographic questions and a social presence scale to understand parent's perceived social presence, perceived learning, and their satisfaction with the instructor in their child's online learning (see Appendix A). Perceived learning was operationalized as the parents' subjective assessment of how much their child learned from prior online learning experiences, while satisfaction with the instructor referred to a parent's overall contentment with overall online course delivery, instructional quality, and outcomes.

The social presence scale was adapted from Richardson and Swan's (2003) work and included 15 items using a 7-point Likert scale ("Strongly disagree" to "Strongly agree"). For example, one item stated, "Getting to know other course participants gave my child a sense of belonging in the course." When revising the survey, we were mindful of the potential mismatch between academic terminology (e.g., "courses" and "course participants") and the lived experiences of young learners. We adapted the language to better reflect the context of primary education in China. For example, terms like "courses" were replaced with more familiar phrases such as "online classes," and "course participants" was reframed as "teachers," "classmates," or "other children in the class."

This instrument included three underlying factors: overall social presence (SP)—survey items 1-13; overall perceived learning (PL)—survey item 14; and overall satisfaction with instructors (SI)—survey item 15 (Richardson & Swan, 2003). The online survey was translated by the first author whose native language is Chinese and fluent in English and verified by an English/Chinese expert prior to distributing to participants.

### **Interviews**

Interview questions were created to understand parents' perceptions of social presence and its importance in their children's online learning to further interpret and extend survey findings (see Appendix B for the interview protocol). Interview questions were created in English. The first author then translated them into Chinese. To ensure the accuracy of the translation, a Chinese language expert was consulted. The interviews were piloted on survey respondents that were not selected for the interview. Based on the survey results, purposeful sampling was used to select two parents with the highest-achieved social presence scores and two with the lowest. The sample size was appropriate because the qualitative interviews aimed to explain and expand the quantitative results instead of producing statistically generalizable findings. See Table 2 for interview participant demographic information.

**Table 2***Interview Participant Demographic information (n = 4)*

| <b>Variables</b>                             | <b>Parent 1</b> | <b>Parent 2</b> | <b>Parent 3</b> | <b>Parent 4</b> |
|----------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| Gender                                       | Female          | Female          | Female          | Male            |
| Age                                          | 35–44           | 35–44           | 35–44           | 35–44           |
| Education                                    | BA              | BA              | MS              | MS              |
| SP score                                     | 84              | 89              | 34              | 33              |
| Child grade level                            | 6               | 4               | 3               | 4               |
| Child OL experience before Covid-19 Pandemic | Yes             | Yes             | Yes             | Yes             |
| Child OL hours in the past three years       | 11–20 h         | 4–10 h          | over 20 h       | 1–3 h           |

*Note.* SP = social presence, OL = online learning, BA = Bachelor of Arts, MS = Master of Science.

### ***Data Collection and Analysis***

This study consisted of two phases of inquiries in a sequential timing wherein the quantitative phase occurred before qualitative inquiry. Institutional Review Board approval was received prior to data collection.

#### **Quantitative Phase**

A Cronbach's Alpha test was administered to measure the internal consistency among the social presence items (1–13) in the survey. The results (Cronbach's Alpha = 0.924) indicated that the social presence scale was reliable. The researchers then conducted a Shapiro-Wilk test to determine whether the assumptions for correlation and regression analysis were met. The results on the dependent variable, parents' overall perception of social presence in their children's online learning, indicated that the assumption of normality was satisfied ( $p = 0.663$ ). Later, a series of descriptive analyses were conducted along with the correlation and regression analysis to answer the main research question: How does parents' perceived social presence explain their satisfaction with the instructor and perceived learning in their children's online learning?

#### **Qualitative Phase**

Four semi-structured interviews were conducted and recorded by the first author via Zoom video communications, then transcribed for analysis. The interview transcripts were coded using inductive/deductive hybrid thematic analysis (Proudfoot, 2023) by two members of this research team whose native language was Chinese. Following this method, the researchers started with a deductive approach (provided a structured theoretical framework for setting up the initial set of first-level codes). Then, the researchers used inductive thematic analysis to generate sub-level codes from the interview transcripts. A combination of

deductive and inductive coding helped the researchers consider parents' opinions in a more holistic manner (acknowledging researcher reflexivity).

During the deductive coding stage, the researchers used Swan (2003) and Rourke et al. (2001) as the theoretical underpinnings to generate first-level codes. These codes were organized according to the three dimensions of social presence: affective indicators, cohesive indicators, and interactive indicators. Sample first-level codes included "emotion," "self-disclosure," "social sharing," "self-reflection," "approval," and "invitation." In the inductive coding process, researchers generated sub-level codes such as "perceived definition of social presence," "importance of social presence," and "factors that impact perceived social presence."

The two Chinese researchers initially conducted separate deductive and inductive analyses. They then merged the resulting themes from both approaches to offer a comprehensive insight into parents' perceptions of their children's online learning experience. Following this integration, the researchers engaged in debriefing sessions and discussions to ensure complete consensus on each theme, achieving 100% agreement. Additionally, to reflect parents' viewpoints in a comprehensive and accurate way, the researchers analyzed the initial Chinese transcripts to generate codes and themes. The combined themes were then translated from Chinese into English.

Proudfoot (2023) argued that this inductive and deductive hybrid coding approach is particularly apt for mixed methods studies due to its emphasis on synthesis. It "necessitates both a more open and inductive approach to theme generation and also benefits from the theoretical rigor offered by the deductive application of themes derived from an existing framework" (Proudfoot, 2023, p. 309).

## Results

In this study, we explored parents' perceptions of social presence in their children's online learning and the relationships among parents' perceived social presence, perceived learning, and satisfaction with the instructor.

### *Quantitative Findings*

#### Results of Correlation Analysis

Correlations were calculated across three variables (see Table 3): parents' overall perception of social presence in their child's online learning (Overall SP), parents' overall perceived learning in their child's online learning (Overall PL), and parents' overall satisfaction with their child's online instructor (Overall Satisfaction). Parents' overall perception of social presence in their child's online learning showed a statistically significant relationship with parents' overall perceived learning in their child's online learning,  $r(51) = 0.517, p < 0.01$ , and parents' overall satisfaction with their child's instructor  $r(51) = 0.518, p < 0.01$ . Additionally, the strongest correlation was between parents' overall perceived learning and parents' overall satisfaction with the instructor of their child's online learning,  $r(53) = 0.630, p < 0.01$ . The findings reveal three insights:

1. Parents reporting higher perceived social presence scores also perceived that their children learned more from the online courses than those reporting lower perceived social presence scores.



2. Parents with high overall social presence scores also indicated they were highly satisfied with their children's online instructors; implying that parents' perceptions of social presence are related to the perceptions of their children's instructors as having a satisfactory online presence in terms of interaction and/or quality of that interaction.

3. Parents who were most satisfied with their children's online instructors also believed their children learned more from online courses than those who were less satisfied.

**Table 3**

*Correlations Between Overall SP, Overall PL, and Overall Satisfaction*

|            |                     | Overall SP | Overall PL | Overall Satisfaction |
|------------|---------------------|------------|------------|----------------------|
| Overall SP | Pearson Correlation | 1          | .517**     | .518**               |
|            | Sig. (2-tailed)     |            | <.001      | <.001                |
|            | N                   | 51         | 51         | 51                   |
| Overall PL | Pearson Correlation | .517**     | 1          | .630**               |
|            | Sig. (2-tailed)     | <.001      |            | <.001                |
|            | N                   | 51         | 53         | 53                   |
|            | Sig. (2-tailed)     | <.001      | <.001      |                      |
|            | N                   | 51         | 53         | 53                   |

*Note.* SP = Parents' perceived social presence, PL = Parents' perceived learning, Overall satisfaction = Parents' satisfaction for instructor \*\*. Correlation is significant at the 0.01 level (2-tailed).

Correlations were also calculated for the control variables in the survey such as parents' age, education background, perceived learning, and satisfaction with the instructor. Child's grade level showed a statistically significant relationship with parents' perceived learning,  $r(53) = 0.355, p < 0.01$  and parents' overall satisfaction with the instructor,  $r(53) = 0.398, p < 0.01$ . In short, parents of upper-elementary children reported more positive learning outcomes from their child's online learning and greater satisfaction with the online instructor.

Parents' perceived learning also showed a statistically significant relationship with their child's online learning hours,  $r(53) = -0.312, p < 0.05$ . Parents perceived lower learning outcomes when their child spent more hours in online learning (see Table 4 for correlation information). Correlations were also calculated between parents' satisfaction with instructors and three variables: parents' age, educational background, and the number of hours their children spent in online learning. No significant relationships were found, suggesting that parents' satisfaction in their children's online learning was not influenced by parent age, education background, or the amount of time their children spent in online learning.

**Table 4***Correlation between Overall PL, Overall Satisfaction, and the Control Variables*

|                      |                     | Age   | Education | Grade level | OL hours | Overall PL | Overall Satisfaction |
|----------------------|---------------------|-------|-----------|-------------|----------|------------|----------------------|
| Age                  | Pearson Correlation | 1     | .138      | .231        | .008     | -.001      | .170                 |
|                      | Sig. (2-tailed)     |       | .325      | .096        | .953     | .997       | .223                 |
|                      | N                   | 53    | 53        | 53          | 53       | 53         | 53                   |
| Education            | Pearson Correlation | .138  | 1         | -.153       | .135     | -.159      | -.208                |
|                      | Sig. (2-tailed)     | .325  |           | .273        | .336     | .256       | .135                 |
|                      | N                   | 53    | 53        | 53          | 53       | 53         | 53                   |
| Grade level          | Pearson Correlation | .231  | -.153     | 1           | -.056    | .355**     | .398**               |
|                      | Sig. (2-tailed)     | .096  | .273      |             | .690     | .009       | .003                 |
|                      | N                   | 53    | 53        | 53          | 53       | 53         | 53                   |
| OL Hours             | Pearson Correlation | .008  | .135      | -.056       | 1        | -.312*     | -.250                |
|                      | Sig. (2-tailed)     | .953  | .336      | .690        |          | .023       | .071                 |
|                      | N                   | 53    | 53        | 53          | 53       | 53         | 53                   |
| Overall PL           | Pearson Correlation | -.001 | -.159     | .355**      | -.312*   | 1          | .630**               |
|                      | Sig. (2-tailed)     | .997  | .256      | .009        | .023     |            | <.001                |
|                      | N                   | 53    | 53        | 53          | 53       | 53         | 53                   |
| Overall Satisfaction | Pearson Correlation | .170  | -.208     | .398**      | -.250    | .630**     | 1                    |
|                      | Sig. (2-tailed)     | .223  | .135      | .003        | .071     | <.001      |                      |
|                      | N                   | 53    | 53        | 53          | 53       | 53         | 53                   |

*Note.* OL Hours = Online learning hours, PL = Parents' perceived learning, SI = Parents' satisfaction for instructor. \*\* Correlation is significant at the 0.01 level (2-tailed).

### Results of Regression Analysis

To further understand the nature of the relationship between parents' perceived social presence and their perceived learning in their children's online learning, a standard direct entry regression was administered. Parents' perceptions of social presence, a continuous fixed variable served as the predictor; parents' overall perceived learning served as the dependent variable. In this model, parents' perceptions of social presence explained 26.7% of the variance in parents' perceived learning in their child's online courses ( $F(1, 49) = 17.862, p < 0.01, R^2 = 0.267$ ). Parents' perceived social presence was a significant predictor of parents' perceived learning of their child's online courses, meaning that parents' perceived social presence is important in explaining variations in their overall perceived learning in their child's online learning. The results of this standard entry regression are shown in Tables 5 through 8.

**Table 5***Variables Entered/Removed<sup>a</sup>*

| Model | Variables Entered         | Variables Removed | Method |
|-------|---------------------------|-------------------|--------|
| 1     | Perceived social presence |                   | Enter  |

a. Dependent Variable: Perceived learning

**Table 6***Model Summary*

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .517 <sup>a</sup> | .267     | .252              | 1.173                      |

a. Predictors: (Constant), Perceived social presence

**Table 7***ANOVA<sup>a</sup>*

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.               |
|-------|------------|----------------|----|-------------|--------|--------------------|
| 1     | Regression | 24.557         | 1  | 24.557      | 17.862 | <.001 <sup>b</sup> |
|       | Residual   | 67.365         | 49 | 1.375       |        |                    |
|       | Total      | 91.922         | 50 |             |        |                    |

a. Dependent Variable: Parents' perceived learning

b. Predictors: (Constant), Parents' perceived social presence

**Table 8***Coefficients<sup>a</sup>*

| Model |                           | Unstandardized Coefficients |            | Standardized Coefficients |       | Sig.  |
|-------|---------------------------|-----------------------------|------------|---------------------------|-------|-------|
|       |                           | B                           | Std. Error | Beta                      | t     |       |
| 1     | (Constant)                | 1.386                       | .725       |                           | 1.911 | .062  |
|       | Perceived social presence | .646                        | .153       | .517                      | 4.226 | <.001 |

a. Dependent Variable: Parents' perceived learning.

***Qualitative Findings***

The qualitative data collected from the semi-structured interviews reinforced the findings of the quantitative data. No notable differences were observed in parents'

descriptions of social presence or their experiences, as two parents reported high levels of social presence while the other two reported low levels. Qualitative findings are detailed in six dimensions.

### Parents' Perceived Definitions of Social Presence

Social presence was initially defined as the degree to which an online participant is perceived as a real person in the online learning community (Short et al., 1976). Under this definition, social presence can be interpreted as the interactions among online participants (e.g., teacher-student interaction and student-student interaction). However, in this study, parents' perceived social presence differently. Although parents considered social interaction among students and classroom climate in their perceived definitions of social presence, their focus was predominately on teacher-student interaction. Notably, parents' perceived definitions of social presence were limited to online synchronous learning, with little reference to asynchronous formats, indicating that synchronous learning may be more engaging or memorable for parents, even if their child also engaged in asynchronous learning. Table 9 presents synthesized definitions of social presence by parents. These are paraphrased summaries that capture the essence of each parent's response. Each parent's social presence group (high or low) is also indicated in the table.

### Parents' Perceived Social Presence in Their Child's Online Learning

Aligned with parents' perceived definition of social presence, the most reported social presence themes (Swan & Richardson, 2003) were approval (expressing approval, offering praise, and encouragement) and invitation (asking questions or otherwise inviting responses). Parent 1 shared, "In my daughter's online Math and English classes, teachers often ask questions or invite students to check each other's responses. Also, my daughter enjoys her online classes because she receives constant positive feedback from teachers and peers." Parents indicated that their children desired positive/affirmative feedback from instructors or peers (mostly instructors). Parent 3 stated, "My daughter usually expects positive feedback from teachers or peers when she thinks she is doing a good job in the class." They further explained that when approval was given, the child would feel a sense of achievement and confidence, which would therefore prompt them to behave more actively in class and be more willing to complete course-related tasks after class. Parent 2 shared, "My child is more motivated to participate in the class and complete homework when she receives teachers' affirmative feedback and peers' recognition. Because she feels a sense of accomplishment and confidence in that learning environment." Also, all four parents observed frequent instructor-initiated invitations in the form of asking questions or inviting responses. Parent 1 shared, "I noticed that the online instructor constantly asks questions in my daughter's online English and Math class. It is the main format of student-teacher interaction. Sometimes, the instructor invites students to check each other's responses."

**Table 9***Parents' Perceived Definition of Social Presence*

| Parents      | Perceived Definitions of Social Presence                                                                                                                                                                                                                                                                     |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parent 1 (H) | Social presence is the high interactivity between students and teachers. It is manifested as teachers' asking questions and providing immediate feedback and students' concentration on the online class (e.g., answering questions in a timely and accurate manner, staying focused throughout the lesson). |
| Parent 2 (H) | Social presence refers to the interaction between students and teachers. For example, students freely share their recent updates in a warm-up activity. A student's social presence level depends on his/her classroom participation.                                                                        |
| Parent 3 (L) | Social presence refers to the interactions among students and teachers. It focuses on teacher-student interaction. Student-student interaction is secondary.                                                                                                                                                 |
| Parent 4 (L) | Social presence is teacher-student interaction and student-student interaction in an online class.                                                                                                                                                                                                           |

*Note.* H = high social presence score; L = Low social presence score.

Social sharing (sharing information unrelated to the course; casual talk as a group; engaging in non-intellectual group activities) and self-disclosure (sharing personal information, expressing vulnerability) were also highlighted by the parents. Parent 1 explained that her daughter enjoyed chatting with her peers during class breaks. She shared, "My daughter likes to talk to other students during class breaks. They share recent life updates and introduce their hometowns to each other. Sometimes, they send each other texts after class." However, parent 2 mentioned the difficulty of practicing social sharing in online class compared to in-person lessons. She said, "Due to the nature of online learning, my daughter does not communicate with other students in the same ways such as playing games or sharing snacks, as traditional classrooms." This parent also indicated that her daughter was afraid to speak in an online math class due to the fear of making mistakes. Parent 3 mentioned her child would comment on other online students' hobbies or personal traits after class.

A fourth common social presence theme was self-reflection (reflection on the course itself, a kind of self-awareness of the group). Three parents reported children experiencing stress from the online course and assignments being challenging to complete. For example, Parent 4 shared, "My son thinks his online language class is challenging. He feels frustrated sometimes." Parent 1 echoed, "My daughter thinks her online course is stressful. She must spend a lot of time trying to keep up." Parent 2 reported her 10-year-old daughter would evaluate her learning based on other classmates' coursework or class participation and adjust accordingly.

While Swan (2003) described other social presence strategies, such as humor (use of humor, teasing cajoling, etc.), vocatives (addressing classmates by name), agreement and disagreement (expressing agreement or disagreement with others' messages), participants did

not mention observing these. All parents interviewed in this study indicated that they normally did not directly participate in their child's online class. Their observation usually occurred when they were in the same or nearby room where the child was having an online class.

### Factors Impacting Parents Perceived Social Presence

Parents' perceived social presence was influenced by factors including class size, the child's age, computer literacy, and personality, as well as teacher's background, instructional strategies, and the extent of students' social connections prior to an online course.

Class size was highlighted by all four parents. Parents perceived less social presence in large classes compared to small classes (4–8 students). Teacher-centered instruction was commonly observed when the class size was too large to initiate social interactions. Online synchronous classes became chaotic when multiple students spoke simultaneously, and the situation deteriorated when some students participated from a noisy environment. Parent 2 shared that her child felt intense peer pressure when class size was big.

Child's age, personality, and computer literacy also influenced parents' perceived social presence. Parent 2 stated that she would have perceived more social presence if her child was older. She believed younger learners' social-emotional skills and cognitive level hinder their participation in an online course when compared to older kids. This finding helped explain the significant correlation between a child's grade level and parents' perceived learning, as reported in the quantitative findings section above.

Three parents considered young learners' personalities a factor that impacted their perceived social presence. Parent 3 stated that the online learning environment magnified young learners' personal traits in a way that facilitated outgoing students' participation but hindered introverted learners' social presence. Parent 4 echoed with a specific example: "My son is an introverted child. Compared to outgoing kids who have great social skills, it is challenging for him to participate in an online course."

Additionally, parent 4 believed participating in an online class was easier for students when the child had higher technical skills. The parent explained that his son was often very slow when typing responses in an online class chatroom such as DingTalk, and then, the child gradually gave up on participating in the course because he failed to see the meaning of participation.

Further, teachers' background and instructional strategies also influenced parents' perceived social presence. Parent 4 shared an example of an online English instructor who, despite being a native English speaker, had spent time living in China. This cultural background enabled the instructor to better understand Chinese students, ultimately contributing to a positive online learning experience for this parent's child. Parent 2 reported an instructional approach that was hyper-competitive, which caused fear in her child when answering questions: "There are a lot of students in my daughter's online math class. The teacher encourages students to compete with each other. My daughter is usually worried about giving wrong answers because she wants to avoid negative feedback from the teacher and other students."

### Parents' Perceived Importance and Expectations of Social Presence

Parents agreed that social presence is critical to learning outcomes. For example, parent 1 stated, "Interaction greatly fosters students' learning because it reinforces students' understanding and application of content knowledge." Parent 4 explained, "High-level classroom interactivity and timely feedback from teachers improves online learning outcomes."

Parents also emphasized the importance of frequent communication, personalized feedback, and collaborative activities facilitated by teachers to enhance social presence in their children's online learning environment. They viewed these interactions as crucial for fostering a sense of belonging, engagement, and connection among students and between students and their instructors.

Given the importance of social presence, parents reported high expectations of social presence in their children's online learning. Parent 1 expected social presence to facilitate her child's social skills development. She said, "I hope my kid develops social skills through the social interactions with peers and teachers in class." Parent 2 expected more social presence in a language class over a math lesson: "Classroom interaction should take up 80% of the class time, and the other 20% should be allocated to the instruction of content knowledge. It is particularly important in language courses because it could reduce students' anxiety in speaking a foreign language and improve their confidence." Parent 3 explicitly stated that she has higher expectations for teacher-student interaction (instructor social presence) compared to student-student interaction because the nature of online learning makes peer interaction more difficult. Parent 4 expressed higher expectations for small-sized online classes compared to larger ones.

### Perceived Roles of Instructor in Supporting Social Presence

All four parents underlined the importance of the instructor's role in fostering social presence. Specifically, they expected online instructors to create an inclusive learning environment in which young learners could participate freely. Parents also emphasized the significance of instructors' timely/immediate feedback such as approval, encouragement, and suggestions.

### Parental Involvement

When asked about parental involvement in their children's online learning, all four participants indicated that their role was mainly supervision, which included passing along information regarding course announcements, assignment requirements, important deadlines, and teachers' feedback. Additionally, parent 4 indicated that he occasionally helped with some challenging assignments: "I participated in my son's online class in the beginning. I became short-tempered sometimes, so I stopped. But I still help with homework when needed." Parent 2 believed her child depended on her more than she desired: "My daughter has a high reliance on me regarding her studies. Most of the time, I need to oversee her learning process including prior-lesson preparation, homework completion, pass-along teachers' feedback, and provide guidance on things that need to be improved."

## Discussion

This study showcased a two-phase explanatory sequential mixed methods study to understand parents' perceptions of social presence in their children's online learning and the relationships among parents' perceived social presence of their child's online learning, perceived learning, and satisfaction with the instructor. The quantitative phase examined the relationship across parents' perceived social presence of their child's online learning, perceived learning, and satisfaction with the instructor. To further explain and enrich these quantitative findings, the qualitative interviews focused on parents' perceptions of social presence and its importance in their child's online learning.

Results demonstrated that parents' perceived social presence was significantly correlated with the perceived learning and satisfaction with their child's online instructor. Specifically, parents' perceived social presence explained 26.7% of perceived learning in their child's online learning. These results provided further empirical evidence of the effects of social presence on learning outcomes and satisfaction of a course (Gunawardena & Zittle, 1997; Lee et al., 2025; Miao et al., 2022; Richardson & Swan, 2003; Richardson et al., 2017).

Importantly, this study reaffirmed the positive impact of social presence on young learners (Lee et al., 2025) as reflected in parents' perceived learning outcomes and satisfaction with a course instructor. These findings also align with Borup et al.'s (2014) work, emphasizing the importance of social presence in community learning.

Furthermore, the results highlight how social presence is closely intertwined with teaching presence, as suggested by Richardson and Swan (2003) and Shea et al. (2010). Instructors play a pivotal role in shaping the online learning experience, particularly by facilitating social presence through intentional pedagogical strategies and interactions (Richardson et al., 2015, 2016), which may be particularly impactful in the context of young learners.

No significant correlation was found between parents' perceived social presence and their age, education background, and child online learning hours. This result echoed findings from Richardson & Swan's (2003) research that found that students' overall perception of social presence was insignificantly correlated with students' age, and/or college credits earned. However, grade level was significantly correlated with parents' perceived learning and parents' satisfaction with the instructor in this study. Specifically, parents of older kids reported higher perceived learning outcomes and greater satisfaction with their children's online learning experience. Qualitative findings further explained this relationship, suggesting that parents believe a child's age influences parents' perceived social presence in online learning. This finding may point to a possibility that with a larger sample size, the correlation between a child's grade level and parents' perceived social presence might reach statistical significance. Also, as indicated in the qualitative findings, young learners' cognitive development, digital literacy, and social skills might play a critical role in shaping their social presence in an online learning environment.

Interestingly, how Chinese parents' defined social presence was slightly different from the definition provided by previous studies (Garrison et al., 2001; Richardson et al., 2015). Chinese parents' definition of social presence emphasized student-teacher interaction and teachers' immediacy behaviors, while placing less value on student-student interaction. Although Chinese parents placed importance on social presence, they expected instructors to play a leading role in facilitating social presence in an online community. For example, they



expected instructors to create an inclusive learning environment and provide timely feedback for young learners. This finding aligns with Chakraborty and Nafukho (2015), who highlighted that teaching presence and teaching immediacy are closely intertwined in online learning environments, suggesting that integrating elements of both social and teaching presence is essential. The emphasis on the instructor's role could be further explained by the traditional but the widely criticized teacher-centered, dominant instructional approach in the Chinese education system (Cheng & Ding, 2021). Chinese students are more adapted to traditionally valued teacher-centered approaches regardless of the enthusiastic advocacy of the learner-centered paradigm change (Cheng & Ding, 2021).

Additionally, this finding aligns with prior research indicating that cultural perspectives influence perceptions of social presence (Gunawardena et al., 2001; Tu, 2001; Yen & Tu, 2011). Learners from different cultural backgrounds perceive social presence differently. For example, U.S. learners value it more than Mexican learners (Gunawardena et al., 2001), while Chinese university students considered asynchronous online communication more comfortable due to reduced confrontation and face-saving concerns (Tu, 2001). These insights underscore the importance of considering cultural perspectives when designing inclusive and effective online learning environments (Gunawardena, 2017).

## **Theoretical Significance and Implications**

As a widely used theoretical concept, social presence theory has significantly impacted online teaching and learning for decades, especially in higher education contexts (Richardson et al., 2017). This study extends its application by exploring parental perspectives on social presence in young learners' online experiences—a context that has received limited attention. With online learning becoming a popular option for young learners, this study offers empirical evidence to guide educators and instructional designers in the design and development of inclusive and engaging online environments.

Importantly, findings from this study highlight the crucial role parents play in facilitating online learning. Parents not only support technical, emotional, organizational and academic aspects of their children's online learning but also shape how social presence is perceived and enacted. These insights suggest the importance of intentionally include parents into the online learning process—through clear communication, collaborative planning, and personalized supporting strategies. Moreover, incorporating parental perspectives on social presence provides valuable insights when considering the effectiveness of online learning. Therefore, establishing specific procedures and protocols to systematically include these perspectives can enhance our understanding of how online learning impacts young learners.

## **Limitations and Future Research**

Although parents' perspective could significantly impact young learners' perception of social presence, young learners could hold different views from their parents. The sample size may prevent findings from being less generalizable. In addition, the instrument used in this study was adopted from a study investigating social presence of adult learners in higher education context (Richardson & Swan, 2003). Though the validity of the instrument was confirmed, cultural and contextual differences might bring in potential risk. In future studies, research should further validate the instrument and adopt a large sample size. Additionally, research should also explicitly differentiate between synchronous and asynchronous modalities to accurately isolate perceptions of social presence across different modalities. Exploring instructors' perspectives on social presence would also enrich understanding of

young learners' online learning experiences, offering a more comprehensive and multi-dimensional view.

## **Declarations**

### ***Conflict of Interest***

We have no known conflict of interest to disclose.

### ***Ethics Statement***

This study involving human participants was reviewed and approved by the researchers' Institutional Review Board (Approval No. 2023-40). All procedures were conducted in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments.

### ***Acknowledgements***

The authors extend their sincere thanks to Dr. Wanju Huang for her invaluable support in reviewing the survey translation. Special appreciation goes to the participants whose insights made this study possible.

## References

- Abuhammad, S. (2020). Barriers to distance learning during the COVID-19 outbreak: A qualitative review from parents' perspective. *Heliyon*, 6(11). <https://doi.org/10.1016/j.heliyon.2020.e05482>
- Ali, M., Samiaji, M. H., & Prawening, C. (2021). Distance learning model innovation for early childhood during COVID-19 pandemic. *Al-Athfal: Journal Pendidikan Anak*, 7(1), 87–98. <http://dx.doi.org/10.14421/al-athfal.2021.71-07>
- Archambault, L., Leary, H., & Rice, K. (2022). Pillars of online pedagogy: A framework for teaching in online learning environments. *Educational Psychologist*, 57(3), 178–191. <https://doi.org/10.1080/00461520.2022.2051513>
- Bond, M. (2020). Schools and emergency remote education during the COVID-19 pandemic: A living rapid systematic review. *Asian Journal of Distance Education*, 15(2), 191–247. <https://doi.org/10.5281/zenodo.4425683>
- Borup, J. (2016). Teacher perceptions of learner-learner engagement at a cyber high school. *International Review of Research in Open and Distributed Learning*, 17(3), 231–250. <https://doi.org/10.19173/irrodl.v17i3.2361>
- Borup, J., Graham, C. R., & Davies, R. S. (2013). The nature of adolescent learner interaction in a virtual high school setting. *Journal of Computer Assisted Learning*, 29(2), 153–167. <https://doi.org/10.1111/j.1365-2729.2012.00479.x>
- Borup, J., Chambers, C. B., & Stimson, R. (2019). Online Teacher and on-site facilitator perceptions of parental engagement at a supplemental virtual high school. *The International Review of Research in Open and Distributed Learning*, 20(2). <https://doi.org/10.19173/irrodl.v20i2.4237>
- Borup, J., West, R. E., Graham, C. R. & Davies, R. S. (2014). The adolescent community of engagement framework: A lens for research on K–12 online learning. *Journal of Technology and Teacher Education*, 22(1), 107–129. <https://www.learntechlib.org/primary/p/112371/>
- Çakin, M., & Külekçi Akyavuz, E. (2021). Educational adventure of students in the COVID-19 period in Turkey: Determination of parents' views. *International Journal on Social and Education Sciences*, 3(1), 109–125. <https://doi.org/10.46328/ijonses.87>
- Chakraborty, M., & Nafukho, F. M. (2015). Strategies for virtual learning environments: Focusing on teaching presence and teaching immediacy. *Journal of Online Learning Research and Practice*, 4(1). <http://digitalcommons.apus.edu/internetlearning/vol4/iss1/2>
- Cheng, H.Y., Ding, Q.T. Examining the behavioral features of Chinese teachers and students in the learner-centered instruction. *European Journal of Psychology of Education*, 36, 169–186 (2021). <https://doi.org/10.1007/s10212-020-00469-2>
- Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage Publications.

- Cui, S., Zhang, C., Wang, S., Zhang, X., Wang, L., Zhang, L., ... & Zhou, X. (2021). Experiences and attitudes of elementary school students and their parents toward online learning in China during the COVID-19 pandemic: Questionnaire study. *Journal of Medical Internet Research*, 23(5), e24496. <https://doi.org/10.2196/24496>
- Dong, C., Cao, S., & Li, H. (2020). Young children's online learning during COVID-19 pandemic: Chinese parents' beliefs and attitudes. *Children and Youth Services Review*, 118. <https://doi.org/10.1016/j.childyouth.2020.105440>
- Erdogan, N. I., Johnson, J. E., Dong, P. I., & Qiu, Z. (2019). Do parents prefer digital play? Examination of parental preferences and beliefs in four nations. *Early Childhood Education Journal*, 47, 131–142. <https://doi-org.ezproxy.lib.purdue.edu/10.1007/s10643-018-0901-2>
- Flynn, N., Keane, E., Davitt, E., McCauley, V., Heinz, M., & Mac Ruairc, G. (2021). 'Schooling at home' in Ireland during COVID-19: Parents' and students' perspectives on overall impact, continuity of interest, and impact on learning. *Irish Educational Studies*, 40(2), 217–226. <https://doi.org/10.1080/03323315.2021.1916558>
- Fontenelle-Tereshchuk, D. (2021). 'Homeschooling' and the COVID-19 crisis: The insights of parents on curriculum and remote learning. *Interchange*, 52(2), 167–191. <https://doi.org/10.1007/s10780-021-09420-w>
- Garrison, D. R. (2003). Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction, and metacognition. *Elements of Quality Online Education: Practice and Direction*, 4(1), 47–58.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2–3), 87–105. [https://doi.org/10.1016/S1096-7516\(00\)00016-6](https://doi.org/10.1016/S1096-7516(00)00016-6)
- Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications*, 1(2), 147–166. <https://www.learntechlib.org/primary/p/15156/>.
- Gunawardena, C. N. (2017). Cultural perspectives on social presence. In A. L. Whiteside, A. G. Dijkers, & K. Swan (Eds.), *Social Presence in Online Learning: Multiple Perspectives on Practice and Research* (pp. 113–129). Sterling, VA: Stylus.
- Gunawardena, C. N., Nolla, A. C., Wilson, P. L., Lopez-Islas, J. R., Ramirez-Angel, N., & Megchun-Alpizar, R. M. (2001). A cross-cultural study of group process and development in online conferences. *Distance Education*, 22(1), 85–121. <https://doi.org/10.1080/0158791010220106>
- Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education*, 11(3), 8–26. <https://doi.org/10.1080/08923649709526970>
- Günbaş, N., & Gözüküçük, M. (2020). Views of elementary school children's parents about distance education during the COVID-19 pandemic. *Sakarya University Journal of Education*, 686–716. <https://doi.org/10.19126/suje.789705>

- Harjule, P., Rahman, A., & Agarwal, B. (2021). A cross-sectional study of anxiety, stress, perception and mental health towards online learning of school children in India during COVID-19. *Journal of Interdisciplinary Mathematics*, 24(2), 411–424. <https://doi.org/10.1080/09720502.2021.1889780>
- Henderson, M. B., Houston, D. M., Peterson, P. E., & West, M. R. (2020). What American families experienced when Covid-19 closed their schools. *Education Next*, 20(1), 45–59.
- Johnson, C. C., Walton, J. B., Strickler, L., & Elliott, J. B. (2023). Online teaching in K–12 education in the United States: A systematic review. *Review of Educational Research*, 93(3), 353–411. <https://doi.org/10.3102/00346543221105550>
- Kipp, K., Rice, K., Lowenthal, P. R., & Hung, J. L. (2023). The influence of course community and personal community support on learner engagement in online courses. *Educational Technology Research and Development*, 71(4), 1397–1420. <https://doi.org/10.1007/s11423-023-10189-1>
- Kolak, A., Markić, I., Horvat, Z., Klemenčić, M., & Stojanac, M. (2021). When the parent becomes the teacher—attitudes on distance learning in the time of Corona-teaching from parents’ perspective. *TOJET: The Turkish Online Journal of Educational Technology*, 20(1), 85–94.
- Lau, E. Y. H., & Lee, K. (2021). Parents’ views on young children’s distance learning and screen time during COVID-19 class suspension in Hong Kong. *Early Education and Development*, 32(6), 863–880. <https://doi.org/10.1080/10409289.2020.1843925>
- LaRocque, M., Kleiman, I., & Darling, S. M. (2011). Parental involvement: The missing link in school achievement. *Preventing School Failure*, 55(3), 115–122. <https://doi.org/10.1080/10459880903472876>
- Lee, S., Hwang, H., Shin, Y., & Kendeou, P. (2025). Teaching presence, social presence and digital literacy in predicting online learning experience in elementary students. *British Journal of Educational Technology*, 1–19.
- Liu, X., Zhao, L., & Su, Y. S. (2022). Impact of parents’ attitudes on learning ineffectiveness: The mediating role of parental self-efficacy. *International Journal of Environmental Research and Public Health*, 19(1), 615. <https://doi.org/10.3390/ijerph19010615>
- Ma, Y., Zuo, M., Yan, Y., Wang, K., & Luo, H. (2022). How do K–12 students’ perceptions of online learning environments affect their online learning engagement? Evidence from China’s COVID-19 school closure period. *Sustainability*, 14(23), 15691. <https://doi.org/10.3390/su142315691>
- Manoharan, S. R., Hua, T. K., & Sultan, F. M. M. (2022). A comparison of online learning challenges between young learners and adult learners in ESL classes during the COVID-19 pandemic: A critical review. *Theory and Practice in Language Studies*, 12(1), 28–35. <https://doi.org/10.17507/tpls.1201.04>
- Mantovani, S., Bove, C., Ferri, P., Manzoni, P., Cesa Bianchi, A., & Picca, M. (2021). Children ‘under lockdown’: Voices, experiences, and resources during and after the COVID-19 emergency insights from a survey with children and families in the Lombardy region of

- Italy. *European Early Childhood Education Research Journal*, 29(1), 35–50.  
<https://doi.org/10.1080/1350293x.2021.1872673>
- Maslin, K., Murcia, K., Blackley, S., & Lowe, G. (2023). Fostering young children's creativity in online learning environments: A systematic literature review. *Thinking Skills and Creativity*, 47, 101249. <https://doi.org/10.1016/j.tsc.2023.101249>
- Miao, J., Chang, J., & Ma, L. (2022). Teacher–student interaction, student–student interaction and social presence: Their impacts on learning engagement in online learning environments. *The Journal of Genetic Psychology*, 183(6), 514–526.  
<https://doi.org/10.1080/00221325.2022.2094211>
- Nusser, L. (2021). Learning at home during COVID-19 school closures—how do German students with and without special educational needs manage? *European Journal of Special Needs Education*, 36(1), 51–64. <https://doi.org/10.1080/08856257.2021.1872845>
- Pastori, G., Pagani, V., Mangiattordi, A., & Pepe, A. (2021). Parents' view on distance learning during lockdown. A national survey. *Rivista Italiana Di Educazione Familiare*, 18(1), 61–96. <https://doi.org/10.36253/rief-10256>
- Pittas, E., Bravo, I. F., Gómez-Merino, N. (2022). Young children's online learning and teaching: Challenges and effective approaches. In J. Pattnaik & M. Renck Jalongo (Eds.), *The impact of COVID-19 on early childhood education and care* (pp. 397–419). Springer, Cham. [https://doi-org.ezproxy.lib.purdue.edu/10.1007/978-3-030-96977-6\\_20](https://doi-org.ezproxy.lib.purdue.edu/10.1007/978-3-030-96977-6_20)
- Pozas, M., Letzel, V., & Schneider, C. (2021). 'Homeschooling in times of Corona': Exploring Mexican and German primary school students' and parents' chances and challenges during homeschooling. *European Journal of Special Needs Education*, 36(1), 35–50.  
<https://doi.org/10.1080/08856257.2021.1874152>
- Pujiani, T., Harsiwi, W., & Almustaflikhah, N. (2022). The use of animation video as online learning media to teach English for young learners. *Journal of Teaching and Education*, 4(1), 244–251. <https://doi.org/10.30650/ajte.v4i1.3220>
- Putri, M. W., Juniarta, P. A. K., & Wahyuni, L. G. E. (2022). The implementation of songs in teaching English for Young learners in online learning context. *The Art of Teaching English as a Foreign Language (TATEFL)*, 3(1), 49–58.  
<https://doi.org/10.36663/tatefl.v3i1.251>
- Proudfoot, K. (2023). Inductive/deductive hybrid thematic analysis in mixed methods research. *Journal of Mixed Methods Research*, 17(3), 308–326. <https://doi-org.ezproxy.lib.purdue.edu/10.1177/15586898221126816>
- Ribeiro, L. M., Cunha, R. S., Silva, M. C., Carvalho, M., & Vital, M. L. (2021). Parental involvement during pandemic times: Challenges and opportunities. *Education Sciences*, 11(6), 302. <https://doi.org/10.3390/educsci11060302>
- Richardson, J. C., Arbaugh, J. B., Cleveland-Innes, M., Ice, P., Swan, K. P., Garrison, D. R. (2012). Using the Community of Inquiry framework to inform effective instructional design. In L. Moller & J. Huett (Eds.), *The next generation of distance education*. Springer. [https://doi-org.ezproxy.lib.purdue.edu/10.1007/978-1-4614-1785-9\\_7](https://doi-org.ezproxy.lib.purdue.edu/10.1007/978-1-4614-1785-9_7)



- Richardson, J. C., Besser, E., Koehler, A., Lim, J., & Strait, M. (2016). Instructors' perceptions of instructor presence in online learning environments. *International Review of Research in Open and Distributed Learning*, 17(4), 82–104. <https://doi.org/10.19173/irrodl.v17i4.2330>
- Richardson, J. C., Koehler, A. A., Besser, E. D., Caskurlu, S., Lim, J., & Mueller, C. M. (2015). Conceptualizing and investigating instructor presence in online learning environments. *International Review of Research in Open and Distributed Learning*, 16(3), 256–297. <https://doi.org/10.19173/irrodl.v16i3.2123>
- Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, 71, 402–417. <http://dx.doi.org/10.1016/j.chb.2017.02.001>
- Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 68–88.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education*, 14(2), 51–70. <https://www.ijede.ca/index.php/jde/article/view/153>
- Russo, T. C., & Benson, S. (2005). Learning with invisible others: Perceptions of online presence and their relationship to cognitive and affective learning. *Journal of Educational Technology & Society*, 8(1), 54–62. <http://www.jstor.org/stable/jeductechsoci.8.1.54>
- Shea, P., Hayes, S., & Vickers, J. (2010). Online instructional effort measured through the lens of teaching presence in the community of inquiry framework: A re-examination of measures and approach. *International Review of Research in Open and Distributed Learning*, 11(3), 127–154. <https://doi.org/10.19173/irrodl.v11i3.915>
- Shea, P., Richardson, J., & Swan, K. (2022). Building bridges to advance the community of inquiry framework for online learning. *Educational Psychologist*, 57(3), 148–161. <https://doi.org/10.1080/00461520.2022.2089989>
- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. John Wiley & Sons.
- Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988–2018). *American Journal of Distance Education*, 33(4), 289–306. <https://doi.org/10.1080/08923647.2019.1663082>
- Swan, K. (2003). Developing social presence in online discussions. In S. Naidu (Ed.), *Learning and teaching with technology: Principles and practices* (pp. 147–164). Kogan Page.
- Swan, K., Garrison, D. R., & Richardson, J. C. (2009). A constructivist approach to online learning: The community of inquiry framework. In C. R. Payne (Ed.), *Information technology and constructivism in higher education: Progressive learning frameworks* (pp. 43–57). <https://doi.org/10.4018/978-1-60566-654-9.ch004>

- Swan, K., & Richardson, J. C. (2017). Learning about the Community of Inquiry (CoI) framework. In A. L., Whiteside, A. G., Dikkers, & K. Swan (Eds.), *Social presence in online learning: Multiple perspectives, theories, and practices* (pp. 64–76). Sterling, VA: Stylus Publishing, LLC.
- Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9(3), 115–136.
- Soltero-González, L., & Gillanders, C. (2021). Rethinking home-school partnerships: Lessons learned from Latinx parents of young children during the COVID-19 era. *Early Childhood Education Journal*, 49(5), 965–976. <https://doi.org/10.1007/s10643-021-01210-4>
- Song, J., Koehler, A., & Farmer, T. (2022). Preparing preservice teachers to intentionally include parents in eLearning. In E. Baumgartner, R. Kaplan-Rakowski, R. E. Ferdig, R. Hartshorne & C. Mouza (Eds.), *A retrospective of teaching, technology, and teacher education during the COVID-19 pandemic* (pp. 57–64). Association for the Advancement of Computing in Education (AACE). <https://www.learntechlib.org/primary/p/221522/>
- Sonnenschein, S., & Stites, M. L. (2021). The effects of COVID-19 on young children's and their parents' activities at home. *Early Education and Development*, 32(6), 789–793. <https://doi.org/10.1080/10409289.2021.1953311>
- Sonnenschein, S., Grossman, E. R., & Grossman, J. A. (2021). U.S. parents' reports of assisting their children with distance learning during COVID-19. *Education Sciences*, 11(9), 501. <https://doi.org/10.3390/educsci11090501>
- Stankovska, G., Dimitrovski, D., Ibraimi, Z., & Memedi, I. (2021). Online learning, social presence and satisfaction among university students during the COVID-19 pandemic. *Bulgarian Comparative Education Society*, 19, 181–188.
- Tackie, H. N. (2022). (Dis)Connected: Establishing social presence and intimacy in teacher–student relationships during emergency remote learning. *AERA Open*, 8. <https://doi.org/10.1177/23328584211069525>
- Tao, J., & Xu, Y. (2022). Parental support for young learners' online learning of English in a Chinese primary school. *System*, 105, 102718. <https://doi.org/10.1016/j.system.2021.102718>
- Trilestari, K., & Almunawaroh, N. F. (2021). E-Module as a solution for young learners to study at home. In *4th Sriwijaya University Learning and Education International Conference* (pp. 364–369). Atlantis Press. <https://doi.org/10.2991/assehr.k.201230.132>
- Tu, C. H., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education*, 16(3), 131–150. [https://doi.org/10.1207/S15389286AJDE1603\\_2](https://doi.org/10.1207/S15389286AJDE1603_2)
- Tung, F. W., & Deng, Y. S. (2006). Designing social presence in e-learning environments: Testing the effect of interactivity on children. *Interactive Learning Environments*, 14(3), 251–264. <https://doi.org/10.1080/10494820600924750>



- Wang, F., Zhu, X., Pi, L., Xiao, X., & Zhang, J. (2024). Patterns of participation and performance at the class level in English online education: A longitudinal cluster analysis of online K–12 after-school education in China. *Education and Information Technologies*, 29(12), 15595–15619. <https://doi-org.ezproxy.lib.purdue.edu/10.1007/s10639-024-12451-2>
- Weidlich, J., Göksün, D. O., & Kreijns, K. (2023). Extending social presence theory: Social presence divergence and interaction integration in online distance learning. *Journal of Computing in Higher Education*, 35(3), 391–412.
- Wise, A., Chang, J., Duffy, T., & Del Valle, R. (2004). The effects of teacher social presence on student satisfaction, engagement, and learning. *Journal of Educational computing research*, 31(3), 247–271. <https://doi-org.ezproxy.lib.purdue.edu/10.2190/V0LB-1M37-RNR8-Y2U1>
- Xu, X., Dugdale, D. M., Wei, X., & Mi, W. (2022). Leveraging artificial intelligence to predict young learner online learning engagement. *American Journal of Distance Education*, 37(3), 185–198. <https://doi.org/10.1080/08923647.2022.2044663>
- Yayci, L., & Kendirci, A. (2021). Determination of educational/academic and some social behavioral trends of elementary school students in Turkey during coronavirus (COVID-19) pandemic days. *International Online Journal of Education and Teaching*, 8(1), 358–380.
- Yen, C. J., & Tu, C. H. (2011). A multiple-group confirmatory factor analysis of the scores for online social presence: Do they measure the same thing across cultural groups? *Journal of Educational Computing Research*, 44(2), 219–242.
- Yuan., Y., & Dao., P. (2025): Young learners' online engagement: exploring learners' and teachers' perspectives, *Language Awareness*, 1–36. <https://doi.org/10.1080/09658416.2025.2502427>
- Zhang, T. (2021). Chinese parents' perception of emergency remote K–12 teaching-learning in China during the COVID-19 pandemic. *Asian Journal of Distance Education*, 16(1), 16–30. [https://digitalcommons.cedarville.edu/education\\_publications/118](https://digitalcommons.cedarville.edu/education_publications/118)
- Zhang, Y., & Lin, C. H. (2021). Effects of community of inquiry, learning presence and mentor presence on K–12 online learning outcomes. *Journal of Computer Assisted Learning*, 37(3), 782–796. <https://doi.org/10.1111/jcal.12523>
- Zhao, Y., L. Y., Sun., Z. H., Jiang, Q., & Zhao, S. (2024). Variations in online self-regulated learning abilities among Chinese K–12 teachers across different regions and levels. *Frontiers in Psychology*, 15, 1463287. <https://doi.org/10.3389/fpsyg.2024.1463287>
- Zhu, Y., Chen, Y., Yan, S., Zhang, L., & Sun, Z. (2025). Assessing K–12 online learning: a quantitative approach using an extended community of inquiry framework. *Interactive Learning Environments*, 1–21. <https://doi.org/10.1080/10494820.2025.2542896>
- Zuo, M., Hu, Y., Luo, H., Ouyang, H., & Zhang, Y. (2022). K–12 students' online learning motivation in China: An integrated model based on community of inquiry and technology acceptance theory. *Education and Information Technologies*, 27(4), 4599–4620. <https://doi-org.ezproxy.lib.purdue.edu/10.1007/s10639-021-10791-x>

Zuo, M., Ma, Y., Hu, Y., & Luo, H. (2021). K–12 Students' online learning experiences during COVID-19: Lessons from China. *Frontiers Education in China*, 16(1), 1–30. <https://doi-org.ezproxy.lib.purdue.edu/10.1007/s11516-021-0001-8>

## Appendix A

### Survey Instrument

#### Section A. Demographic Information

- Please indicate your city of residence: \_\_\_\_\_
- Gender
  - Female
  - Male
- Please indicate your age group:
  - 25–34 years old
  - 35–44 years old
  - 45–54 years old
- Please indicate your education background:
  - Community college
  - Bachelor's degree
  - Master's degree
  - Doctoral degree
- What grade is your child in elementary school this year?
  - Grade 1
  - Grade 2
  - Grade 3
  - Grade 4
  - Grade 5
  - Grade 6
- Did your child have online learning experience prior to the COVID-19 pandemic?
  - Yes
  - No
- In the past three years, approximately how many hours of online instruction have your child received per week ?
  - 0–3 hours per week
  - 4–10 hours per week
  - 11–20 hours per week
  - More than 20 hours per week

#### Section B. Social Presence Scale

Your response to the following questions should reflect your child's overall online experience. For the following statements please indicate the number which best reflects your opinion in the answer column to the right of the question (SD = strongly disagree, SA = strongly agree).

| Social presence scale                                                                       | S<br>D        | S<br>A |
|---------------------------------------------------------------------------------------------|---------------|--------|
| Getting to know other course participants gave my child a sense of belonging in the course. | 1 2 3 4 5 6 7 |        |
| The instructor created a feeling of an online community.                                    | 1 2 3 4 5 6 7 |        |
| My child was able to form distinct impressions of some course participants.                 | 1 2 3 4 5 6 7 |        |

|                                                                                                                                        |   |   |   |   |   |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| My child enjoys social interaction in the form of online or web-based communication.                                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My child feels comfortable introducing himself/herself in online courses.                                                              | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My child felt comfortable conversing through the online medium.                                                                        | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My child felt comfortable participating in the course discussions.                                                                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| The instructor facilitated discussions in online courses.                                                                              | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My child felt comfortable interacting with other course participants.                                                                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My child felt comfortable disagreeing with other course participants while still maintaining a sense of trust.                         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My child felt that his/her point of view was acknowledged by other course participants.                                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Online discussions help my child to develop a sense of collaboration.                                                                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Compared to other learning environments, my child's level of learning that took place in an online setting was of the highest quality. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Overall, my child's online courses met my expectations.                                                                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Overall, the instructors of my child's online courses met my expectations.                                                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

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## Appendix B

### Interview Protocol

Thank you for agreeing to participate in the interview and for completing the survey in advance. We appreciate you taking the time out of your busy schedule! Also, we do need to collect a signed consent form from you if we have not already.

As a reminder, the purpose of our study is to determine: what are parents' perceptions of social presence in their child's online learning experience? How important do parents believe social presence is and why?

Just to let you know, participation is voluntary, and you are free to withdraw at any time. Have you had a chance to review the project consent form? Do you have any questions related to this?

Do I have your permission to record this session (once permission is granted then turn on recorder and verify so they are on "tape" granting permission).

Please feel free to refer to social presence and/or your survey responses as needed throughout the interview. (Social presence is explained in the survey and I will provide the participants a copy of their survey responses before the interview).

### Questions

In your survey, you have listed that you're very satisfied/dissatisfied with your child's online learning experience regarding social presence.

- o Can you describe your child's online learning experiences? (e.g., how many courses have they taken online? What's been the nature of these courses?)
- o Can you describe how you envision social presence in online learning? What is its role in the learning process?
- o How would you describe your child's overall online learning experience regarding social presence?

In the survey, you indicated that... (e.g., your child developed a sense of belonging in the course; your child doesn't feel comfortable participating in the course discussion). Can you identify some examples of social presence you've observed? (Specific questions will be adapted based on each participants response)

- o How important do you believe social presence is in your child's online learning? Why?
- o How important do you think your child believes social presence is for their learning? Why?
- o How important do you think it is for teachers to create opportunities for social interaction and collaboration in online learning platforms?

- o Can you share specific examples you observed in your child's online learning experiences of interaction and collaboration?
- o How important do you think it is for teachers to create a comfortable place for students to communicate in online learning platforms? Why?
- o Can you share specific examples you observed in your child's online learning experiences of how the instructor created a comfortable learning environment?
- o How important do you think it is for your child to have a sense of the other learners in the class as real people?
- o Can you share specific examples you observed in your child's online learning experiences?
- o How involved are you in your child's online learning experiences?
- o What expectations do you have for social presence to be facilitated in online learning setting?

### **Closing out**

Is there anything else you would like to share that may be related to social presence in young learners online learning that we have not discussed?

On behalf of our research team, thank you again for your time in participating in this interview. Please feel free to reach out to us by email or phone if you have any questions or concerns. We will contact you for verification as we conduct the analysis.

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# ***Plática* as a Methodology for Creating Counterspace in Online Teaching and Beyond**

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## **Abstract**

In this paper, we reflect upon and (re)analyze a self-study of teacher education practices (S-STEP) inquiry that was focused on deconstructing the circumstances of loss and anxiety we experienced during the pandemic years and onward as we conducted our online teacher education classes. In seeking to repair, restore, and heal, we engaged with Chicana feminist thinking and centered on the methodology of *plática*. Our *pláticas* created intimate spaces to address entangled laborings, emotional work, and consider ways to address our statuses within the hierarchy of our institution. Based on our experiences teaching online during the pandemic and beyond, we illustrate the potential of *plática* as a methodology for intentionally cultivating counterspaces directed at fostering healing and facilitating relational engagement—not only for online teacher educators of varied backgrounds, but across diverse fields and instructional formats. *Plática* methodology offers additional opportunities for transformative framing to reimagine pedagogical connections between students and instructors.

**Keywords:** Chicana feminism, online counterspaces, *plática*, posthumanism, self-study of teacher education practices

Dathe, M., Brassington, L., Rice, M. (2025). *Plática* as a methodology for creating counterspace in online teaching and beyond. *Online Learning*, 29(4), 292-310.  
<https://doi.org/10.24059/olj.v29i4.5219>

Practices of knowing and being are not isolable; they are mutually implicated. We don't obtain knowledge by standing outside the world...We are part of the world in its differential becoming.

—Karen Barad (*Meeting the Universe Halfway*)

## Introduction

As our campus closed in April 2020, we were brought to grief. The realities of the pandemic had begun to emerge—family members and students were dying, institutional financial recissions loomed, and student struggles with health, employment, and more came daily. Anger. Fear. Sadness. Loneliness. We felt these. None of the platitudes from political and university leaders about how lovely everything was going to be when we could all just *get back to normal*—meaning “on campus”—were comforting in the face of these losses.

We were not the only ones feeling sad and having deep anxieties. Rice et al. (2024) edited a book about emotional labor in teacher education during the COVID-19 pandemic that highlighted the emotional realities of teacher educators in several countries. The authors of the various chapters in that book seemed to share a definition of emotional labor as a heightened relationality across time and through physical and virtual spaces that enabled online instructors to sympathize deeply with students and be motivated to change their practices and expectations so that students could have hope to continue with online classes and advance their learning. Rice and Dunn (2024) illustrated how emotional labors are in fact, so laborious, for online teachers because they are often *bantams*, or small in size, but many in quantity, and non-existent in their formal recognition on the university landscape. Further, Rice and Dunn (2024) argued that online teachers continually make bantam adjustments not merely to humanize pedagogy, but to reconcile the needs of humans alongside the requirements and limitations of technological infrastructure.

Recently, Selwyn et al. (2025) illustrated how so-called automated labor from artificial intelligence relied extensively on hidden human labor. Emotional labor might be included in understandings about hidden labor. Rice (2024) described her first online teaching experience with little support but an injunction to make her supervising professor—and by extension, the program, department, and university, *look good*. Yet, the students had many needs for support and wanted to write to her for comfort. Emotional labor carries an expectation that it should be given freely, and institutional pressures are exerted to make the institution look good. In some cases, there is also pressure to make online teaching, as an innovation, look good. While there is a great expectation to perform emotional labor, there is also an institutional stance that emotional labor not happening, not valuable, and/or being emotionally invested is problematic. Finally, there is a special feminizing of emotional labor—although any instructor could provide it.

In the current study, we are women. We did take up *labor* as a term in accordance with definitions of feminism around various forms of pain and deliverance through sisterhood in the literature of Chicana feminism (Arvin et al., 2013; Calderón et al., 2012; Delgado Bernal, 2001). Yet, we also understood it as a term associated with generating capital from which we are largely alienated from the benefits (Aksakalli, 2025). We sought a community where we could openly discuss the challenges of adapting online teaching under ongoing university directives, our emotional labors, and the frustrations we faced in trying to support our students amid limited resources during the unsettling times of the COVID-19 pandemic in the spring of 2020. While it might be tempting to think that the COVID-19 pandemic and



its aftermath are behind us—that we are *back to normal*—and therefore this study is tired and unneeded, we ask for reconsideration of that idea. First, we argue that because of global political and economic events, institutions of higher education in many, if not most parts of the world, are certainly not in a safer or in a more stable position than they were during the COVID-19 pandemic closures (Alawadi, 2024; Goodman, 2024; Hasan et al., 2024). Second, we suggest that although many universities have expanded online offerings considerably, many instructors would still be greatly un- and under-prepared for another crisis involving distance learning with online resources on an emergency basis for *all* coursework because institutions do not prepare for the traumatic toll health, environmental, war, and other disasters take on people who must teach and take courses (Brenya, 2024; Jones et al., 2021; Osegbue, 2025). Also, although internet connectivity was a major necessity for success and wellbeing during the COVID-19 building closures, there are still large parts of global infrastructure that are un- and under-connected (e.g., Amjad et al., 2024; Marques et al., 2024). Finally, although it is unpleasant to report, while there were about 100 years between the 1918 pandemic and the 2020 one, there is reason to believe that the next similar global health catastrophe could occur sooner rather than later (Liu et al., 2025).

Our community consisted of an academic intergenerational circle of doctoral students, doctoral candidates. All but one of these students has now completed her doctoral degree and that student is scheduled for defense in the coming months. There was also an assistant professor that moved to the associate level and was granted tenure in 2022. Common ground emerged through our positions as online instructors at a southwest United States public university. As a diverse community linked through emotional laborings, we represented various positionalities: a Mexican woman immigrant active in community-based criticality-focused teaching at the elementary, secondary, and post-secondary levels; a white woman with over 25 years of teaching secondary social studies; a woman of Bangladeshi origin who taught internationally for 14 years; a white woman with over seven years of experience as a tutor in foreign language and research assistant; another white woman, who had been a teacher educator with more than 20 years of experience preparing teachers for initial certification, providing professional learning, and supporting advanced degrees. Though we had varying levels of experience in online and in-person instruction, we found commonality through our commitment to helping students, ourselves, and each other during this time.

We discovered that we had similar struggles, and we expressed feelings of frustration about our lack of access to decision-making and negotiation within the hierarchy of the institution during the COVID-19 outbreak. As non-decision makers, we felt that our recommendations and proposals could not break through within the larger spaces of our stewardship; within the margins of the university, we identified with descriptions of subaltern status (Spivak, 1988) that did not allow us a voice in the construction of COVID-19 policies or remediations. When Spivak (1988) spoke of the subaltern she was describing women with much less privilege than we as university women in the U.S. Yet, elements of Spivak's (1988) subalternity resonated with our predicament; rather than asking, "Can the subaltern speak?" we framed our conversation around the question, "Can the subaltern—or can people who are not primary decision makers—be heard?" (Zembylas, 2017). We found the answer was yes, but if we could figure out how to listen to one another, too.

The purpose of this paper is to theorize *plática*,—or the deliberate relational conversation that centers everyday experiences and emphasizes healing (Fierros & Delgado Bernal, 2016). We achieve our purpose by contextualizing the place where we teach and providing more information about our initial study. Then we provide a review of previous

studies about supporting students through the pandemic. We also provide additional methodological information about *plática*, and how we layered it alongside S-STEP research. Finally, we discuss how *plática* might broaden from our study to other work to support online teachers and teaching.

## Contextualizing the Study

Our university is classified as a minority-serving institution, more specifically, a Hispanic-serving institution. Because the Latinx identity is historically complex, racially varied, and even politically charged, there are many students and faculty on campus who identify as Black, Indigenous, and mixed race alongside claiming a Latino and/or Hispanic (sometimes Hispano) identity (Mena, 2022). The university also had historically hosted many international students because tuition and costs of living were low in this part of the U.S. Around 50 percent of graduating students are first-generation college students. While there might be temptation to consider the demographic characteristics a challenge or problem, instead, we considered how institutional structures can be more responsive to the needs of students (Smith, 2007). Also, as teacher educators, we prepare teachers to work with children; central to that work is to help our students see all children as being worthy of dignified treatment and of help when it is needed. Therefore, we feel it is important to demonstrate what it means to treat students as if they deserve education and that having struggles and needing help are not disqualifying.

The original study that we conducted (Dathe et al., 2024) discussed the ways in which we met regularly online for *pláticas* and examined our teacher personas in four specific areas: (1) our online teacher identities; (2) challenges of online instruction before, during and after COVID-19; (3) emotional laborings we encountered in online teaching during the pandemic; and (4) the role technologies played in affecting our praxis and emotional laborings during initial campus closures through to campus reopening. During that initial work we considered how our efforts to use *plática* were not just to comfort each other, but by attending to Chicana feminism as a way of knowing and being, we moved toward decolonial ways of knowing. Cornthassel and Hardbarger (2019) explained that colonial practices of claiming land/water and knowledge through deception and/or violence were not a one-time event, and therefore, community recovery—or (de)colonizing would not be a single unitary process. Instead, individuals who wanted to (re)consider what knowing is, how to know, and where to know, would have to participate together, regularly, as acts of healing and (re)claiming. *Plática*'s emphasis on blurring the private and the public was precisely the methodology that would support recovery (Fierros & Delgado Bernal, 2016).

While our narratives, identities, teaching modalities, routines, and futures were interrupted, even irrevocably changed during the pandemic, we felt it was important to document and dissect our stories as we continued to witness traumas, trials, and opportunities from this cataclysmic event. Isolated as we were during the many shifting protocols, we relished the time together to process and evaluate our diverse perspectives. Deleuze and Guattari (1972) deemed such events part of the natural deterritorialization and reterritorialization in which context is altered, mutated, and destroyed only to be reborn into new interactions, new ways of doing life, new teaching practices. "Creation takes place in bottlenecks...A creator who isn't grabbed around the throat by a set of impossibilities is no creator" (Deleuze, 1990, p. 133). Again, our way of knowing and being was that of making space for multiple simultaneous possibilities.

Braidotti (2022) defined these periods of flux, epidemic, and innovation as posthuman convergences, in which social, environmental, and technological factors merge to create our present historical condition. Braidotti (2022) explained that at the social level, there is increasing structural injustice through the unequal distribution of wealth and access to technology; at the environmental level, there are climate and pandemic issues to confront; at the technological level, robotics, nanotechnologies, and digital interconnectivities produce uncertainties generated by uncharted frontiers—all of which affected us in the academy. “The pandemic foregrounds the importance of human/non-human interaction and its destructive, as well as generative, potential” (Braidotti, 2022, p. 4). Beneath the surface of the worldwide upheaval, the global pandemic revealed that we can “no longer make do with disconnected ways of thinking and being, or onto-epistemologies, that emphasize dualisms, linearity, one-to-one correspondences, and essentialism” (Strom, 2021, p. 199). Living through these turbulent times, we encountered destruction and regeneration, bewilderment and clarity, uncertainty and resolve, grief and gratification. We chronicled our journey, widened our circle, and joined with others as we attempted to make sense of our odyssey through uncertain times (Dathe et al., 2024).

Our intention was to listen to each other as validation of the tears we shed, the ways we changed, and the emotions that remain close to the surface. This self-study concentrated on our teaching practices between spring 2020 and fall 2022 semesters; we investigated the entanglement of emotional work and identity issues as they affected our emergence and continued growth as online teacher educators through the lens of our peripheral roles within the institution. Our analyses were drawn from the various moments, including the initial shift to online teaching during the first days of campus shutdowns, and how subsequent shifts between asynchronous, synchronous, and hybrid instruction elicited different types of emotional, physical, and professional teacher identity questions and responses. We framed our emotional work in many dimensions, including our own affective reactions to various pandemic effects, our students’ efforts to process this unexpected and unsettling interruption of their academic progress, and our attempts to uphold pedagogical standards while supporting the oft-times distressing situations that developed within our own families and the families of our students and colleagues. Since our work with preservice teachers involved preparing those future teachers for their classrooms, modeling, structures, and workload expectations necessitated constant reevaluation, review, and revision. After all, we were now sending teachers into a radically different, radically shifting context as well.

Now we were engaged in the paradoxical *bantam* (Rice & Dunn, 2024) where we made many, but small modifications of modules, tiny, but on-going adjust expectations, and recognized the need to reorganize assignments to provide students with peer interactions while also making dozens of seemingly minuscule efforts to accommodate schedules and comfort students undergoing trauma that prevented strong group engagement. As Braidotti (2022) argued, though our posthuman laborings might make us seem catastrophe-prone at first sight, in retrospect, our reflections reveal a more complex and multilayered account of our circumstances, which highlight the positive potential of the posthuman assemblages that beset, bedeviled, and certainly, enhanced our virtual classrooms. New ways of knowing, self-understanding, and an appreciation of the rich, historical transition that any cataclysmic or tempestuous epoch produces—all these afford opportunities for tremendous growth in the educational community. As resilient teacher educators, we narrated our experiences and learnings about our own evolving teacher identities so we could support our students, but also so we could remember how we did this, so if called upon, we could do it again.

Through identification with aspects of subaltern identities, we desired control of our narratives, which evolved through pláticas, textual reminiscences, and artifacts. Our plática created a warm, secure, and inviting counterspace to deconstruct our feelings about larger issues within society, along with our own personal reflections on our academic and familial journeys.

## **Literature Review**

Online courses in higher education were already increasing due to a multitude of factors (Lowenthal & Trespalacios, 2022; Lomellini et al., 2024). For example, online courses are assumed to provide some convenience and carry an expectation of flexibility to balance work and family obligations (Lightner, 2025). Also, a major shift in online instruction happened during the COVID-19 pandemic as many schools and universities quickly responded to the teaching continuity challenges by restructuring content delivery to online formats, which continued to be offered even after students returned to on-campus learning (Lowenthal & Trespalacios, 2022).

### ***Online Teaching is More than Subject Matter***

Online teachers must address issues other than content and technological challenges; student engagement, community, dialogue, and interpersonal relationships are factors that also contribute to student satisfaction, success, and perceived and assessed learning (Lowenthal & Trespalacios, 2022; Phirangee, 2017). However, online education is not usually perceived as the kind of education that is purposeful for relationship building (Anderson, 2013) or configured to foster authentic community (Hockridge, 2013). An online course “reduces, modifies, and eliminates” physical and social cues, which restricts social information about individuals, leaves online learners with unclear impressions of other students, allows for biased interpretations, and leads to less self-reflective communication” (Phirangee, 2017, p. 162).

While relational concerns were not the only concerns teachers had, online teacher instructors did face a host of relational concerns during the COVID-19 pandemic. There is no evidence that relational concerns have vanished as the pandemic immediacy has subsided (Alawadi, 2024; Goodman, 2024; Hasan et al., 2024). Novice and seasoned online educators have a theoretical option to not engage with students, except for the purposes of teaching content (Ozfidan et al., 2021).

### ***Connecting Student Needs to Emotions***

Attention to emotions for students has received some attention as emotional presence—where teachers are supposed to create space for student emotions (Cleveland-Innes & Campbell, 2012). The idea is that more emotions and more positive ones are better. Researchers like Jiang and Koo (2020) have found that authentic expression of student emotionality can be quite low. Moreover, attention to online instructors as having emotions during, but especially before and after teaching has not received much attention. In addition, our choice to talk about this as labor was born of the understand that it is more than just feeling a feeling but doing things—lots of things—often off script and behind the scenes to care for students because of shared emotionality (Rice & Dunn, 2024). In other words, attention to emotions and attention to emotional needs are very different propositions.

Students in online courses often experience unmet needs due to the distance between them and the teacher, and the fact that for some students, whatever is causing them to prefer to take the course online rather than come onto campus can mean that they are struggling in some way. For example, McPartlan et al. (2021) found that students had a variety of motivations for taking a class online. However, when that reason was many competing responsibilities, unsurprisingly, students struggled in the course. In online teaching, Jones et al. (2021) argued, “unmet needs emerge as visible behaviors or decisions: unresponsiveness to email correspondence, lack of accountability for assigned tasks, and feelings of insecurity” (p. 32). While students experience unmet needs, instructors also find that their intersecting social locations and laborings generate stress and insecurities in their own lives (Porter et al., 2023; Stewart et al., 2021).

### ***Meeting Needs as Part of Online Teacher Labor***

Institutions may not be able to require all online teachers to perform emotional labor with students, but there are benefits when they do. For example, Rollag Yoon et al. (2024) outlined the uncompensated labor that they provided while teaching online. This labor served to keep students enrolled in class, resulting in increased revenue for the university. However, there is also the possibility that the departments and programs gain or keep better reputations when there is a sense that a teacher is there and will help you. All online instructors were not required to engage in this labor—but Rollag Yoon et al. (2024) did so because of a commitment they felt to students. Yet, there is little acknowledgement or encouragement for doing emotional labor.

As teacher educators make decisions about how much emotional labor to do, they might also be confronting unfamiliar teaching realities—their responses have direct bearing on inequities within systems (Porter et al., 2023; Williams et al., 2021). The pressure to make up for systemic inequities as the course level might be especially high for online instructors who were already feeling marginalized due to their precarious status as temporary status instructors, their positions as graduate students, or because they are members of groups historically not well-served by educational institutions (Brissett, 2020).

## **Methodology**

Both our original study and the reflection on that study for methodological insights drew on self-study of teacher education practices (S-STEP) research methodology (Dathe et al., 2024). S-STEP methodology accommodates myriad research designs and approaches centered on a turn to practice that supports teacher education (Pinnegar & Hamilton, 2009). Using S-STEP methodology required collaboration with a “clear and explicit focus on the self-in-practice” (Fletcher et al., 2016, p. 303). Specifically, LaBoskey (2004) highlighted how exemplar-based validation of findings improves practice as key characteristics of S-STEP work. Exemplars emerged through *plática*, we held to unpack our entangled laborings. Our efforts centered on two ideas: (1) engaging with the notion of the subaltern and (2) speaking with *plática*.

### ***Engaging with the Subaltern***

Intellectual discourse prioritizes Western forms of knowing by diminishing other forms of communication and articulation; Spivak’s (1988) *subaltern*, a marginalized figure within the academic community, must conform expression of self to normative or imperialistic ways of knowing the world. Only by speaking in the language and intellectual

formats of the empire are there opportunities for what has been pressed into subaltern spaces be expressed.

As we explored our subalternity, we found that our personal expressions through journals, artifacts, and photographic articles ignited our discursive group interchanges. Although Gramsci (2021) is credited with coining the term subaltern, Spivak's (1988) essay, "Can the Subaltern Speak?" demonstrated "to what extent historical circumstances and ideological structures conspire to efface the possibility of being heard...for those who are variously located as the others" (Morris, 2010, p. 6–7). Subalternity, as gendered muting, is not seen as an identity, but rather a predicament, a "structured place from which the capacity to access power is radically obstructed" (Morris, 2010, p. 8). Intentional measures should enable online learning communities and ignite meaningful communication—to inspire the learners to experience healing and remediation through the intimate and personal reflections of each learner about marginality, anticolonialism, and posthuman convergence. As such, *plática* offered opportunities for healing, which enables us to process self-study/narratives/reflections on what it means to know and be in a space through the lens of the subaltern.

Spivak's term *strategic essentialism*, which refers to solidarity for strategic action, which we defined through our positionalities, dovetails with Braidotti's (2022) fusion of posthumanism and feminist thought as a means of effecting change to elevate each other (Chakraborty, 2010). There must be intentional measures taken to enable online learning communities and ignite meaningful communication—to inspire the learners to experience healing through intimate and personal reflections of each learner about marginality, anticolonialism, and posthuman convergence.

### ***Speaking with Plática***

*Plática* as part of Chicana feminism builds connection and respects researcher/participants epistemic orientations. As a methodology *plática* embraces the stories and the experiences of researchers/participants and it fosters relationships. Researchers and participants in a *plática* are vulnerable and open to sharing intimate truths that contribute to collective knowledge (Fierros & Bernal, 2016). While *plática* is sometimes used as a strategy alone, Fierros and Bernal (2016) emphasize the importance of conceptualizing *plática* within the entire frame for knowing and being from which it is drawn: (1) it emphasizes decolonial feminist thought; (2) it is relational and centers upon everyday experiences; (3) it recognizes participants as co-constructors of knowledge; (4) it emphasizes healing; and (5) it is reciprocal and embraces vulnerability. *Plática* supported us in processing the experiences that, in many ways, marked and changed our praxis as teacher educators.

We analyzed data collected during the winter of 2022 and spring of 2023 from our *pláticas* of about 60-80 minutes each. *Pláticas* happened every three weeks for 15 weeks to share impressions and events during the initial S-STEP (North, 2017). In reviewing our own S-STEP work, our methods, techniques, and modes of inquiry we used were powerful enabled *plática* that made space for us to talk about how we could support students. We also held additional *plática*, monthly in 2024 through 2025.

Within our group, we used the familial milieu of *plática* to unpack our remembrances of the disruptions of the past few years as they affected our roles inside and outside of the university community. *Plática* occurred in a well-defined cultural space for dialogue where

feminist perspectives coalesced to engage in a community of intellectual theorizing (Fierros & Bernal, 2016). It represented a form of authentic talk that nurtures deep dialogue in affirming cultural spaces for the subaltern to engage in truth-telling, mutual emotionality, and sharing vulnerable truths (Evans-Winters & Esposito, 2018; Hampton & Mendoza Aviña, 2023).

In revisiting and reviewing our prior use of *plática* alongside S-STEP, we realized that this intimate conversational methodology provided a useful platform for student interaction and engagement with issues in their personal, academic, and professional lives. S-STEP researchers are often encouraged to journal, to gather images, to produce artifacts that could deepen and describe intimate emotions (LaBoskey, 2004). While we did do some personal writing and sharing of photos and other images to discuss feelings, we did not want these moments when we let to feel like assignments where we had to share homework. Instead, we wanted to create an atmosphere that felt more like sharing at a kitchen table or in a living room. When our meetings had to be online, we took care not to force an agenda or protocol, although we did have a purpose, and we did record the meeting to help us with data collection. After the initial study, when it was possible to meet in person, we usually went to a café or sat in a park or other comfortable space. While these meetings did not have a video conference record option, we did take some notes, and we collected overall ideas and coalesced sentiments through emails and text messages when needed. All of us speak languages other than English, and we use these languages for conversation or to explain ideas where necessary. During the initial study period, the assistant professor convened the group, but afterward, other members shared in convening responsibilities. In this way, we do have multiple simultaneous methodologies that allow us to draw on our commitments as women to multiple simultaneous commitments (Braidotti, 2019).

Because we were operating within a complex conceptual framing, our conversations were about more than sharing experiences. Communal efforts to understand teaching experiences during pandemic times might help with reparative efforts in academic culture, this inquiry relied on a holistic approach. Through the methodology of *plática* as part of Chicana feminist knowing and being, we intentionally incorporated discussion and analysis of our public lives as teachers, including our multiple on-going efforts with students, and our private struggles. From this complex ecology of relationality and conversation, foregrounded by our original study, the key outcomes of this current inquiry emerged.

## Outcomes

We honored collective and individual teaching experiences through the pandemic years amid a need to holistically address loss inside and outside the teaching machine (Spivak, 1993). We attempted to support an entanglement of needs, rather than a hierarchy of traumas. As we revisited our earlier study conducted during the pandemic years, we seek to examine how attention to affect in our context shifted healing and restorative justice within our teaching community to address feminist practices, decolonization in classrooms, and posthuman convergences pointing to the unequal distribution of wealth and access to technology (Braidotti, 2022).

### *Pláticas as a Counterspace to Foster Transformative Learning*

Some educators have advocated for creating counterspaces (Artiles et al., 2025; Becerra, 2023; Morales, 2017), places for people on the margins to foster dialogue, critical

discourse, and transformation that foster a sense of community in much the same manner advanced by Oldenburg (1998) and others who envisioned face-to-face and online learning spaces that function as environments where students and instructors could dialogue informally, as one would in a coffeeshop, brewery or cafe. Counterspaces (Artiles et al., 2025; Becerra, 2023; Morales, 2017) considers surroundings that are separate from the usual spaces of home/work/school.

Counterspaces outline the processes that occur when marginalized groups of individuals gather with one another in a space “counter” to settings where they experience marginalization (Odera & Webster, 2024). In both spaces, these borderlands are ones that are open and inviting, comfortable and informal, convenient, unpretentious, conversational, and, in some cases, light-hearted (Oldenburg, 2023; Becerra, 2023). Counterspaces can be physical spaces, such as concerts or festivals where like-minded people converge, bookstores, or borderland areas where neighborhoods gather to discuss issues affecting marginalized individuals. In many cases, these spaces provide a safe realm where participants work against hegemonic constructs and dominant orthodoxy.

Postmodern, postcolonial, and posthumanist scholars like Said (1978), Anzaldúa (1987), Spivak (1993), hooks (1994), Bhabha (1994), and Braidotti (2019) along with Soja (1996) have all influenced academic discourse on the creation of zones/areas or counterspaces where power structures, marginality, subalternity, and oppression can be comfortably/freely addressed and analyzed. To address the issues of alienation, *otherness*, and detachment in online learning frameworks, the creation of a counterspace allows students and instructors to relate in an intimate and shared venue where time, space, generational disparities, and differing socioeconomic distinctions are erased.

In our original S-STEP study, we evaluated our own experiences with *plática* as a methodological tool to create an intimate space where all voices are heard and acknowledged and address the ways in which we feel that *plática* can be implemented in any online learning environment in the future. In this iteration of our research, we reflected on the lessons learned through our application of *plática* methodology, highlighting its potential to foster a more relational classroom environment in a wide range of online educational settings. As we illustrate in the following quotes, our *plática* revealed the counterspace that it was created to foster transformative learning amongst ourselves:

We were talking about children’s literature, but I couldn’t ignore the news, learning about what groups were more impacted by COVID-19. I think we made it part of the course. We were talking and discussing about the protests in the country, you know, the black lives matter, and everything that happened. Those events were, like, contextualizing that period and I couldn’t ignore that. It was like talking about what’s going on and how that was affecting people like us, people that were taking this course. I think that was also very emotional. It was a lot of emotional labor because I was trying to bring those topics for dialogue and talk about racism in humanizing ways. How do we talk about this without triggering more emotions?

Using *plática* we realized new efforts we making to create spaces for our students to discuss current events affecting their lives within the institution. *Plática* supported us in conceptualizing these spaces as counterspaces (Artiles et al., 2025; Becerra, 2023; Morales, 2017) both for our own *plática* and for use in our classrooms with the purpose of offering our



students a positive environment where vulnerability was embraced. Here is an example of writing from an author that we newly (re)interpreted.

Leading up to the closures, I was having a pretty miserable semester already. I was trying to do some things for my research to prepare for a conference and there were issues at the university and in the department that were taking up time. When I returned from the conference at the end of February, we had a little bit of time and then campus closed. I was not excited about the virus, but teaching online did not bother me and it seemed safer. What I wondered about was my sense of the range of feelings about online teaching and learning outside of the pandemic. While this is a major area of expertise for me, as a new professor I did not know what were useful and acceptable ways to bring the expertise to the college and department and I was not being invited because there is an expectation you will just push in as a faculty member.

This author revealed vulnerability as *plática* unfolded. As a new professor, seeking her identity within the institution, she shared intimate details of her journey with graduate students, which is not a usual practice in the hierarchy of academia. Living in the *plática* as a counterspace suggested a milieu where trust is built over time and relationships develop through sharing emotional and relational laborings. Since the likelihood of other pandemics or natural disasters necessitating school/university closures is a possibility in the future and since students will continue to utilize online classes for personal and professional reasons, it was reasonable to hope that academic institutions could be prepared to maintain and expand digital infrastructure along with providing instruction to equip both students and faculty with the skills and knowledge needed to successfully navigate the technical, academic, and emotional aspects of online learning communities.

In our study, we incorporated *plática*, the practice of deliberate relational conversation that centers everyday experiences and emphasizes healing (Fierros & Bernal, 2016), as a counterspace which facilitated an understanding of the changes, challenges, and altered circumstances encountered by the community of learners-to serve as our counterspace. The mediating role of self-study methodology blending well with *plática* aided us, as online instructors, to address communication, marginality and subalternity, anticolonialism, and posthuman convergence as a means of reflecting on past and current crises which might affect our online classes. Psychological resilience and growth mandate a meaning-making, collaborative strategy in shared, intimate, and open conversations about the realities of the pandemic and/or other situational phenomena.

Each author's efforts, while personal and place-centered to a certain extent, were ones that perhaps will resonate with others who struggle and continue to labor through the disruptions and uncertainties of the past few years. Being intentional in connecting the online format with methods that invoke community allows *plática* to enable communication about the themes of marginality and anticolonialism and the angst many feel in dealing with posthuman convergence (Braidotti, 2022). *Plática* can be applied to any online learning community; however, it disrupts the routinization of the classroom and allows discourse on current issues and challenges that most have with online learning platforms. In this manner, we present a path to the possibilities that are inherent in the *plática* methodology, which combines ancient, indigenous, and elemental practices to confront the issues of marginality, anticolonialism, communication, and the posthuman convergence.

### ***Revisiting Community in Online Teaching and Lessons learned from Plática***

Feminist scholars have advocated for methodologies that bring public and private knowing and being together into classroom spaces (Butler, 1990; hooks, 1994; Delgado Bernal, 2001; Cariaga, 2019; Hannegan-Martinez & Griffin, 2024). While there are multiple feminisms, our critical post-humanist variety emphasized multiplicity and bringing together the human and (non)human in technological spaces (Braidotti, 2022).

Becerra (2023) described her use of plática podcasts as being transformative spaces for sharing knowledge, raising consciousness, and forging connections. From our experiences participating in our original S-STEP pláticas, we held discussions about healing, caring, resisting, and remediation of collective anxiety and alienation. One author shared the following.

So, as an online teacher during, though, and after the pandemic, we have students with challenges that are technological, and then those that would be there even if we were in person. Having been an English as a Second Language teacher for 10 years in public schools as a white woman, I had to learn that even though you love them, you must have high standards for learners and help them. If you don't match your care and concern with high expectations, then your respect for them and your appreciation for their struggles does not do them any good.

The author reveals her care and emotional labor in creating a community where collective anxiety and alienation can be discussed and explored. Through her reflection on students' needs that she exhibited a feminist positionality that care, and love are inherent in all aspects of the educational process (hooks, 1994). Plática allowed such reflections to be articulated and shared with the other participants in the hope of affirming everyone's emotional and professional laborings. The following quote illustrates another author's desire to consider the online classroom to reflect anti-colonial and post-feminist perspectives:

As I created my arts-based retrospective of my pandemic journey, I was reminded of the humor I injected into situations to ease tension, of the reliance on historical precedent which, for me, allowed reflection and opportunities for introspection, and of the many times I think I made a difference in the lives of my students as we collaborated on diffusing the sometimes-volatile situations that arose in their personal, academic, or professional lives. We were frontline for many of these students; some were so traumatized or isolated that we were their main contact, their only ally in this struggle to stay healthy, abreast of the classwork, and on top of daily commitments. That is a lot of emotional laboring – intense pressure to be there for our students 24/7.

The author revealed her desire to “construct a discursive community that cares about the state of the world and wants to intervene productively in it” (Braidotti, 2022). In this sense, the students' constructed realities are heard and respected through intimate interactions that are enabled by plática methodology.

Toward (de)colonization with online education, pláticas were counterspaces (Artiles et al., 2025; Becerra, 2023; Morales, 2017) to address and interrogate our own practices. During pláticas, we shared out feelings on how students were working to survive during this period of trauma due to socioeconomic complications, university policies that were not

always attuned to individual circumstances, unappreciated cultural capital that students might bring to the university context, and disrespect for individual community practices.

Posthuman convergences as the merging of technological advances and accelerated ecological degradation, along with global interconnectedness were also present (Braidotti, 2019). Our students experienced lack of internet connection, unequal access to financial resources, loss of cultural identity due to the necessity to cope with an urban versus rural environment, caring for children and parents—sometimes simultaneously, working multiple jobs, and other factors affected by the ongoing technological transformation of society and late-stage capitalism, seemed be general sense of anxiety and angst in our online educational classes that might not be captured with emotion gaging instruments for measuring presence.

With the rapid acceleration of technology coupled with ecological and environmental crises, many students needed to discuss the disruptions and feelings of alienation they were experiencing. Through our own experience with *plática*, with its intimate, artifact-based, conversational nature, we gained insights into how to provide an area where students felt that their voices were being heard. The need to discuss and address various sociopolitical, economic, and environmental crises did not abate during the study and (anecdotally) has not since we began exploring *pláticas*.

## Discussion

Our work is important because using *plática* as a frame for knowing felt authentic and relational to us. Our contribution to the field centers on the need for online teachers—and students—to make more spaces to explore multiple frameworks and locate what resonates with them as they take up online teaching and learning. During both the original study and our revisit of it, we saw the opportunity for healing as an on-going process rather than something that can be done in one moment (Corntassel & Harbarger, 2019). In the more recent past, we find ourselves and we find our students remain socially and politically unsettled; although we were also undergoing various pressures, recognizing the entangled laborings with our students represented an effort to provide a frame for building support for each other and students.

Since we found the *plática* methodology to be helpful alongside S-STEP commitments, we anticipated that sharing it might be useful within online teaching. Our stories, while personal and place-centered, extent, may resonate with others who performed emotional labor through the ensuing collateral hardships during and in the aftermath of the pandemic. Through research and revision, we hope to contribute to relational scholarship that provides intentional possibilities of deeper engagement in examining teaching and context (Alawadi, 2024; Goodman, 2024; Hasan et al., 2024). We also understand that our ideological differing from dominant thought is not always welcome. Said (1978) wrote of this phenomenon in *Orientalism*. Indeed, the point of the was to learn to live as being and thinking not like the institutions, while trying to figure out how to stay a part of them so we can help students (Spivak, 1988).

### *Doing and Being within a Plática for Online Teaching*

What does a functional *plática*, look like for online teachers? While we emphasize that *plática* is a way of knowing and being and not merely a strategy, we suggest that those who might want to try *plática* should form groups with people who share similar ethical

commitments to students (Fierros & Delgado Bernal, 2016). They should plan casual times to meet in comfortable places. If they want to conduct a formal study, they could agree on how and what to record (Dathe et al., 2024). Then they should be prepared to think about how learning from initial conversations and learning from the analysis results in various forms of understanding about emotional labor and possible efforts toward community making and healing. For online teachers, special considerations are necessary for communicating at a distance, understanding the entangled demands between teachers, students, and the technological elements—including devices and infrastructures (Braidotti, 2022).

We also suggest that students, particularly if they are future teachers, might also benefit from plática-based community building and relational counterspaces (Artiles et al., 2025; Becerra, 2023; Morales, 2017). For our own continuity as a community, we anticipate long-term goals might include using plática with students to challenge individualistic perspectives of academic success; solidarity and mutual respect; challenging hierarchies of all manner; authentic communication which demands authenticity from other members; compassionate and unselfish collective action which addresses the needs of all (Chakraborty, 2010). Collecting data about plática for students might look different. Sometimes there is a tendency to use plática to begin an interview or focus group to make students comfortable or because it is supposed to signal familiarity with some conception of *Latinx culture* (Fierros & Delgado Bernal, 2016). However, this is not regarded as being in the ethical traditions and commitments of plática. If teachers have a desire to create healing counterspaces (Artiles et al., 2025; Becerra, 2023; Morales, 2017) for students, they will have to make commitments to (re)examining teaching practices to become more relational. The way that the plática operates as a community makes it difficult to claim relationality, but also to do emotional labor while attempting to avoid emotional burnout.

## Conclusion

We offered S-STEP and plática alongside one another for scholarly considerations on how to combine deep analysis on our own online teaching and the connections with other pedagogical and methodological approaches that deepen and transform online teaching and learning. Plática, as an intimate, feminist online counterspace within the larger educational institution, can initiate care, repair, and remediation by addressing issues pertaining to anticolonialism and the posthuman convergence (hooks, 1994; Spivak, 1998; Fierros & Delgado Bernal, 2016; Braidotti, 2022). As we have experienced first-hand the greater possibilities of plática methodology as an affective and effective plan of action to build stronger online teaching relationships, we advance the ideas of plática as well suited for remedy and repair for research as well as pedagogy within our classrooms, across disciplines, and throughout our academic and social communities.

## Declarations

The authors declare no conflicts of interest. The authors declare no funding associated with this work. The authors declare that the University of New Mexico declared the data collected in this study does not constitute that which is governed by human subject review because it was collected from individuals who are listed publicly as authors.

## References

- Alawadhi, H. (2024). The effects of war on the quality of higher education in Yemen: Scholars' perspectives. *International Journal of Educational Development*, 108, 103058. <https://doi.org/10.1016/j.ijedudev.2024.103058>
- Aksakalli, A. (2025). From Marx to the classroom: Understanding teacher alienation in policy contexts. *Policy Futures in Education*, 23(2), 337–354.
- Amjad, A., Aslam, S., Tabassum, U., Sial, Z., & Shafqat, F. (2024). Digital equity and accessibility in higher education: reaching the unreached. *European Journal of Education*, 59(4), e12795. <https://doi.org/10.1111/ejed.12795>
- Anderson, P. K. (2013). University education as relational: The challenge of online studies. *Contemporary PNG Studies*, 19, 36–49. <https://search.informit.org/doi/abs/10.3316/INFORMIT.847038795975728>
- Anzaldúa, G. (1987) *Borderlands/La Frontera: The new mestiza*. Aunt Lute Books.
- Artiles, M., Huggins, N., Matusovich, H., & Adams, S. (2025). Advisors, peers, and counterspaces: The socialization of minoritized doctoral engineering students. *Journal of Diversity in Higher Education*. <https://doi.org/10.1037/dhe0000628>
- Arvin, M., Tuck, E., & Morrill, A. (2013). Decolonizing feminism: Challenging connections between settler colonialism and heteropatriarchy. *Feminist Formations*, 8–34. <https://www.jstor.org/stable/43860665>
- Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.
- Becerra, A. (2023). Anzalduing it: Podcasting, pláticas, and digital jotería counterspaces. *International Journal of Qualitative Studies in Education* 36(9), 1726–1740. <https://doi.org/10.1080/09518398.2023.2181436>
- Bhabha, H. (1994). *The location of culture*. Routledge.
- Braidotti, R. (2019). *Posthuman knowledge*. Polity.
- Braidotti, R. (2022). *Posthuman feminism*. Polity.
- Brenya, B. (2024). Higher education in emergency situation: blended learning prospects and challenges for educators in the developing countries. *Journal of Applied Research in Higher Education*, 16(4), 1015–1028. <https://doi.org/10.1108/JARHE-01-2023-0044>
- Brissett, N. (2020). Teaching like a subaltern: Postcoloniality, positionality, and pedagogy in international development and education. *Comparative Education Review*, 64(4), 577–597.
- Butler, J. (1990). *Gender trouble: Feminism and the subversion of identity*. Routledge.
- Calderón, D., Delgado Bernal, D., Huber, L. Malagón, M., & Vélez, V. (2012). A Chicana

- feminist epistemology revisited: Cultivating ideas a generation later. *Harvard Educational Review*, 82(4), 513-539. <https://meridian.allenpress.com/her/article-abstract/82/4/513/32069/A-Chicana-Feminist-Epistemology-Revisited>
- Cariaga, S. (2019). Towards self-recovery: Cultivating love with young women of color through pedagogies of bodymindspirit. *Urban Review*, 51(1), 101–122. <https://link.springer.com/article/10.1007/s11256-018-0482-9>
- Chakraborty, M. N. (2010). Everybody's afraid of Gayatri Chakravorty Spivak: Reading interviews with the public intellectual and postcolonial critic. *Signs: Journal of Women in Culture and Society*, 35(3), 621–645. <https://www.journals.uchicago.edu/doi/abs/10.1086/649575>
- Cleveland-Innes, M., & Campbell, P. (2012). Emotional presence, learning, and the online learning environment. *International Review of Research in Open and Distributed Learning*, 13(4), 269–292. <https://doi.org/10.19173/irrodl.v13i4.1234>
- Corntassel, J., & Hardbarger, T. (2019). Educate to perpetuate: Land-based pedagogies and community resurgence. *International Review of Education*, 65, 87–116. <https://link.springer.com/article/10.1007/s11159-018-9759-1>
- Dathe, M., Brassington, L. E., Rahman, R., Garver, H., & Rice, M. (2024). Entangled laboring in online teacher education: Subaltern negotiations. In M. Rice, R. Cutri, and J. Mena (Eds.) *Self-studies of teacher education practice online: Theorizing online teacher education beyond crisis* (pp. 107–136). Springer. [https://link.springer.com/chapter/10.1007/978-3-031-58097-0\\_7](https://link.springer.com/chapter/10.1007/978-3-031-58097-0_7)
- Deleuze, G. (1990). *Negotiations: 1972–1990*. Columbia University Press.
- Deleuze, G., & Guattari, F. (1972). *Anti-Oedipus: Capitalism and schizophrenia*. Bloomsbury.
- Delgado Bernal, D. (2001). Learning and living pedagogies of the home: The mestiza consciousness of Chicana students. *International Journal of Qualitative Studies in Education*, 14(5), 623–639. <https://doi.org/10.1080/09518390110059838>
- Evans-Winters, V., & Esposito, J. (2018). Researching the bridge called our backs: The invisibility of 'us' in qualitative communities. *International Journal of Qualitative Studies in Education*, 31(9), 863–876. <https://doi.org/10.1080/09518398.2018.1478152>
- Fierros, C. O., & Delgado Bernal, D. (2016). Vamos a platicar: The contours of pláticas as Chicana/Latina feminist methodology. *Chicana/Latina Studies*, 15(2), 98–121,
- Goodman, R. (2024). Higher education as the frontline of democracy: The case against Florida House Bill 233, the anti-shielding/intellectual viewpoint diversity/student recording legislative act. *Review of Education, Pedagogy, and Cultural Studies*, 46(1), 64–84. <https://doi.org/10.1080/10714413.2023.2245311>
- Gramsci, A. (2021). Notebook 25 (1934): On the margins of history (The history of subaltern social groups). In J. Buttigieg & M. Green (Eds.), *Subaltern social groups: A Critical*

- Edition of Prison Notebook 25* (pp. 1–14). Columbia University Press. <https://doi.org/10.7312/gram19038-005>
- Hampton, L., & Mendoza Aviña, S. (2023). Chicana/latina feminista plática methodology as a praxis of solidarity for black women and women of color contingent faculty at a Predominantly White Institution (PWI). *International Journal of Qualitative Studies in Education*, 36, 1769–1780. <https://doi.org/10.1080/09518398.2023.2181435>
- Hannegan-Martinez, S., & Griffin A. (2024). Platicando about love at the kitchen table. *Education Sciences* 14(8). <https://doi.org/10.3390/educi14080879>
- Hassan, M., Murtaza, A., & Rashid, K. (2025). Redefining higher education institutions (HEIs) in the era of globalisation and global crises: A proposal for future sustainability. *European Journal of Education*, 60(1), e12822. <https://doi.org/10.1111/ejed.12822>
- Hockridge, D. (2013). Challenges for educators using distance and online education to prepare students for relational professions. *Distance Education*, 34(2), 142–160. <https://doi.org/10.1080/01587919.2013.793640>
- hooks, b. (1994). *Teaching to transgress*. Routledge.
- Jones, E., Valley, J., & Garrahy, D. (2021). Keeping focus on relational, social, and emotional needs of students and faculty during university-level remote instruction. *The Journal of Physical Education, Recreation & Dance*, 92(8), 27–33. <https://doi.org/10.1080/07303084.2021.1962448>
- Jiang, M., & Koo, K. (2020). Emotional presence in building an online learning community among non-traditional graduate students. *Online Learning*, 24(4), 93.
- Lightner, C.A., Lightner-Laws, C.A. & Womack, T. (2025). Adjusting to a new normal: Understanding the need for a significant overhaul of the technological infrastructure at higher education institutions. *Education Technology Research & Development*. <https://link.springer.com/article/10.1007/s11423-025-10487-w>
- Liu, J., Gao, G., Yuen, K., Poon, L., & Song, N. (2025). Time is now: Preparing for the next pandemic. *hLife*, 3(3), 113–117. <https://doi.org/10.1016/j.hlife.2024.12.008>
- Lomellini, A., Lowenthal, P., Trespalacios, J. H., & Snelson, C. (2024). Instructional designers' perceptions of accessible and inclusive online course design. *Online Learning*, 28(4), 310–330. DOI: 10.24059/olj.v28i4.3719
- Lowenthal, P. R., & Trespalacios, J. (2022). Classroom community and time: Comparing students' perceptions of classroom community in traditional vs. accelerated online courses. *Online Learning*, 26(4), 59–77. doi:10.24059/olj.v26i4.3498
- Marques, J., Schrubbe, A., Marwell, N. P., & Feamster, N. (2024). Are we up to the challenge? An analysis of the FCC broadband data collection fixed internet

- availability challenges. *arXiv preprint arXiv:2404.04189*.  
<https://arxiv.org/abs/2404.04189>
- McPartlan, P., Rutherford, T., Rodriguez, F., Shaffer, J. F., & Holton, A. (2021). Modality motivation: Selection effects and motivational differences in students who choose to take courses online. *The Internet and Higher Education*, 49, 100793.  
<https://doi.org/10.1016/j.iheduc.2021.100793>
- Mena, J. (2022). From cradle to college: Cultural socialization, identity development, and the college experiences of Latinx students. *Journal of Latinx Psychology*, 10(3), 191–206.  
<https://doi.org/10.1037/lat0000207>
- Morales, S. (2017). Redefining counterspaces: New directions and implications for research and praxis. *Center for Critical Race Studies at UCLA*. <https://tinyurl.com/kj5jf92m>
- Morris, R. (Ed.). (2010). *Reflections on the history of an idea: Can the subaltern speak?* Columbia University Press.
- Phirangee, K., & Malec, A. (2017). Othering in online learning: an examination of socialpresence, identity, and sense of community. *Distance Education*, 38(2), 160–172. <https://doi.org/10.1080/01587919.2017.1322457>
- Porter, C., Boss, G., & Davis, T. (2023). Just because it don't look heavy, don't mean it ain't: An intersectional analysis of Black women's labor as faculty during COVID. *Gender, Work and Organization*, 30(2), 657–672. <https://doi.org/10.1111/gwao.12820>
- Odera, E., & Webster, N. (2024). Creating space: A university-based action research curriculum as a counterspace. *Education, Citizenship, and Social Justice* 19(3), 399–412. <https://doi.org/10.1177/17461979231162067>
- Oldenburg, R. (1999/2023). *The great, good place: cafes, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community*. Berkshire.
- Osegbue, G. (2025). Crisis intervention and response in educational institutions: developing and implementing plans in developing countries. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, 15(1).  
<https://www.ajemates.org/index.php/ajemates/article/view/724>
- Ozfidan, B., Fayez, O., & Ismail, H. (2021). Student perspectives of online teaching and learning during the COVID-19 pandemic. *Online Learning*, 25(4), 461–485.  
<https://doi.org/10.24059/olj.v25i4.2523>
- Rice, M. (2024). Preface: Of emotions, grief, and the imperative to go on as online teacher educators. In M. Rice, R. Cutri, and J. Mena (Eds.), *Self-studies of teacher education practice online: Theorizing online teacher education beyond crisis* (pp. xiii–xxii). Springer.
- Rice, M., Cutri, R., & Mena, J. (Eds.) (2024). *Self-studies of teacher education practice online: Theorizing the emotional work in times of crisis* (pp. 107–136). Springer International Publishing. <https://doi.org/10.1007/978-3-031-58097-0>
- Rice, M., & Dunn, S. (2024). Bantam becoming: (Re)claiming online spaces for (more than)



- humans. *Distance Learning Journal*, 23(3), 27–32.  
<https://www.proquest.com/openview/d4b05bcd33fb654e4dc4ff8a135f8a46/1?pq-origsite=gscholar&cbl=29704>
- Rollag Yoon, S., Lo Bello Miller, J., Gilpin, S., & Rice, M. (2024). The crisis of teacher preparation during the early pandemic emergency and new directions for online teacher preparation. In M. Rice, R. Cutri, and J. Mena (Eds.), *Self-studies of teacher education practice online: Theorizing online teacher education beyond crisis* (pp. 15–30). Springer. [https://link.springer.com/chapter/10.1007/978-3-031-58097-0\\_2](https://link.springer.com/chapter/10.1007/978-3-031-58097-0_2)
- Said, E. (1978). *Orientalism*. Pantheon.
- Selwyn, N., Ljungqvist, M., & Sonesson, A. (2025). When the prompting stops: Exploring teachers' work around the educational frailties of generative AI tools. *Learning, Media and Technology*, 1–14. <https://doi.org/10.1080/17439884.2025.2537959>
- Soja, E. (1996). *Thirdspace: Journeys to Los Angeles and other real-and-imagined places*. Wiley-Blackwell.
- Smith, R. (2007). An overview of research on student support: helping students to achieve or achieving institutional targets? Nurture or de-nature? *Teaching in Higher Education*, 12(5–6), 683–695.
- Spivak, G. (1988). Can the subaltern speak? In C. Nelson & L. Grossberg (Eds.), *Marxism and the interpretation of culture* (pp. 24–28). Macmillan.
- Spivak, G. (1993). *Outside in the teaching machine*. Routledge.
- Stewart, N. K., Rahman, A., Adams, P. R., & Hughes, J. (2021). Same storm, different nightmares: Emergency remote teaching by contingent communication. *Communication Education*, 70(4), 402–420.  
<https://doi.org/10.1080/03634523.2021.1948084>
- Strom, K. (2021). Illuminating a continuum of complex perspectives in teacher development. *Professional Development in Education*, 47(2–3), 199–208.  
<https://doi.org/10.1080/19415257.2021.1901005>
- West, N. (2023). Defining the contours of a participatory action research counterspace developed by, for, and about black women in higher education. *International Journal of Qualitative Studies in Education*, 37(5), 1542–1565.  
<https://doi.org/10.1080/09518398.2023.2181449>
- Williams, T., McIntosh, R., & Russell III, W. (2021). Equity in distance education during COVID-19. *Research in Social Sciences and Technology*, 6(1), 1–24.  
<https://eric.ed.gov/?id=EJ1317047>

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## **Introduction to Section II of the December Issue of the Online Learning Journal**

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In addition to the special section in this fourth quarterly volume, this issue also contains 13 articles from our regular submission process. These articles cover a broad range of related themes such as AI use, video-based learning, flipped classrooms, the Community of Inquiry framework, mobile learning, and other topics.

Generative artificial intelligence (GenAI) tools such as ChatGPT, Grammarly, and Quillbot are increasingly used by English as a foreign language (EFL) students, yet limited research explains why learners adopt these tools or how their intentions translate into actual use, especially in the context of the global south. Our first paper in the section, “Understanding EFL Students’ Adoption of Generative AI for English Learning: An Integrated UTAUT2 Model and Self-Determination Theory” integrates the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) with Self-Determination Theory (SDT) to examine the technological and psychological factors shaping Indonesian EFL students’ behavioral intention and actual use of GenAI for English learning. Using a cross-sectional survey of 462 students from three private universities and analyzing the data with partial least squares structural equation modeling (PLS-SEM), the study found that performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, habit, autonomy, and relatedness significantly predicted behavioral intention, whereas competence showed no significant effect.

As higher education expands online offerings, educators face persistent challenges in designing learning experiences that preserve the rich social and cognitive benefits of collaborative problem solving. In “Student Reflections on 360-Degree Video for Pseudo-Synchronous Collaborative Problem Solving in Online Mathematics Learning” the authors examine a novel learning approach that uses 360-degree video excerpts of authentic classroom problem-solving sessions to support asynchronous online learners of mathematics. Using an exploratory mixed-methods survey design with 56 pre-service teachers, the authors analyzed students’ online and face-to-face problem-solving experiences through descriptive statistics and thematic analysis. Findings indicate that while students generally prefer face-to-face collaboration, the 360-degree video environment provided meaningful opportunities to observe peer reasoning, compare strategies, overcome moments of impasse, and engage in reflective, metacognitive thinking.

Flipped classroom models are increasingly used in English as a Foreign Language (EFL) instruction, yet little is known about how to enhance their effectiveness for complex learning tasks such as academic writing. “EFL Learners’ Writing Performance and Perception in a Flipped Classroom Model with Self-Regulated Strategy Development Instruction” extends the classic flipped classroom model by integrating Self-Regulated Strategy Development (SRSD) to strengthen students’ writing strategies and learning self-regulation. Using a quasi-experimental design with 90 Indonesian EFL students across 13 weeks, the authors compared three conditions: a flipped classroom combined with SRSD, a flipped classroom without SRSD, and a conventional writing classroom. Quantitative analyses of pre- and post-test writing performance

revealed that the flipped classroom with SRSD produced the highest gains, significantly outperforming both comparison groups.

Research on generative artificial intelligence (GAI) in education has expanded rapidly since 2022, yet much of the emerging literature focuses on operational issues while overlooking the foundational learning theories that explain how humans think, develop, and learn. This scoping review, “A Critical Analysis of GAI Learning Research: From Theory to Implementation Risks” analyses 465 studies published between 2022 and 2024 to identify how current GAI-in-learning research aligns with—or diverges from—core principles of Cognitive Load Theory, Constructivism, Sociocultural Theory, Activity Theory, and Bloom’s Taxonomy. Findings reveal significant theoretical gaps: although GAI supports writing, feedback, and efficiency, the literature rarely addresses its implications for schema formation, social meaning-making, intrinsic motivation, or cognitive progression.

Research on teaching presence within the Community of Inquiry (CoI) framework has typically centred on asynchronous discussions, leaving limited understanding of how teaching presence is demonstrated across diverse instructional materials in accelerated online courses. In “An Examination of Teaching Presence in an Accelerated Online Bachelor of Business Administration Course” the authors conduct a multi-source quantitative content analysis of an accelerated online Bachelor of Business Administration (BBA) course to examine how teaching presence is manifested through instructional design and organization, facilitating learning, and direct instruction. Data were drawn from module overview pages, course announcements, instructional videos, discussion prompts, instructor discussion replies and feedback, assignment instructions, and assignment feedback. Findings indicate that direct instruction was the most prominent category, followed by facilitating learning and instructional design and organization,

Online student engagement remains a persistent challenge in higher education, particularly in people-centered fields like Guidance and Counselling, where learning traditionally relies on interpersonal interaction and experiential practice. This design-based study “Do Interactive Technologies Enhance Online Students’ Engagement? Insights from a Post-Graduate Guidance and Counselling Course” examines how three widely accessible interactive technologies—Padlet, Google Docs, and video-embedded quizzes—support postgraduate counselling students’ engagement in a fully online course at a regional Australian university. Using pre- and post-surveys grounded in Redmond et al.’s (2018) online engagement framework, the study explored how these tools shaped cognitive, behavioral, emotional, social, and collaborative engagement. Results indicate that while students viewed technology as essential to both their current learning and future professional practice.

Subjective wellbeing (SWB) is closely tied to students’ academic engagement, motivation, and mental health, yet little is known about how SWB is shaped by social relationships in fully online university programs. The next paper, “The Role of Social Relationships with Peers and Teachers for Undergraduate Students’ Subjective Wellbeing in the Context of University Synchronous Online Learning”, examines how undergraduate students enrolled in a synchronous online program perceive the role and quality of their relationships with teachers and peers in relation to their SWB. Eight semi-structured interviews with second-year computer science students were analyzed using thematic analysis. Findings highlight the

centrality of teacher–student relationships for students’ sense of support, security, and emotional wellbeing.

As colleges and universities expand online and blended offerings, many instructors continue to report uncertainty, workload strain, and reduced confidence when transitioning from face-to-face to online teaching. To better understand these challenges, “Like Throwing Darts at a Dartboard: A Literature Synthesis of Higher Education Instructors’ Interactions in the Transition to Online Teaching” analyzes findings from 31 empirical studies published between 2010 and 2022 that document higher education instructors’ experiences as novice online teachers. Using Anderson’s (2003) model of educational interactions as an analytical lens, we examined qualitative evidence from more than 200 instructors across diverse institutions and disciplines. Two major domains shaped instructors’ experiences: teacher–content interactions and teacher–student interactions. Faculty described extensive time demands, the need for clearer course structure, challenges transferring face-to-face content to digital formats, and the design of new learning activities and media assets.

Asynchronous discussion boards are a core component of many online courses, yet instructors frequently struggle to elicit meaningful student participation or deep learning. The action research study “TiLTing the Discussion Board: Rethinking the Purpose of Online Discussion in an Online GE Writing Course” examines how the Transparency in Learning and Teaching (TiLT) framework can be used to redesign asynchronous discussions in an online undergraduate general education writing course. Using a multi-semester redesign process, data were collected from student work, discussion posts, peer responses, midterm check-in surveys, and Student Evaluations of Instruction across four course sections. Analysis showed that explicit discussion purposes, transparent grading criteria, and structured response guidelines (including the 3-2-1 feedback model) improved student performance, increased peer-to-peer interaction, and promoted indicators of deep learning such as questioning, perspective-taking, and reflective engagement.

Micro-credentials have rapidly emerged as flexible, skills-focused alternatives and supplements to traditional qualifications, gaining particular traction in online and digital learning environments. Despite accelerating global adoption, the field lacks a comprehensive synthesis that maps research trends, technological innovations, and implementation challenges. The next paper, “Towards a Future of Qualifications: A Systematic Review of Micro-Credentials” presents a systematic literature review of 205 publications indexed in Scopus and Web of Science, following PRISMA guidelines, and complemented by bibliometric, text-mining, and social network analysis techniques. Findings reveal five dominant impact areas: (1) the strategic positioning of micro-credentials for higher education; (2) workforce-aligned upskilling and reskilling through flexible curriculum models; (3) digital proof of skills and competencies enabled by technologies such as blockchain, digital badges, and AI-driven credentialing; (4) design, development, and institutional implementation frameworks; and (5) critiques and challenges related to quality assurance, accreditation, policy alignment, and standards.

Mobile learning continues to expand in higher education, yet the psychological and performance-related factors that shape students’ acceptance and use of mobile learning tools remain insufficiently understood. The next study, “Unraveling Factors Affecting Engineering

Students' Acceptance of Artificial Intelligence in Blended Learning Environment Context” examines how perceived enjoyment, self-efficacy, satisfaction, and learning performance influence students’ behavioral intentions to adopt mobile learning in a Vietnamese university context. Using a quantitative design, data were collected from 527 students and analyzed with structural equation modeling (PLS-SEM). Results show that learning performance is the strongest predictor of behavioral intention, highlighting the importance of demonstrable academic benefits for sustained adoption.

As online and blended formats become increasingly central to second-language instruction, there is a need to understand how learners—particularly adult migrants—experience bichronous models that combine synchronous and asynchronous online modalities. The next paper in this section, “An Exploration of Immigrant Students' Experiences with Bichronous Remote Teaching in the Context of Swedish as a Second Language Education” explores the perspectives of immigrant students enrolled in Swedish for Immigrants (SFI) courses who participated in intentionally designed bichronous online instruction. Drawing on thematic analysis of semi-structured group interviews (n = 10), the study identifies key benefits and challenges associated with the model. Students reported that synchronous sessions supported listening comprehension, speaking practice, and immediate teacher feedback, while asynchronous work enhanced grammar, writing, and self-paced learning. However, challenges emerged around peer interaction, real-time communication anxiety, limited digital competence, and the self-regulation demands of autonomous study.

Developing critical reading skills in English as a Foreign Language (EFL) courses remains a persistent challenge in online learning environments, where opportunities for interaction and deep engagement vary widely. The mixed-methods study, “Virtual Literature Circle: Fostering Critical Reading Skill, Collaborative Learning, and Learning Outcomes for EFL Students” examines how Virtual Literature Circles (VLCs) foster critical reading development, collaborative learning processes, and student engagement among 25 EFL students enrolled in a Critical Reading course at an Indonesian university. Quantitative data from structured questionnaires revealed notable gains in students’ confidence, analytical ability, and engagement, while qualitative interviews illuminated the mechanisms underlying these outcomes.

Special thanks to Patrick R. Lowenthal, Boise State University, Mary F. Rice, University of New Mexico, Robert L. Moore University of Florida and Eric S. Belt University of Maryland for their work in identifying and curating papers in the AERA Conference from the Online Learning Special Interest Group. We also thank the authors, reviewers, and the entire OLC/OLJ editorial team for their countless contributions to this issue.

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# Understanding EFL Students' Adoption of Generative AI for English Learning: An Integrated UTAUT2 Model and Self-Determination Theory

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## Abstract

Despite the increasing use of generative artificial intelligence (GenAI) tools among students, limited research has examined the underlying mechanisms guiding their adoption in English as a Foreign Language (EFL) education. Drawing on the unified theory of acceptance and use of technology 2 (UTAUT2) and self-determination theory (SDT), this study examines the factors shaping Indonesian EFL students' intention and actual use of GenAI for English learning. Using a cross-sectional survey design, data were collected using an online questionnaire from 462 EFL students at three private universities in Indonesia and analyzed with the partial least squares structural equation modeling (PLS-SEM) using SmartPLS 4. The results indicated that performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, habit, autonomy, and relatedness significantly impacted EFL students' intention to adopt GenAI for English learning. While competence did not significantly influence behavioral intention, both the SDT components (autonomy, competence, and relatedness) and behavioral intention were predictors of actual usage. The integrated framework explained a high proportion of variance ( $R^2 = 83.1\%$  for behavioral intention;  $R^2 = 77.1\%$  for actual use). These insights advance understanding of the technological and motivational determinants of GenAI adoption in EFL education and offer evidence-based direction for designing effective, equitable, and ethically responsible AI-supported English learning practices.

**Keywords:** EFL students; English learning; Generative AI; SDT; UTAUT2

Surachmi, S. W., Solihati, T. A., Rahmatika, L., Musdalifah, Islam, M. M., & Haryanto, S. (2025). Understanding EFL Students' Adoption of Generative AI for English Learning: An Integrated UTAUT2 Model and Self-Determination Theory, *Online Learning*, 29(4), 311-340. <https://doi.org/10.24059/olj.v29i4.5129>



## Introduction

As digital advancements continue to reshape education, the ability to effectively utilize cutting-edge technologies has become vital for language students. This transformation includes the rising incorporation of generative artificial intelligence (GenAI) applications into various educational contexts. Within English as a foreign language (EFL) learning, widely used GenAI platforms like ChatGPT, Grammarly, and Quillbot offer personalized linguistic input, instant feedback, and adaptive correction, which collectively foster improved writing fluency, greater confidence, and enhanced learner autonomy (Bae & Bozkurt, 2024; Ho, 2024; Sarwanti et al., 2024). These tools are particularly valuable in resource-limited regions such as Southeast Asia, where many EFL students depend on them outside formal classrooms. In Indonesia, where mobile access is widespread but systematic GenAI use is nascent, students increasingly rely on these tools to develop writing, grammar, and speaking skills (Azwar & Jayanti, 2025; Laksana et al., 2024; Waziana et al., 2024). They effectively bridge language skill gaps by offering timely and reliable support. Despite their growing use, empirical study on what drives GenAI adoption in non-Western English as a Foreign Language (EFL) education remains limited.

Most prior investigations into educational technology adoption have been anchored in externalist models such as the technology acceptance model (TAM) (Davis, 1989) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). Although these frameworks have proven effective in explaining early adoption, the application of existing technology acceptance models remains limited in comprehensively addressing specific factors that influence the use of GenAI in EFL education. UTAUT2, an expansion of the original framework, introduced additional constructs such as hedonic motivation, price value, and habit to better align with consumer technology behaviors (Venkatesh et al., 2012). However, this model remains grounded in extrinsic drivers and still lacks the motivational depth needed to capture students' self-determined engagement with autonomous technologies.

Self-determination theory (SDT), in contrast, provides a robust psychological framework to explain intrinsic motivation, emphasizing autonomy, competence, and relatedness as essential to sustained behavior (Deci & Ryan, 2000; Ryan & Deci, 2020). In educational contexts, SDT has been shown to explain students' proactive engagement with technology-enhanced environments where external control is minimal (Chai et al., 2022). This makes it highly applicable to GenAI contexts, where students independently decide how, when, and why to engage with GenAI like ChatGPT. Empirical studies have highlighted the synergy between technology acceptance models and SDT in various domains, including mobile learning (Alowayr & Al-Azawei, 2021; Şahin & Yildiz, 2024; Şahin, 2025), massive open online courses (MOOCs) (Alharbi, 2023), mobile-assisted vocabulary learning application (Han & Chen, 2024), communicational artificial intelligence (Cortez et al., 2024), e-learning environments (Osei et al., 2022), and large language models (Wang & Reynolds, 2024).

However, empirical study integrating UTAUT2 and SDT in GenAI adoption within EFL education remains limited. Existing study often emphasized on behavioral intention, overlooking the combined impact of intrinsic and extrinsic factors on both intention and actual use. Although some studies (Alowayr & Al-Azawei, 2021; Wang & Reynolds, 2024; Yakubu et al., 2025) address this intersection, they largely focus on behavioral intention without measuring actual usage. As Zheng et al. (2024) and Zhao et al. (2025) caution, behavioral intention alone

may not predict actual use, particularly for emerging, self-directed technologies. Including actual use as an outcome variable is essential to understanding sustained engagement and verifying whether initial intention materializes into regular use, a dimension often overlooked in educational technology research (Strzelecki, 2024). This study addresses a documented gap in educational technology study by integrating UTAUT2 and SDT to examine the technological and psychological factors influencing Indonesian EFL students' intention and actual use of GenAI for English learning. The following research questions guide the inquiry:

- (1) Which UTAUT2 factors significantly influence EFL students' intention to adopt GenAI for English learning?
- (2) To what extent do SDT variables influence EFL students' intention and actual use of GenAI?
- (3) To what extent does behavioral intention predict the actual use of GenAI among EFL students in higher education?

By answering these questions, the study offers a theoretically and empirically validated framework for understanding GenAI adoption and use in EFL education. Its results generate practical, pedagogical, and policy insights that can guide educators, institutions, and policymakers in designing effective, equitable, and ethically informed approaches to integrating GenAI into EFL education, particularly in under-resourced contexts.

## Literature Review

### *UTAUT2*

Developed by Venkatesh et al. (2003), UTAUT has been extensively employed as a theoretical framework to understand how individuals accept new technologies across educational, organizational, and consumer domains. This model synthesizes constructs from eight foundational theories, including the technology acceptance model, the theory of planned behavior, and the diffusion of innovations theory. The original UTAUT framework identifies four constructs (e.g., performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC)) as predictors of behavioral intention (BI), which in turn influences actual use (AU). To better reflect the consumer use of technology, Venkatesh et al. (2012) later extended the model into UTAUT2, which added three new constructs: hedonic motivation (HM), price value (PV), and habit (HT). This revised model significantly improved the explanatory power of UTAUT in informal, consumer, and educational settings. In the current study, price value is intentionally excluded, as most GenAI tools used by EFL students such as ChatGPT, Grammarly, Quillbot, and Gemini are either free or provided through institutional access. Therefore, the model focuses on six core UTAUT2 constructs to assess how these factors shape EFL students' BI and AU to adopt GenAI for English learning.

A growing number of studies affirm UTAUT2's effectiveness in explaining students' use of educational technologies. For instance, Nikolopoulou et al. (2020) integrated UTAUT2 to explore mobile phones, revealing that SI, HM, and HT significantly influenced students' BI to use the technology, with habit being the strongest influence. These results are supported by

scholars (e.g., Strzelecki, 2024; Zheng et al., 2025), who identify HT as the primary factor driving students' adoption of ChatGPT and e-learning. A study by Arthur et al. (2025) reported that PE, EE, SI, and HM were significant predictors of students' BI to use ChatGPT, with HM being the strongest predictor. Additionally, studies by Grassini et al. (2024) and Zheng et al. (2024) identified PE as the most influential construct affecting BI toward GenAI tools such as ChatGPT.

Building on the UTAUT2 framework, researchers have integrated various context-specific constructs to tailor the model to emerging technologies and diverse learner profiles. For instance, Zacharis and Nikolopoulou (2022) introduced learning value into UTAUT2, finding it to be a significant contributor alongside traditional UTAUT2 factors in predicting e-learning adoption. In a study on the metaverse, Al-Adwan and Al-Debei (2024) added personal innovativeness (PI) in IT to the model, demonstrating the predictive power of PE, EE, FC, HM, PV, and PI in shaping Gen Z students' intention to adopt immersive technologies in higher education. Similarly, Strzelecki (2024) included PI in his adaptation of UTAUT2, emphasizing its significant role along with SI and HM, and other core constructs in explaining ChatGPT adoption among university students. In further modifications, Amin et al. (2025) added perceived knowledge of ChatGPT and trust, illustrating how UTAUT2 remains versatile and predictive when applied to emerging digital tools. Among the most relevant studies for the current research, Zhao et al. (2025) applied the complete UTAUT2 model including PV to investigate Chinese EFL students' adoption of translation technologies. They found that all seven UTAUT2 constructs significantly predicted BI, further validating the model's utility in language-learning contexts. These studies collectively demonstrate the robustness of UTAUT2 in predicting students' technological adoption across different contexts.

### ***SDT***

SDT (Deci and Ryan, 1985; 2000) provides a robust framework for understanding individuals' intrinsic and extrinsic motivations to engage in behaviors, including the use of educational technology. Central to SDT are three essential psychological needs: autonomy (AUTO), competence (COMP), and relatedness (REL). When these needs are satisfied, individuals are more likely to demonstrate higher motivation, engagement, and persistence in tasks. In technology-enhanced learning environments, especially those involving self-directed tools like GenAI, SDT has emerged as a critical lens to explain why students voluntarily choose to integrate such tools into their academic routines (Zogheib & Zogheib, 2024).

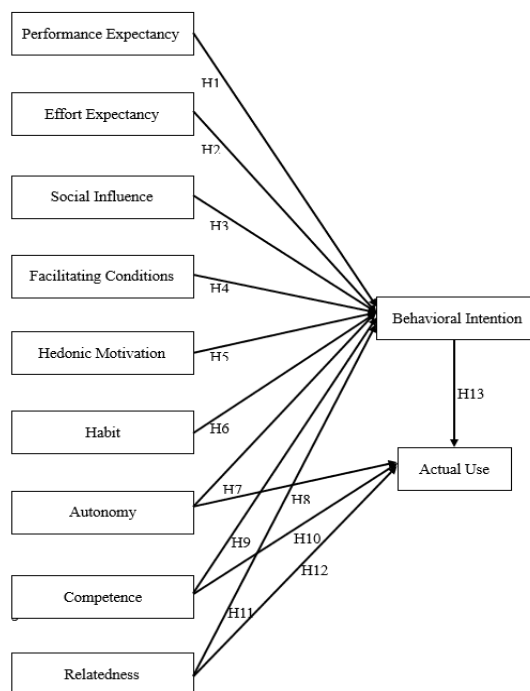
Several studies have highlighted SDT's relevance in explaining students' motivation and engagement in educational settings. For instance, Han and Chen (2024) explored the acceptance of mobile-assisted vocabulary learning applications among Chinese EFL students using TAM and SDT and reported that COMP strongly influenced BI. Supporting this, Raman et al. (2022) further supported this view by examining students' intention to adopt Moodle-based learning, showing that both AUTO and COMP were strong predictors of students' BI. Meanwhile, scholars (e.g., Şahin, 2025; Şahin and Yildiz, 2024; Xie et al., 2023) reported that COMP and REL significantly influenced the acceptance of autonomous vehicles and mobile learning platforms. Cortez et al. (2024) further demonstrated that AUTO and REL significantly predicted BI in AI-integrated learning environments. Expanding on this, Osei et al. (2022) examined e-

learning adoption during the COVID-19 pandemic and found that all three core SDT components had significant effects on both BI and AU.

Despite its proven relevance, the empirical application of SDT in studies examining GenAI adoption remains relatively limited, particularly within the EFL educational domain. While models like UTAUT2 account for external factors, they do not fully capture students' internal motivations. Recent studies have begun to bridge this theoretical gap. For example, Alowayr and Al-Azawei (2021) integrated UTAUT, expectation confirmation, and SDT to investigate students' acceptance of mobile learning and found that AUTO significantly predicted BI. Similarly, Alharbi (2023) investigated Saudi students' intentions and AU of MOOCs by combining SDT, UTAUT, and cognitive evaluation theory, and found that all three SDT components significantly influenced BI. Wang and Reynolds (2024) took a similar approach by merging SDT with UTAUT to explore students' use of large language models for vocabulary development. Their research highlighted how psychological needs interact with technological perceptions to shape BI. However, such work is still scarce and often lacks direct focus on EFL education navigating GenAI tools in under-resourced educational settings. Therefore, this study aims to contribute to the existing literature by integrating SDT with UTAUT2 to examine how both psychological needs and technological perceptions jointly influence Indonesian EFL students' BI and AU of GenAI for English learning. By bridging these theoretical frameworks, the study enhances understanding of the key factors driving GenAI adoption in EFL education.

### ***Research Model and Hypothesis Development***

**Figure 1**  
*Proposed Framework*



This study integrates six items from UTAUT2 and three items from SDT to investigate behavioral intention and actual use of GenAI for English learning among Indonesian EFL students in higher education, as shown in Figure 1. The following subsections detail the development of the study's hypotheses.

### Performance Expectancy

Performance expectancy is the belief that using technology will lead to improved job performance (Venkatesh et al., 2003). In this study, it denotes how strongly EFL students believe GenAI tools can support their academic achievement in English learning, particularly for tasks such as translation, comprehension, and improving writing. Previous studies in various technology have reported that performance expectancy significantly predicts students' intentions to adopt new tools, such as mobile learning (Lutfi et al., 2022), MOOCs (Meet et al., 2022), metaverse (Al-Adwan & Al-Debel, 2024), e-learning (Zheng et al., 2025), large language models (Wang & Reynolds (2024), GenAI like ChatGPT (Amin et al., 2025; Budhathoki et al., 2024; Lai et al., 2024; Strzelecki, 2024; Xu & Thien, 2025; Yakubu et al., 2025; Zheng et al., 2024), and translation technology (Zhao et al., 2025). Hence, the following hypothesis is proposed:

H1: PE directly and positively predicts BI.

### Effort Expectancy

Effort expectancy refers to the degree to which an individual perceives a new technology as being straightforward and effortless to use (Venkatesh et al., 2003). Within the context of GenAI for English learning, this pertains to how effortlessly EFL students can use the tools, including the perceived ease of navigation and the straightforward application of features to assist with their language learning activities. Research has repeatedly demonstrated that effort expectancy significantly shapes intention to adopt technologies across platforms such as Moodle (Raman et al., 2022), mobile applications (Lutfi et al., 2022), MOOCs (Alharbi, 2023), tablet-based learning (Arthur et al., 2023), and GenAI applications (Budhathoki et al., 2024; Lai et al., 2024; Strzelecki, 2024; Xu & Thien, 2025; Wang & Reynolds, 2024; Yakubu et al., 2025; Zhao et al., 2025). Accordingly, this hypothesis is proposed:

H2: EE directly and positively predicts BI.

### Social Influence

Social influence refers to the extent to which individuals perceive that the views of important people around them affect their choice to embrace a new technology (Venkatesh et al., 2023; 2012; 2016). In this research, social influence focuses on how EFL students in higher education are influenced by the encouragement and advice of classmates, teachers, friends, and other key figures in their decision to incorporate GenAI into their English learning process. Previous studies have demonstrated the role of social influence in predicting behavior across various educational contexts, including mobile learning (Alowayr & Al-Azawei, 2021), e-learning (Zacharis & Nikolopoulou, 2022; Zheng et al., 2025), MOOCs (Alharbi, 2023), tablet-based learning (Arthur et al., 2023), GenAI like ChatGPT and large language models (Abdi et al., 2025; Amin et al., 2025; Arthur et al., 2025; Budhathoki et al., 2024; Strzelecki, 2024; Xu &

Thien, 2025; Wang & Reynolds, 2024; Yakubu et al., 2025; Zheng et al., 2024), and translation technology (Zhao et al., 2025). In light of this, the study presents the following hypotheses:

H3: SI directly and positively predicts BI.

### Facilitating Conditions

Facilitating conditions are the perception that the necessary technical resources and support systems are in place to enable the effective use of new technology (Arthur et al., 2023; Venkatesh et al., 2012). In this study, facilitating conditions are described as the perceptions of EFL students in higher education of having access to the required resources, technical assistance, and infrastructure that support the effective use of GenAI tools for English learning. These factors are crucial for evaluating technology adoption, as they have a strong impact on students' intentions to use technology in higher education, including, mobile learning (Alowayr & Al-Azawei, 2021; Lutfi et al., 2022), metaverse (Al-Adwan & Al-Debei, 2024), tablet-based learning (Arthur et al., 2023), MOOCs (Alharbi, 2023; Meet et al., 2022), e-learning (Zheng et al., 2025), ChatGPT (Arthur et al., 2025), and translation technology (Zhao et al., 2025). Drawing from these insights, the study presents the following hypothesis:

H4: FC directly and positively predicts BI.

### Hedonic Motivation

Venkatesh et al. (2012) define hedonic motivation as the degree to which individuals are motivated to use new technology for enjoyment or due to its novelty. In this study, hedonic motivation specifically refers to the enjoyment EFL students experience when using GenAI tools to enhance their English language learning. Hedonic motivation has been a significant predictor in studies on MOOCs (Meet et al., 2022), the metaverse (Al-Adwan & Al-Debei, 2024), tablet learning (Arthur et al., 2023), and GenAI (Abdi et al., 2025; Faroughi et al., 2023; Strzelecki, 2024; Tan et al., 2024; Zheng et al., 2024). However, its impact has shown variability in some contexts (Grassini et al., 2024; Raza et al., 2022; Tseng et al., 2022). Considering these inconsistent outcomes, the following hypotheses are put forward:

H5: HM directly and positively predicts BI.

### Habit

Habit is defined as the extent to which the use of a particular technology becomes an automatic behavior, integrated into a person's daily routines (Venkatesh et al., 2012). In this study, habit is understood as the degree to which students consistently incorporate GenAI into their academic routines for English learning. Recent research suggests that habit has a significant effect on students' behavioral intention to adopt GenAI such as ChatGPT (Grassini et al., 2024; Habibi et al., 2023; Salifu et al., 2024; Strzelecki, 2024; Zheng et al., 2024), e-learning (Zacharis & Nikolopoulou, 2022; Zheng et al., 2025), and translation technology (Zhao et al., 2025). In contrast, habit was found to have no notable influence on behavioral intention in some studies (Arthur et al., 2023; Arthur et al., 2025; Meet et al., 2022). Given these mixed outcomes in prior research, this study formulates the following hypotheses:

H6: HT directly and positively predicts BI.

### Autonomy

Autonomy is defined as an individual's desire to have their behavior regulated and controlled (Ryan & Deci, 2020). In this study, it relates to students' motivation to use GenAI tools as a way to independently manage their English learning. Studies have confirmed autonomy as a strong determinant in learning systems like Moodle (Raman et al., 2022), mobile learning (Alowayr & Al-Azawei, 2021; Şahin, 2025), MOOCs (Alharbi, 2023), large language models (Wang & Reynolds, 2024), and AI platforms (Chai et al., 2022; Cortez et al., 2024). Autonomy also influences actual use (Osei et al., 2022). Thus, the hypotheses are:

H7: AUTO directly and positively predicts BI.

H8: AUTO directly and positively predicts AU.

### Competence

Competence is defined as the sense of confidence individuals have in their capability to successfully carry out a given task (Deci & Ryan, 1985). In this research, it involves students' belief in their ability to use GenAI tools effectively for English learning. This belief has been shown to predict technology adoption across learning platforms such as Moodle (Raman et al., 2022), e-learning systems (Osei et al., 2022), MOOCs (Alharbi, 2023), mobile tools (Şahin & Yildiz, 2024), and large language models (Wang & Reynolds, 2024). It also influences actual use behavior (Osei et al., 2022). Based on these results, the following hypotheses are presented:

H9: COMP directly and positively predicts BI.

H10: COMP directly and positively predicts AU.

### Relatedness

Relatedness captures the need to feel socially connected (Ryan & Deci, 2020). For this study, it reflects EFL students' sense of belonging and connection within their learning environment, which can shape their engagement with GenAI tools. Relatedness has been shown to influence behavioral intention in MOOCs (Alharbi, 2023), e-learning (Osei et al., 2022), autonomous systems (Xie et al., 2023), AI platforms (Cortez et al., 2024), and mobile tools (Şahin & Yildiz, 2024). It has also been linked to actual technology use (Osei et al., 2022). Building on previous research, the following hypotheses are proposed:

H11: REL directly and positively predicts BI.

H12: REL directly and positively predicts AU.

### Behavioral Intention and Actual Use

Behavioral intention reflects users' willingness to adopt a technology, while actual use represents the practical application of that intention (Venkatesh et al., 2003; 2012). In this study,

behavioral intention captures students' willingness to engage with GenAI tools for academic purposes, and AU denotes how frequently and effectively they actually use them. Prior studies on mobile tools (Nikolopoulou et al., 2020), e-learning (Osei et al., 2022), ChatGPT (Alharbi, 2023; Amin et al., 2025; Budhathoki et al., 2024; Strzelecki, 2024; Zheng et al., 2024), and translation tools (Zhao et al., 2025) have confirmed that intention reliably predicts usage. Given that behavioral intention is widely regarded as a predictor of actual use in GenAI, the following hypotheses are proposed:

H13: BI directly and positively predicts AU.

## Methods

### *Participants*

This study recruited undergraduate students enrolled in English departments at three private universities located in Central Java, West Java, and South Sulawesi, Indonesia. Participants were selected using a convenience sampling technique. As shown in Table 1, the final sample consisted of 462 EFL students. The gender distribution revealed a notable imbalance, with 68.2% identifying as female and 31.8% as male. This pattern aligns with typical demographic trends in English departments at Indonesian universities, where female students generally outnumber males. Participants' ages ranged from 17 to above 22 years, with 62.1% falling within the 17–21 age group, and the remaining 37.9% being 22 or older. The sample also reflected a spread across academic levels, with 37.9% in their first year, 29.2% in their second year, and 32.9% in their third year.

**Table 1**

### *Participants' Information*

|                   | Number | %    |
|-------------------|--------|------|
| Gender            |        |      |
| Male              | 147    | 31.8 |
| Female            | 315    | 68.2 |
| Age               |        |      |
| 17-21 years       | 287    | 62.1 |
| 22 years and over | 175    | 37.9 |
| Study year        |        |      |
| First             | 175    | 37.9 |
| Second            | 135    | 29.2 |
| Third             | 152    | 32.9 |

### *Instrument*

The questionnaire was structured into three main sections. The first section gathered demographic details from participants, such as their gender, age, and study year. The second section focused on constructs related to students' technology acceptance measured six factors from the UTAUT2 model developed by Venkatesh et al. (2012). These constructs included PE,



EE, SI, FC, HM, and HT. The items were adapted to the context of GenAI in English learning (see appendix), with reference to updated findings from Zheng et al. (2024), ensuring the scale remained contextually relevant and theoretically grounded. These constructs helped in identifying the technological factors that influence students' behavioral intention to adopt GAI tools. The third section focused on motivational factors based on SDT including 4 items autonomy, 3 items competence, and 4 items relatedness was adapted from Hew and Kadir (2016). The questionnaire employed a five-point Likert scale, ranging from strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, to strongly agree = 5. Since the research took place in Indonesia, a back-translation method was used to validate the instrument. One researcher translated the items from English into Indonesian, while a second researcher independently translated them back into English to ensure accuracy in language and cultural relevance.

To enhance the content validity of the instrument, the questionnaire was reviewed by two specialists in technology-assisted language learning. Their feedback focused on the relevance, clarity, and alignment of the items with the study's objectives and theoretical framework. Suggestions from these experts were carefully incorporated into the final version of the instrument. Prior to launching the formal survey, a pilot test was conducted with 15 undergraduate students who matched the profile of the target respondents. This stage was essential for identifying any ambiguous language, confusing instructions, or technical issues related to the online survey platform. Following the feedback, a few subtle edits were applied to make the questionnaire more understandable and well-structured. After incorporating expert and student feedback, the final version of the questionnaire was distributed through Google Forms, allowing easy access for participants and ensuring efficient data collection.

### ***Data Collection***

This study adopted a single cross-sectional design, collecting data through Google Forms (an online survey platform) between October and November 2024. The survey link was distributed to students via WhatsApp group class from three lecturers in different private universities. Before participating, students were provided with an informed consent form that outlined the study's objectives, procedures, and their right to withdraw at any time. The survey took approximately seven to ten minutes to complete, and participation was entirely voluntary. To ensure confidentiality, all responses remained anonymous, and pseudonyms were assigned throughout the study. Survey questionnaires were distributed to 600 students across three universities, resulting in 470 returned responses. After excluding 8 participants who reported no prior experience with ChatGPT, a total of 462 valid questionnaires were included in the analysis. This corresponds to a response rate of approximately 78.3%.

### ***Data Analysis***

In this study, SmartPLS 4 was utilized alongside the partial least squares structural equation modeling (PLS-SEM) technique for data analysis. The evaluation process followed the two-step approach proposed by Hair et al. (2022), beginning with an assessment of the measurement model, followed by an evaluation of the structural model. To ensure the reliability of the data, common method bias (CMB) was first checked using the Variance Inflation Factor (VIF). The measurement model was then evaluated in the first step to verify its internal consistency and validity. Once these criteria were met, the second step focused on evaluating

the structural model. Finally, the predictive power of the model was assessed using PLS Predict (Shmueli et al., 2019), providing a thorough evaluation of the model's performance.

## Results

### *Common Method Bias*

This study relied on an online self-reported survey using a cross-sectional design to collect data at a single point in time, which may introduce common method variance and potentially inflate the observed relationships between variables. To assess CMB, VIF was examined in this study. According to Kock (2015), VIF values below 3.3 are considered acceptable, indicating no significant CMB and multicollinearity issues. As shown in Table 2, all VIF values fell below the 3.3 threshold ranging from 1.334 to 2.836, confirming that CMB and multicollinearity were not a concern in this study.

**Table 2**

*Collinearity Statistics (VIF)*

|      | PE | EE | SI | FC | HM | HT | AUTO | COMP | REL | BI    | AU    |
|------|----|----|----|----|----|----|------|------|-----|-------|-------|
| PE   |    |    |    |    |    |    |      |      |     | 2.548 |       |
| EE   |    |    |    |    |    |    |      |      |     | 2.100 |       |
| SI   |    |    |    |    |    |    |      |      |     | 2.836 |       |
| FC   |    |    |    |    |    |    |      |      |     | 2.554 |       |
| HM   |    |    |    |    |    |    |      |      |     | 1.383 |       |
| HT   |    |    |    |    |    |    |      |      |     | 2.112 |       |
| AUTO |    |    |    |    |    |    |      |      |     | 2.754 | 2.501 |
| COMP |    |    |    |    |    |    |      |      |     | 2.481 | 2.142 |
| REL  |    |    |    |    |    |    |      |      |     | 1.379 | 1.334 |
| BI   |    |    |    |    |    |    |      |      |     |       | 1.891 |
| AU   |    |    |    |    |    |    |      |      |     |       |       |

### *Measurement Model Evaluation*

The measurement model was assessed to ensure that each indicator reliably and validly measured its intended construct by evaluating reliability, convergent validity, and discriminant validity. Reliability was confirmed by examining Cronbach's alpha and composite reliability (CR). As shown in Table 3, Cronbach's alpha values ranged from 0.806 to 0.955, and CR values ranged from 0.881 to 0.947, both surpassing the acceptable threshold of 0.70. Convergent validity was established by evaluating factor loadings and average variance extracted (AVE). All factor loadings ranged from 0.774 to 0.951, surpassing the recommended value of 0.70, while AVE values ranged from 0.648 to 0.857, all above the 0.50 benchmark (Hair et al., 2022). These results indicate that the measurement items possess adequate reliability and convergent validity.

To assess discriminant validity, both the Fornell-Larcker criterion and cross-loadings were employed. The Fornell-Larcker criterion, presented in Table 4, demonstrated that the

square root values of the AVE for each construct (0.887, 0.878, 0.870, 0.849, 0.926, 0.883, 0.845, 0.865, 0.862, 0.821, and 0.805) consistently exceeded the correlations between constructs, confirming adequate discriminant validity across all constructs. Additionally, the cross-loading analysis in Table 5 demonstrated that each indicator loaded higher on its respective construct than on any other construct, providing further evidence for discriminant validity (Hair et al., 2022). These results demonstrate that the measurement model meets the standards for reliability, convergent validity, and discriminant validity, supporting its use in further analysis.

**Table 3**

*Measurement Model Assessment*

| Construct | Item  | Mean  | SD    | Factor Loading | Cronbach's Alpha | CR    | AVE   |
|-----------|-------|-------|-------|----------------|------------------|-------|-------|
| PE        | PE1   | 0.891 | 0.011 | 0.891          | 0.910            | 0.937 | 0.787 |
|           | PE2   | 0.894 | 0.011 | 0.894          |                  |       |       |
|           | PE3   | 0.890 | 0.011 | 0.890          |                  |       |       |
|           | PE4   | 0.874 | 0.014 | 0.874          |                  |       |       |
| EE        | EE1   | 0.878 | 0.013 | 0.879          | 0.901            | 0.931 | 0.770 |
|           | EE2   | 0.877 | 0.011 | 0.876          |                  |       |       |
|           | EE3   | 0.867 | 0.014 | 0.867          |                  |       |       |
|           | EE4   | 0.888 | 0.010 | 0.888          |                  |       |       |
| SI        | SI1   | 0.863 | 0.022 | 0.863          | 0.893            | 0.926 | 0.758 |
|           | SI2   | 0.886 | 0.011 | 0.886          |                  |       |       |
|           | SI3   | 0.892 | 0.011 | 0.892          |                  |       |       |
|           | SI4   | 0.839 | 0.019 | 0.839          |                  |       |       |
| FC        | FC1   | 0.867 | 0.018 | 0.866          | 0.806            | 0.886 | 0.721 |
|           | FC2   | 0.889 | 0.013 | 0.889          |                  |       |       |
|           | FC3   | 0.788 | 0.033 | 0.790          |                  |       |       |
| HM        | HM1   | 0.875 | 0.011 | 0.875          | 0.916            | 0.947 | 0.857 |
|           | HM2   | 0.950 | 0.006 | 0.951          |                  |       |       |
|           | HM3   | 0.950 | 0.006 | 0.950          |                  |       |       |
| HT        | HT1   | 0.884 | 0.014 | 0.883          | 0.906            | 0.934 | 0.780 |
|           | HT2   | 0.878 | 0.019 | 0.879          |                  |       |       |
|           | HT3   | 0.861 | 0.017 | 0.861          |                  |       |       |
|           | HT4   | 0.908 | 0.011 | 0.909          |                  |       |       |
| AUTO      | AUTO1 | 0.830 | 0.025 | 0.830          | 0.867            | 0.909 | 0.715 |
|           | AUTO2 | 0.870 | 0.019 | 0.870          |                  |       |       |
|           | AUTO3 | 0.863 | 0.017 | 0.864          |                  |       |       |
|           | AUTO4 | 0.817 | 0.020 | 0.817          |                  |       |       |
| COMP      | COMP1 | 0.818 | 0.025 | 0.819          | 0.832            | 0.899 | 0.748 |
|           | COMP2 | 0.879 | 0.011 | 0.879          |                  |       |       |
|           | COMP3 | 0.895 | 0.011 | 0.895          |                  |       |       |

|     |      |       |       |       |       |       |       |
|-----|------|-------|-------|-------|-------|-------|-------|
| REL | REL1 | 0.774 | 0.036 | 0.774 | 0.884 | 0.920 | 0.743 |
|     | REL2 | 0.903 | 0.014 | 0.904 |       |       |       |
|     | REL3 | 0.903 | 0.012 | 0.903 |       |       |       |
|     | REL4 | 0.860 | 0.020 | 0.860 |       |       |       |
| BI  | BI1  | 0.818 | 0.016 | 0.819 | 0.838 | 0.892 | 0.673 |
|     | BI2  | 0.807 | 0.018 | 0.808 |       |       |       |
|     | BI3  | 0.831 | 0.016 | 0.831 |       |       |       |
|     | BI4  | 0.825 | 0.016 | 0.825 |       |       |       |
| AU  | AU1  | 0.808 | 0.018 | 0.808 | 0.819 | 0.881 | 0.648 |
|     | AU2  | 0.799 | 0.020 | 0.799 |       |       |       |
|     | AU3  | 0.814 | 0.019 | 0.814 |       |       |       |
|     | AU4  | 0.798 | 0.020 | 0.799 |       |       |       |

**Table 4***Discriminant Validity (Fornell-Lacker criterion)*

|      | PE           | EE           | SI           | FC           | HM           | HT           | AUTO         | COMP         | REL          | BI           | AU           |
|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| PE   | <b>0.887</b> |              |              |              |              |              |              |              |              |              |              |
| EE   | 0.645        | <b>0.878</b> |              |              |              |              |              |              |              |              |              |
| SI   | 0.675        | 0.686        | <b>0.870</b> |              |              |              |              |              |              |              |              |
| FC   | 0.639        | 0.593        | 0.695        | <b>0.849</b> |              |              |              |              |              |              |              |
| HM   | 0.441        | 0.457        | 0.363        | 0.378        | <b>0.926</b> |              |              |              |              |              |              |
| HT   | 0.508        | 0.492        | 0.576        | 0.538        | 0.403        | <b>0.883</b> |              |              |              |              |              |
| AUTO | 0.490        | 0.501        | 0.639        | 0.630        | 0.336        | 0.631        | <b>0.845</b> |              |              |              |              |
| COMP | 0.441        | 0.505        | 0.597        | 0.550        | 0.362        | 0.637        | 0.719        | <b>0.865</b> |              |              |              |
| REL  | 0.424        | 0.303        | 0.309        | 0.431        | 0.270        | 0.383        | 0.405        | 0.319        | <b>0.862</b> |              |              |
| BI   | 0.845        | 0.686        | 0.727        | 0.712        | 0.561        | 0.615        | 0.625        | 0.549        | 0.483        | <b>0.821</b> |              |
| AU   | 0.805        | 0.572        | 0.648        | 0.642        | 0.462        | 0.616        | 0.735        | 0.678        | 0.603        | 0.774        | <b>0.805</b> |

**Table 5***Discriminant Validity (Cross Loadings)*

|     | PE           | EE           | SI    | FC    | HM    | HT    | AUTO  | COMP  | REL   | BI    | AU    |
|-----|--------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| PE1 | <b>0.891</b> | 0.527        | 0.564 | 0.547 | 0.372 | 0.443 | 0.438 | 0.372 | 0.383 | 0.763 | 0.587 |
| PE2 | <b>0.894</b> | 0.578        | 0.640 | 0.598 | 0.386 | 0.466 | 0.479 | 0.386 | 0.370 | 0.754 | 0.605 |
| PE3 | <b>0.890</b> | 0.612        | 0.603 | 0.539 | 0.392 | 0.409 | 0.400 | 0.392 | 0.356 | 0.734 | 0.542 |
| PE4 | <b>0.874</b> | 0.572        | 0.589 | 0.584 | 0.415 | 0.483 | 0.421 | 0.415 | 0.394 | 0.747 | 0.562 |
| EE1 | 0.561        | <b>0.879</b> | 0.499 | 0.509 | 0.383 | 0.398 | 0.432 | 0.383 | 0.269 | 0.580 | 0.484 |
| EE2 | 0.590        | <b>0.876</b> | 0.534 | 0.520 | 0.392 | 0.441 | 0.425 | 0.392 | 0.261 | 0.603 | 0.504 |
| EE3 | 0.565        | <b>0.867</b> | 0.532 | 0.522 | 0.451 | 0.475 | 0.450 | 0.451 | 0.264 | 0.629 | 0.524 |

|       |       |              |              |              |              |              |              |              |              |              |              |
|-------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| EE4   | 0.546 | <b>0.888</b> | 0.509        | 0.529        | 0.375        | 0.409        | 0.450        | 0.375        | 0.268        | 0.593        | 0.493        |
| SI1   | 0.544 | 0.521        | <b>0.863</b> | 0.604        | 0.285        | 0.510        | 0.587        | 0.285        | 0.183        | 0.605        | 0.556        |
| SI2   | 0.681 | 0.554        | <b>0.886</b> | 0.614        | 0.358        | 0.486        | 0.556        | 0.358        | 0.353        | 0.690        | 0.609        |
| SI3   | 0.578 | 0.505        | <b>0.892</b> | 0.591        | 0.334        | 0.537        | 0.574        | 0.334        | 0.276        | 0.644        | 0.588        |
| SI4   | 0.534 | 0.474        | <b>0.839</b> | 0.611        | 0.280        | 0.473        | 0.508        | 0.280        | 0.253        | 0.584        | 0.497        |
| FC1   | 0.581 | 0.563        | 0.659        | <b>0.866</b> | 0.330        | 0.473        | 0.619        | 0.330        | 0.332        | 0.651        | 0.610        |
| FC2   | 0.558 | 0.515        | 0.612        | <b>0.889</b> | 0.335        | 0.449        | 0.579        | 0.335        | 0.371        | 0.629        | 0.566        |
| FC3   | 0.482 | 0.420        | 0.484        | <b>0.790</b> | 0.295        | 0.451        | 0.385        | 0.295        | 0.407        | 0.524        | 0.446        |
| HM1   | 0.432 | 0.441        | 0.361        | 0.360        | <b>0.875</b> | 0.361        | 0.276        | 0.875        | 0.225        | 0.542        | 0.431        |
| HM2   | 0.394 | 0.416        | 0.322        | 0.350        | <b>0.951</b> | 0.368        | 0.342        | 0.951        | 0.262        | 0.502        | 0.425        |
| HM3   | 0.394 | 0.409        | 0.321        | 0.337        | <b>0.950</b> | 0.388        | 0.317        | 0.950        | 0.264        | 0.509        | 0.425        |
| HT1   | 0.516 | 0.526        | 0.575        | 0.524        | 0.404        | <b>0.883</b> | 0.636        | 0.404        | 0.358        | 0.627        | 0.611        |
| HT2   | 0.407 | 0.390        | 0.441        | 0.430        | 0.377        | <b>0.879</b> | 0.512        | 0.377        | 0.355        | 0.526        | 0.523        |
| HT3   | 0.410 | 0.392        | 0.504        | 0.449        | 0.339        | <b>0.861</b> | 0.508        | 0.339        | 0.273        | 0.483        | 0.497        |
| HT4   | 0.446 | 0.409        | 0.502        | 0.485        | 0.291        | <b>0.909</b> | 0.553        | 0.291        | 0.359        | 0.514        | 0.529        |
| AUTO1 | 0.397 | 0.401        | 0.575        | 0.522        | 0.239        | 0.465        | <b>0.830</b> | 0.239        | 0.310        | 0.501        | 0.600        |
| AUTO2 | 0.449 | 0.499        | 0.531        | 0.551        | 0.316        | 0.554        | <b>0.870</b> | 0.316        | 0.357        | 0.558        | 0.646        |
| AUTO3 | 0.372 | 0.401        | 0.529        | 0.551        | 0.279        | 0.522        | <b>0.864</b> | 0.279        | 0.357        | 0.501        | 0.604        |
| AUTO4 | 0.435 | 0.387        | 0.528        | 0.508        | 0.299        | 0.586        | <b>0.817</b> | 0.299        | 0.344        | 0.548        | 0.632        |
| COMP1 | 0.296 | 0.350        | 0.462        | 0.383        | 0.267        | 0.590        | 0.553        | <b>0.819</b> | 0.259        | 0.401        | 0.542        |
| COMP2 | 0.447 | 0.486        | 0.548        | 0.556        | 0.355        | 0.485        | 0.654        | <b>0.879</b> | 0.340        | 0.538        | 0.645        |
| COMP3 | 0.388 | 0.463        | 0.533        | 0.472        | 0.309        | 0.593        | 0.651        | <b>0.895</b> | 0.219        | 0.472        | 0.562        |
| REL1  | 0.278 | 0.145        | 0.228        | 0.294        | 0.163        | 0.313        | 0.248        | 0.163        | <b>0.774</b> | 0.329        | 0.450        |
| REL2  | 0.346 | 0.225        | 0.246        | 0.389        | 0.202        | 0.279        | 0.365        | 0.202        | <b>0.904</b> | 0.428        | 0.532        |
| REL3  | 0.413 | 0.283        | 0.268        | 0.409        | 0.291        | 0.340        | 0.359        | 0.291        | <b>0.903</b> | 0.451        | 0.537        |
| REL4  | 0.409 | 0.368        | 0.318        | 0.384        | 0.264        | 0.388        | 0.408        | 0.264        | <b>0.860</b> | 0.443        | 0.552        |
| BI1   | 0.695 | 0.534        | 0.573        | 0.562        | 0.460        | 0.504        | 0.521        | 0.460        | 0.352        | <b>0.819</b> | 0.642        |
| BI2   | 0.697 | 0.553        | 0.619        | 0.585        | 0.430        | 0.485        | 0.480        | 0.430        | 0.378        | <b>0.808</b> | 0.610        |
| BI3   | 0.707 | 0.584        | 0.597        | 0.561        | 0.505        | 0.521        | 0.500        | 0.505        | 0.432        | <b>0.831</b> | 0.647        |
| BI4   | 0.674 | 0.582        | 0.598        | 0.630        | 0.444        | 0.507        | 0.550        | 0.444        | 0.421        | <b>0.825</b> | 0.640        |
| AU1   | 0.557 | 0.449        | 0.510        | 0.502        | 0.405        | 0.494        | 0.580        | 0.405        | 0.463        | 0.639        | <b>0.808</b> |
| AU2   | 0.534 | 0.451        | 0.533        | 0.508        | 0.353        | 0.517        | 0.577        | 0.353        | 0.470        | 0.628        | <b>0.799</b> |
| AU3   | 0.506 | 0.472        | 0.533        | 0.517        | 0.368        | 0.491        | 0.610        | 0.368        | 0.487        | 0.628        | <b>0.814</b> |
| AU4   | 0.488 | 0.469        | 0.512        | 0.542        | 0.363        | 0.482        | 0.600        | 0.363        | 0.521        | 0.597        | <b>0.799</b> |

### *Structural Model Evaluation*

To proceed with the analysis, the structural model was evaluated by computing the coefficient of determination ( $R^2$ ), SRMR, path coefficients, and effect sizes (Hair et al., 2022), following the validation of the measurement model. The analysis was conducted using Smart-PLS 4.0 software, applying the PLS algorithm with a subsample of 5,000 to compute and

present the path coefficients, t-values, and p-values for the structural model, as shown in Table 6.

According to Hair et al. (2022), the coefficient of determination ( $R^2$ ) values of 0.75, 0.50, and 0.25 are interpreted as indicating substantial, moderate, and weak explanatory power, respectively. In this study, the  $R^2$  values for behavioral intention and actual use were 0.831 and 0.771, respectively (refer to Figure 2), showing a substantial level of explanatory power for both constructs. To evaluate the model fit, the Standardized Root Mean Square Residual (SRMR) was calculated. The SRMR value of 0.050 in this study indicates that the proposed model fits the data well and is considered acceptable.

The structural model assessment results, presented in Table 6, indicate that 12 out of the 13 proposed hypotheses were supported. Specifically, PE ( $\beta = 0.469$ ,  $t = 14.770$ ,  $p = 0.000$ ), EE ( $\beta = 0.087$ ,  $t = 3.165$ ,  $p = 0.002$ ), SI ( $\beta = 0.120$ ,  $t = 3.488$ ,  $p = 0.000$ ), FC ( $\beta = 0.095$ ,  $t = 3.017$ ,  $p = 0.003$ ), HM ( $\beta = 0.160$ ,  $t = 6.950$ ,  $p = 0.000$ ), and HT ( $\beta = 0.072$ ,  $t = 2.714$ ,  $p = 0.007$ ) all had significant positive effects on BI, supporting hypotheses H1 through H6. Similarly, AUTO ( $\beta = 0.108$ ,  $t = 3.230$ ,  $p = 0.000$ ) and REL ( $\beta = 0.075$ ,  $t = 3.332$ ,  $p = 0.001$ ) were found to positively impact BI, thereby confirming hypothesis H7 and H11.

In contrast, COMP ( $\beta = -0.032$ ,  $t = 1.004$ ,  $p = 0.315$ ) had no significant effect on BI, resulting in the rejection of hypothesis H8. However, AUTO ( $\beta = 0.237$ ,  $t = 6.172$ ,  $p = 0.000$ ), COMP ( $\beta = 0.215$ ,  $t = 5.757$ ,  $p = 0.000$ ), and REL ( $\beta = 0.386$ ,  $t = 8.558$ ,  $p = 0.000$ ) all showed strong positive effects on AU, confirming hypotheses H9, H10, and H12. Additionally, the relationship between BI and AU was found to be statistically significant ( $\beta = 0.386$ ,  $t = 0.789$ ,  $p = 0.000$ ), thereby supporting hypothesis H13. These results emphasize that PE, motivational factors, and BI play a crucial role in determining AU among EFL students. Both extrinsic (UTAUT2) and intrinsic (SDT) factors jointly shape adoption behavior, indicating that EFL students' intentions effectively translate into actual use of GenAI for English learning.

The effect size ( $f^2$ ) is used to determine the unique predictive power of each exogenous construct. PE emerges as the strongest predictor of BI, with an effect size of  $f^2 = 0.512$ . Constructs such as SI ( $f^2 = 0.030$ ), FC ( $f^2 = 0.021$ ), HM ( $f^2 = 0.110$ ), HT ( $f^2 = 0.015$ ), AUTO ( $f^2 = 0.025$ ), EE ( $f^2 = 0.021$ ) and REL ( $f^2 = 0.024$ ) exhibited small effects on BI, indicating their complementary but less substantial roles in shaping behavioral intention. In terms of predicting AU, BI had a large effect ( $f^2 = 0.343$ ), while motivational and related constructs such as REL ( $f^2 = 0.208$ ), AUTO ( $f^2 = 0.097$ ), and COMP ( $f^2 = 0.094$ ) showed small to medium effects. Notably, COMP had a negligible effect on BI ( $f^2 = 0.002$ ), suggesting minimal influence on behavioral intention.

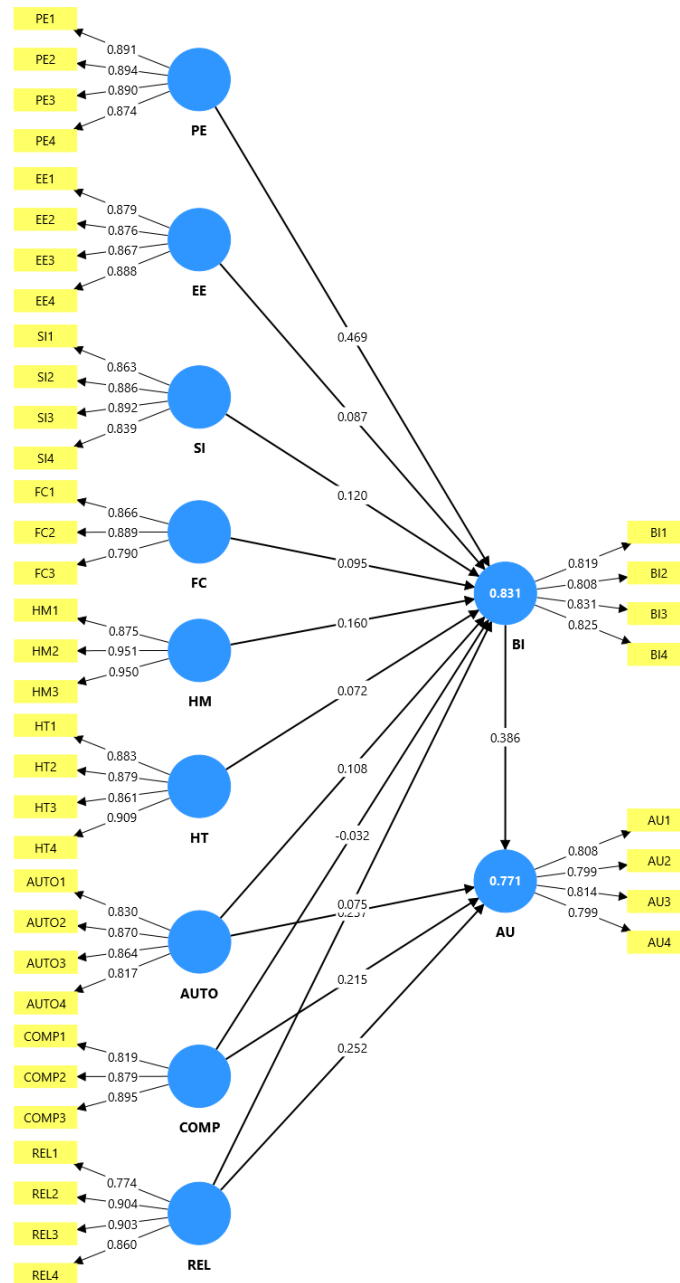
**Figure 2***Structural Model Results*

**Table 6***Structural Model Assessment*

| Hypotheses     | Path Coefficients | T statistics | p values | f <sup>2</sup> | Results |
|----------------|-------------------|--------------|----------|----------------|---------|
| H1: PE → BI    | 0.469             | 14.770       | 0.000    | 0.512          | Yes     |
| H2: EE → BI    | 0.087             | 3.165        | 0.002    | 0.021          | Yes     |
| H3: SI → BI    | 0.120             | 3.488        | 0.000    | 0.030          | Yes     |
| H4: FC → BI    | 0.095             | 3.017        | 0.003    | 0.021          | Yes     |
| H5: HM → BI    | 0.160             | 6.950        | 0.000    | 0.110          | Yes     |
| H6: HT → BI    | 0.072             | 2.714        | 0.007    | 0.015          | Yes     |
| H7: AUTO → BI  | 0.108             | 3.230        | 0.001    | 0.025          | Yes     |
| H8: AUTO → AU  | 0.237             | 6.172        | 0.000    | 0.097          | Yes     |
| H9: COMP → BI  | -0.032            | 1.004        | 0.315    | 0.002          | No      |
| H10: COMP → AU | 0.215             | 5.757        | 0.000    | 0.094          | Yes     |
| H11: REL → BI  | 0.075             | 3.332        | 0.001    | 0.024          | Yes     |
| H12: REL → AU  | 0.252             | 8.558        | 0.000    | 0.208          | Yes     |
| H13: BI → AU   | 0.386             | 9.789        | 0.000    | 0.343          | Yes     |

This study also implemented an out-of-sample prediction analysis (see Table 7) to evaluate the model's predictive performance, focusing on Q<sup>2</sup>predict, RMSE, and MAE values for the endogenous constructs (AU, BI). To assess predictive accuracy, we applied the PLSpredict method, as recommended by Shmueli et al. (2019), which utilizes a 10-fold cross-validation procedure to generate predictions at both the item and construct levels. According to Shmueli et al. (2019), strong predictive power is indicated when the prediction errors (RMSE and MAE) from the PLS-SEM model are consistently lower than those produced by the linear model (LM) and the naïve benchmark (IA). The results indicated that all indicators (AU1 to AU4 and BI1 to BI4) had positive Q<sup>2</sup>predict values (ranging from 0.469 to 0.579), signifying predictive relevance. Furthermore, the PLS-SEM model yielded lower RMSE and MAE values than the LM and IA benchmarks for every indicator, confirming superior predictive accuracy. Based on these results, all indicators were categorized as having strong predictive power.

**Table 7***Model's Predictive Power*

| Indicators | Q <sup>2</sup> predict | PLS-SEM_ |       | LM    |       | IA    |       |
|------------|------------------------|----------|-------|-------|-------|-------|-------|
|            |                        | RMSE     | MAE   | RMSE  | MAE   | RMSE  | MAE   |
| AU_1       | 0.469                  | 0.620    | 0.475 | 0.646 | 0.487 | 0.851 | 0.738 |
| AU_2       | 0.473                  | 0.622    | 0.472 | 0.644 | 0.492 | 0.856 | 0.749 |
| AU_3       | 0.494                  | 0.606    | 0.461 | 0.635 | 0.494 | 0.853 | 0.742 |
| AU_4       | 0.488                  | 0.609    | 0.464 | 0.632 | 0.489 | 0.851 | 0.738 |
| BI_1       | 0.541                  | 0.636    | 0.483 | 0.657 | 0.499 | 0.938 | 0.791 |
| BI_2       | 0.543                  | 0.605    | 0.469 | 0.635 | 0.481 | 0.896 | 0.763 |



|      |       |       |       |       |       |       |       |
|------|-------|-------|-------|-------|-------|-------|-------|
| BI_3 | 0.579 | 0.609 | 0.462 | 0.631 | 0.489 | 0.939 | 0.793 |
| BI_4 | 0.553 | 0.606 | 0.463 | 0.627 | 0.485 | 0.906 | 0.767 |

## Discussion

This study contributes to educational technology study by integrating UTAUT2 and SDT to investigate the factors influencing Indonesian EFL students' BI and AU of GenAI for English learning. Unlike prior studies that examine external or internal factors in isolation, this study presents a comprehensive framework that unifies both technological perceptions and psychological motivations, thereby offering a more holistic and theoretically grounded understanding of GenAI adoption in EFL education. The results show that integrating UTAUT2 and SDT significantly improves the prediction of both BI and AU of GenAI among Indonesian EFL students, thereby advancing theoretical development of technology adoption in educational contexts.

The result reveals that PE emerged as the strongest predictor of BI, consistent with earlier results that highlight PE as a key driver in students' willingness to utilize tools such as ChatGPT and large language models for vocabulary acquisition (Budhathoki et al., 2024; Grassini et al., 2024; Zheng et al., 2024; Wang & Reynolds, 2024). This strong link suggests that EFL students are more inclined to adopt GenAI tools when they perceive them as beneficial to academic performance, particularly for language-related tasks such as writing, translating, and comprehending complex texts. GenAI's ability to deliver real-time support and feedback appears to boost students' motivation by making learning more efficient and effective.

EE also significantly influenced EFL students' BI to use GenAI for English language learning, although with a small effect size. The significance of EE in shaping students' intention to adopt technology has been acknowledged in prior studies (Meet et al., 2022; Strzelecki, 2024; Wang & Reynolds, 2024). The weak relationship may be explained by the fact that EFL students, especially those learning English, tend to adapt quickly to new technologies and require minimal effort to learn how to use tools like GenAI (Strzelecki, 2024). This suggests that EFL students likely have enough prior experience with technology, so the perceived ease of use is less influential in shaping their intention to adopt GenAI.

SI was found to positively and significantly affect BI, supporting prior study (Arthur et al., 2023; Strzelecki, 2024; Zacharis & Nikolopoulou, 2022; Yakubu et al., 2025; Zhao et al., 2025; Zheng et al., 2024; 2025). This suggests that peer, teacher, and academic influencer engagement with GenAI positively shapes students' own intention to adopt the technology. When students observe those around them actively using GenAI tools, their likelihood of adoption increases, underscoring the social nature of learning and technology diffusion. This highlights the importance of SI in encouraging the use of GenAI for language learning, as EFL students are more likely to embrace the technology when they see its adoption by others.

FC was identified as a significant factor influencing EFL students' BI to use GenAI for English learning, consistent with previous studies (Alowayr & Al-Azawei, 2021; Al-Adwan & Al-Debei, 2024; Arthur et al., 2023, 2025; Zheng et al., 2025). However, the relationship was weak, with a small effect size, indicating that while access to resources and technical support remains relevant, it is not a major determinant of students' intention to adopt the tool. This

limited influence may reflect students' high level of digital readiness, as many EFL learners are already accustomed to using technology for academic purposes. As digital natives, they tend to engage in self-directed learning and can navigate GenAI tools independently, reducing dependence on institutional support. Consequently, their intention to adopt GenAI appears to be shaped more by the perceived usefulness and ease of use of the tool than by external resources.

HM had a significant but moderate effect on BI. This indicates while enjoyment is a factor, it is not the primary driver behind students' intention to use GenAI for English learning. This result is supported by previous research (Abdi et al., 2025; Tan et al., 2024; Zheng et al., 2025; Zhao et al., 2025), which highlights the importance of HM in technology acceptance across various fields, such as ChatGPT, e-learning, and translation technology. Moreover, HT was found to have a significant but minimal effect on the BI to use GenAI for English learning. This result is consistent with previous studies that have highlighted the role of HT in technology adoption across various fields, including ChatGPT (Grassini et al., 2024; Habibi et al., 2023; Salifu et al., 2024; Strzelecki, 2024; Zheng et al., 2024) e-learning (Zacharis & Nikolopoulou, 2022; Zheng et al., 2025), and translation technology (Zhao et al., 2025). The minimal effect suggests that EFL students may still be in the early stages of exploring GenAI tools and have yet to form regular usage patterns. Consequently, their intention to adopt GenAI appears to be driven more by perceived usefulness and ease of use than by established habits.

Within the SDT framework, AUTO and REL emerged as significant predictors of BI. These results are in line with previous studies that emphasize the role of self-direction and social connection in motivation (Alharbi, 2023; Osei et al., 2022; Wang & Reynolds, 2024). When EFL students feel in control of their learning and experience supportive peer interactions, their intention to engage with new tools increases. Interestingly, COMP did not significantly influence BI, possibly because students already possess a foundational level of technological skill, reducing its influence on their decision to adopt new tools. However, earlier studies (e.g., Han & Chen, 2024; Şahin & Yildiz, 2024) emphasized COMP as a crucial element in forecasting the intention to embrace technology. This discrepancy could reflect the rapid evolution of technology, where newer tools like GenAI emphasize simplicity and user-centered design such as adaptive interfaces, personalized feedback, and automated corrections, thus minimizing perceived complexity. Although COMP did not affect BI, all three components of SDT significantly predicted AU of GenAI for English learning among EFL students, consistent with Osei et al. (2022). REL, in particular, had a strong impact on AU, suggesting that social connectedness and supportive interactions play a pivotal role in sustaining students' engagement with GenAI tools.

BI strongly predicted AU, showing that EFL students who plan to use GenAI are highly likely to apply it actively in English learning. The strong linkage may result from GenAI's immediate feedback, accessibility, and relevance to EFL students' learning goals, which make it easier for students to translate their motivation into consistent use. This result is consistent with prior studies examining various educational technologies, including mobile phones (Nikolopoulou et al., 2020), e-learning (Osei et al., 2022), ChatGPT (Alharbi, 2023; Amin et al., 2025; Budhathoki et al., 2024; Strzelecki, 2024; Zheng et al., 2024), and translation tools (Zhao et al., 2025), where BI consistently predicted AU. The results underscore the importance of strengthening EFL students' BI to support the effective and sustained integration of GenAI in English learning.

## *Implications*

This study offers practical, pedagogical, and policy implications for integrating GenAI for English learning, particularly in under-resourced contexts. From a practical perspective, since PE was identified as the strongest factor influencing EFL students' BI to use GenAI for English learning, educators should prioritize activities that clearly demonstrate how GenAI can enhance English learning outcomes. For example, educators can use a single shared device to model AI-assisted improvements in vocabulary choice, grammatical accuracy, and paragraph organization. Short demonstrations comparing students' initial drafts with revised versions produced with GenAI can help learners immediately recognize the added value of the technology, even when individual device access is limited. Moreover, the strong effect of BI on AU highlights the importance of embedding GenAI into routine English learning activities such as weekly writing, reading, or speaking tasks rather than using it only occasionally. Collaborative tasks involving one shared smartphone, including generating ideas, evaluating AI feedback, or identifying linguistic errors, allow students to build consistent habits of GenAI use while ensuring equitable participation in resource-constrained classrooms.

Pedagogically, educators should emphasize the observable language-learning benefits of GenAI for EFL students, as these perceptions strongly shape their intention to use the technology for English learning. Learning activities therefore need to be structured in ways that foster autonomy and peer support, reflecting the significant roles these motivational and social factors play in sustaining GenAI-mediated engagement. Encouraging students to work independently with GenAI, for example to generate ideas, analyze linguistic patterns, or revise sentences, while complementing these tasks with guided group discussions and collaborative evaluations of AI-generated outputs, can deepen critical thinking, metalinguistic awareness, and interpersonal interaction. Since enjoyment also contributes meaningfully to students' behavioral intention, activities that incorporate GenAI should be designed to be engaging and anxiety-reducing, helping students develop positive emotional experiences that support continued use. Although technical competence does not influence intention, its strong effect on actual use highlights the value of scaffolded training, gradual practice, and timely feedback to strengthen students' confidence in applying GenAI tools for writing, reading, and language analysis. These pedagogical strategies can promote meaningful, sustained, and ethically responsible integration of GenAI into English learning, particularly in educational environments with limited digital resources.

At the policy level, universities should develop institutional guidelines that reflect these behavioral determinants by promoting ethical, transparent, and pedagogically meaningful uses of GenAI in coursework and assessment. The significant role of social and environmental conditions in shaping intention indicates the need for improved digital infrastructure, AI-enabled learning spaces, and device-loan programmes to ensure equitable access. Policies should also incorporate responsible AI literacy programmes that help students understand the limitations, potential biases, and ethical considerations of GenAI, ensuring that increased autonomy and peer-supported learning are accompanied by informed decision-making. Professional development for educators and ongoing monitoring of GenAI integration are essential to ensure that institutional strategies evolve in alignment with students' needs and emerging technological developments.

## Conclusion

This study investigated the key factors influencing EFL students' behavioral intention and actual use of GenAI tools for English learning in Indonesian universities, using an integrated model of UTAUT2 and SDT. By surveying 462 undergraduate students and applying PLS-SEM, the research revealed that both external technological perceptions (PE, EE, SI, FC, HM, and HT) and internal motivational drivers (AUTO and REL) significantly impacted EFL students' BI to adopt GenAI, with PE exerting the strongest effect. Importantly, BI was found to be the most significant predictor of AU, while motivational constructs such as AUTO, COMP, and REL also demonstrated significant direct effects on AU. This dual-theoretical approach provides a holistic understanding that encompasses both the functional and motivational dynamics of GenAI adoption in EFL education. As artificial intelligence becomes more integrated into digital learning, these results highlight the necessity of aligning technological design and pedagogical strategies with students' psychological needs. By integrating UTAUT2 and SDT, this study provides a more holistic model for understanding BI and AU of GenAI tools in online language learning, thereby advancing both technology-adoption and motivational frameworks.

## Limitation and Future Research

Despite its contributions, this study has several limitations that suggest directions for future research. First, the use of convenience sampling, where participants were selected based on availability rather than through random selection, may limit the generalizability of the findings. Future studies should consider using probability-based sampling methods to enhance representativeness and reduce selection bias. Second, reliance on self-reported measures introduces the possibility of bias due to participants' subjective perceptions. To strengthen the validity of results, future research could incorporate mixed-method approaches, such as interviews or classroom observations, to cross-validate self-reported data. Third, the cross-sectional design restricts the ability to infer causality, as it captures responses at a single point in time. Employing longitudinal or experimental designs in future studies could help track changes over time and better establish causal relationships between variables. Fourth, although the overall participation rate was high, the possibility of non-response bias remains, as individuals who did not participate might differ in important ways from those who did. Future research should address this by implementing follow-up strategies or conducting non-response analyses to improve sample representativeness. Fifth, the study focused exclusively on university students in Indonesia, capturing only a narrow segment of the education system. Expanding future research to include secondary and higher secondary students could provide more comprehensive insights. Sixth, the sample was drawn from only three private universities in Central Java, West Java, and South Sulawesi. Including public universities and institutions from other regions would offer a more complete understanding of GenAI adoption across Indonesia's diverse educational contexts. Lastly, the majority of participants were from English education departments, with minimal representation from other academic disciplines. Future research should aim for a broader disciplinary scope to explore potential differences in GenAI usage and perceptions across various academic fields.

## **Declarations**

### ***Disclosure Statement***

The authors declare no conflicts of interest related to this study.

### ***Ethics Considerations***

This study was reviewed and approved by the Research Ethics Committee of Universitas Muria Kudus. All participants provided informed consent prior to participation, and their responses were anonymized to protect confidentiality.

## References

- Abdi, A. N. M., Omar, A. M., Ahmed, M. H., & Ahmed, A. A. (2025). The predictors of behavioral intention to use ChatGPT for academic purposes: Evidence from higher education in Somalia. *Cogent Education*, 12(1), 2460250. <https://doi.org/10.1080/2331186X.2025.2460250>
- Al-Adwan, A. S., & Al-Debei, M. M. (2024). The determinants of gen z's metaverse adoption decisions in higher education: Integrating UTAUT2 with personal innovativeness in IT. *Education and Information Technologies*, 29(6), 7413-7445. <https://doi.org/10.1007/s10639-023-12080-1>
- Alharbi, A. H. (2023). Investigating the acceptance and use of massive open online courses (MOOCs) for health informatics education. *BMC Medical Education*, 23(1), 656. <https://doi.org/10.1186/s12909-023-04648-9>
- Alowayr, A., & Al-Azawei, A. (2021). Predicting mobile learning acceptance: An integrated model and empirical study based on higher education students' perceptions. *Australasian Journal of Educational Technology*, 37(3), 38-55. <https://doi.org/10.14742/ajet.6154>
- Amin, M. A., Kim, Y. S., & Noh, M. (2025). Unveiling the drivers of ChatGPT utilization in higher education sectors: The direct role of perceived knowledge and the mediating role of trust in ChatGPT. *Education and Information Technologies*, 30(6), 7265-7291. <https://doi.org/10.1007/s10639-024-13095-y>
- Arthur, F., Arkorful, V., Salifu, I., & Abam Nortey, S. (2023). Digital paradigm shift: Unraveling students' intentions to embrace tablet-based learning through an extended UTAUT2 model. *Cogent Social Sciences*, 9(2), 2277340. <https://doi.org/10.1080/23311886.2023.2277340>
- Arthur, F., Salifu, I., & Abam Nortey, S. (2025). Predictors of higher education students' behavioural intention and usage of ChatGPT: The moderating roles of age, gender and experience. *Interactive Learning Environments*, 33(2), 993-1019. <https://doi.org/10.1080/10494820.2024.2362805>
- Azwar, T. A., & Jayanti, F. G. (2025). Examining Indonesian EFL students' acceptance of ChatGPT as a supplementary English grammar learning resource. *Wiralodra English Journal (WEJ)*, 9(1), 123-137. <https://doi.org/10.31943/wej.v9i1.402>
- Bae, H., & Bozkurt, A. (2024). The untold story of training students with generative AI: Are we preparing students for true learning or just personalization?. *Online Learning*, 28(3), 1-9. <https://doi.org/10.24059/olj.v28i3.4689>
- Budhathoki, T., Zirar, A., Njoya, E. T., & Timsina, A. (2024). ChatGPT adoption and anxiety: A cross-country analysis utilising the unified theory of acceptance and use of technology (UTAUT). *Studies in Higher Education*, 49(5), 831-846. <https://doi.org/10.1080/03075079.2024.2333937>

- Chai, C. S., Chiu, T. K., Wang, X., Jiang, F., & Lin, X. F. (2022). Modeling Chinese secondary school students' behavioral intentions to learn artificial intelligence with the theory of planned behavior and self-determination theory. *Sustainability*, 15(1), 605. <https://doi.org/10.3390/su15010605>
- Cortez, P. M., Ong, A. K. S., Diaz, J. F. T., German, J. D., & Jagdeep, S. J. S. S. (2024). Analyzing preceding factors affecting behavioral intention on communicational artificial intelligence as an educational tool. *Heliyon*, 10(3), e25896. <https://doi.org/10.1016/j.heliyon.2024.e25896>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, 11(4), 227–268. [https://doi.org/10.1207/S15327965PLI1104\\_01](https://doi.org/10.1207/S15327965PLI1104_01)
- Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, 19(2), 109–134. [https://doi.org/10.1016/0092-6566\(85\)90023-6](https://doi.org/10.1016/0092-6566(85)90023-6)
- Grassini, S., Aasen, M. L., & Møgelvang, A. (2024). Understanding university students' acceptance of ChatGPT: insights from the UTAUT2 model. *Applied Artificial Intelligence*, 38(1), 2371168. <https://doi.org/10.1080/08839514.2024.2371168>
- Hair, J., Hult, G., Ringle, C., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM) (3rd ed.)*. Sage
- Han, Y., & Chen, C. (2024). Examining Chinese EFL learners' acceptance of mobile-assisted vocabulary learning applications and its influencing factors. *Journal of China Computer-Assisted Language Learning*, 1-29. <https://doi.org/10.1515/jccall-2024-0005>
- Hew, T. S., & Kadir, S. L. S. A. (2016). Understanding cloud-based VLE from the SDT and CET perspectives: Development and validation of a measurement instrument. *Computers & Education*, 101, 132–149. <https://doi.org/10.1016/j.compedu.2016.06.004>
- Ho, C. C. (2024). Using AI-generative tools in tertiary education: Reflections on their effectiveness in improving tertiary students' English writing abilities. *Online Learning*, 28(3), 33-54. <https://doi.org/10.24059/olj.v28i3.4632>
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration (IJEC)*, 11(4), 1-10. <https://doi.org/10.4018/ijec.2015100101>
- Lai, C. Y., Cheung, K. Y., Chan, C. S., & Law, K. K. (2024). Integrating the adapted UTAUT model with moral obligation, trust and perceived risk to predict ChatGPT adoption for assessment support: A survey with students. *Computers and Education: Artificial Intelligence*, 6, 100246. <https://doi.org/10.1016/j.caeai.2024.100246>

- Laksana, I. P. Y., Hudiananingsih, P. D., Suciani, K., Virginiya, P. T., & Wahyuni, L. G. E. (2024). Exploring the possible use of generative artificial intelligence in supporting students' speaking performance. In *Prosiding Seminar Nasional Riset Bahasa dan Pengajaran Bahasa* (Vol. 6, No. 1, pp. 208-218).  
<https://doi.org/10.31940/senarilip.v6i1.208-218>
- Lutfi, A., Saad, M., Almaiah, M. A., Alsaad, A., Al-Khasawneh, A., Alrawad, M., ... & Al-Khasawneh, A. L. (2022). Actual use of mobile learning technologies during social distancing circumstances: Case study of King Faisal University students. *Sustainability*, 14(12), 7323. <https://doi.org/10.3390/su14127323>
- Meet, R. K., Kala, D., & Al-Adwan, A. S. (2022). Exploring factors affecting the adoption of MOOC in generation z using extended UTAUT2 model. *Education and Information Technologies*, 27(7), 10261-10283. <https://doi.org/10.1007/s10639-022-11052-1>
- Nikolopoulou, K., Gialamas, V., & Lavidas, K. (2020). Acceptance of mobile phone by university students for their studies: An investigation applying UTAUT2 model. *Education and Information Technologies*, 25, 4139-4155.  
<https://doi.org/10.1007/s10639-020-10157-9>
- Osei, H. V., Kwateng, K. O., & Boateng, K. A. (2022). Integration of personality trait, motivation and UTAUT 2 to understand e-learning adoption in the era of COVID-19 pandemic. *Education and Information Technologies*, 27(8), 10705-10730.  
<https://doi.org/10.1007/s10639-022-11047-y>
- Raman, A., Thannimalai, R., Rathakrishnan, M., & Ismail, S. N. (2022). Investigating the influence of intrinsic motivation on behavioral intention and actual use of technology in Moodle platforms. *International Journal of Instruction*, 15(1), 1003-1024.  
<https://doi.org/10.29333/iji.2022.15157a>
- Raza, S. A., Qazi, Z., Qazi, W., & Ahmed, M. (2022). E-learning in higher education during COVID-19: evidence from blackboard learning system. *Journal of Applied Research in Higher Education*, 14(4), 1603-1622. <https://doi.org/10.1108/JARHE-02-2021-0054>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and wellbeing. *The American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Şahin, F. (2025). Psychological drivers shaping mobile learning utilization among visually impaired university students. *Education and Information Technologies*, 1-25.  
<https://doi.org/10.1007/s10639-025-13430-x>



- Şahin, F., & Yıldız, G. (2024). Understanding mobile learning acceptance among university students with special needs: An exploration through the lens of self-determination theory. *Journal of Computer Assisted Learning*, 40(4), 1838-1851. <https://doi.org/10.1111/jcal.12986>
- Salifu, I., Arthur, F., Arkorful, V., Abam Nortey, S., & Solomon Osei-Yaw, R. (2024). Economics students' behavioural intention and usage of ChatGPT in higher education: a hybrid structural equation modelling-artificial neural network approach. *Cogent Social Sciences*, 10(1), 2300177. <https://doi.org/10.1080/23311886.2023.2300177>
- Sarwanti, S., Sariasih, Y., Rahmatika, L., Islam, M. M., & Riantina, E. M. (2024). Are they literate on ChatGPT? University language students' perceptions, benefits and challenges in higher education learning. *Online Learning*, 28(3), 105-130. <https://doi.org/10.24059/olj.v28i3.4599>
- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European journal of marketing*, 53(11), 2322-2347. <https://doi.org/10.1108/EJM-02-2019-0189>
- Strzelecki, A. (2024). To use or not to use ChatGPT in higher education? A study of students' acceptance and use of technology. *Interactive learning environments*, 32(9), 5142-5155. <https://doi.org/10.1080/10494820.2023.2209881>
- Tseng, T. H., Lin, S., Wang, Y. S., & Liu, H. X. (2022). Investigating teachers' adoption of MOOCs: the perspective of UTAUT2. *Interactive Learning Environments*, 30(4), 635-650. <https://doi.org/10.1080/10494820.2019.1674888>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178. <https://doi.org/10.2307/41410412>
- Wang, X., & Reynolds, B. L. (2024). Beyond the books: Exploring factors shaping Chinese English learners' engagement with large language models for vocabulary learning. *Education Sciences*, 14(5), 496. <https://doi.org/10.3390/educsci14050496>
- Waziana, W., Andewi, W., Hastomo, T., & Hasbi, M. (2024). Students' perceptions about the impact of AI chatbots on their vocabulary and grammar in EFL writing. *Register Journal*, 17(2), 352-382. <https://doi.org/10.18326/register.v17i2.352-382>
- Xie, Y., Zhou, R., Chan, A. H. S., Jin, M., & Qu, M. (2023). Motivation to interaction media: The impact of automation trust and self-determination theory on intention to use the new interaction technology in autonomous vehicles. *Frontiers in Psychology*, 14, 1078438. <https://doi.org/10.3389/fpsyg.2023.1078438>

- Xu, X., & Thien, L. M. (2025). Unleashing the power of perceived enjoyment: exploring Chinese undergraduate EFL learners' intention to use ChatGPT for English learning. *Journal of Applied Research in Higher Education*, 17(2), 578-593. <https://doi.org/10.1108/JARHE-12-2023-0555>
- Yakubu, M. N., David, N., & Abubakar, N. H. (2025). Students' behavioural intention to use content generative AI for learning and research: A UTAUT theoretical perspective. *Education and Information Technologies*, 1-26. <https://doi.org/10.1007/s10639-025-13441-8>
- Zacharis, G., & Nikolopoulou, K. (2022). Factors predicting university students' behavioral intention to use elearning platforms in the post-pandemic normal: an UTAUT2 approach with 'Learning Value'. *Education and Information Technologies*, 27(9), 12065-12082. <https://doi.org/10.1007/s10639-022-11116-2>
- Zhao, J., Li, X., & Liao, H. (2025). A context-specific analysis of translation technology usage behavior among college EFL students: Insights from the UTAUT2 model. *Education and Information Technologies*, 1-35. <https://doi.org/10.1007/s10639-025-13454-3>
- Zheng, H., Han, F., Huang, Y., Wu, Y., & Wu, X. (2025). Factors influencing behavioral intention to use e-learning in higher education during the COVID-19 pandemic: A meta-analytic review based on the UTAUT2 model. *Education and Information Technologies*, 1-39. <https://doi.org/10.1007/s10639-024-13299-2>
- Zheng, Y., Wang, Y., Liu, K. S. X., & Jiang, M. Y. C. (2024). Examining the moderating effect of motivation on technology acceptance of generative AI for English as a foreign language learning. *Education and Information Technologies*, 1-29. <https://doi.org/10.1007/s10639-024-12763-3>
- Zogheib, S., & Zogheib, B. (2024). Understanding university students' adoption of ChatGPT: Insights from TAM, SDT, and beyond. *Journal of Information Technology Education: Research*, 23, 025. <https://doi.org/10.28945/5377>

## Appendix

### Questionnaire Measures for Students

| Construct               | Item | Measures                                                                                                 |
|-------------------------|------|----------------------------------------------------------------------------------------------------------|
| Performance Expectancy  | PE1  | I find GenAI tools helpful for enhancing my English learning.                                            |
|                         | PE2  | Using GenAI increases my ability to achieve important goals in learning English.                         |
|                         | PE3  | GenAI tools help me learn English more effectively and efficiently.                                      |
|                         | PE4  | GenAI tools make it easier for me to complete English learning tasks quickly.                            |
| Effort Expectancy       | EE1  | I find it easy to learn how to use GenAI tools for my English studies.                                   |
|                         | EE2  | My interaction with GenAI tools during English learning is clear and easy to understand.                 |
|                         | EE3  | I find it easy to use GenAI tools to support my English learning needs.                                  |
|                         | EE4  | It is easy for me to become skilled at using GenAI tools to improve my English.                          |
| Social Influence        | SI1  | My lecturers and classmates believe that I should use GenAI tools for my English studies.                |
|                         | SI2  | My instructors and peers think that it is beneficial for me to use GenAI to enhance my English learning. |
|                         | SI3  | My mentors and friends recommend that I use GenAI tools to improve my English skills.                    |
|                         | SI4  | My university encourages and supports the use of GenAI tools to enhance my English learning.             |
| Facilitating Conditions | FC1  | I have the necessary tools and resources to use GenAI for learning English.                              |
|                         | FC2  | I possess the knowledge and skills needed to use GenAI tools effectively in my English studies.          |
|                         | FC3  | I can easily get support from others if I encounter difficulties using GenAI tools for English learning. |
| Hedonic Motivation      | HM1  | Using GenAI tools makes learning English enjoyable for me.                                               |
|                         | HM2  | I feel satisfied and engaged when I use GenAI tools for learning English.                                |
|                         | HM3  | GenAI tools make my English learning experience fun and interesting.                                     |
| Habit                   | HT1  | Using GenAI tools has become a regular part of how I learn English.                                      |

|                      |       |                                                                                                        |
|----------------------|-------|--------------------------------------------------------------------------------------------------------|
|                      | HT2   | I rely heavily on GenAI tools in my English learning process.                                          |
|                      | HT3   | I feel the need to use GenAI tools whenever I study English.                                           |
|                      | HT4   | Using GenAI tools feels instinctive when it comes to learning English.                                 |
| Autonomy             | AUTO1 | I feel that I have significant control over how I use GenAI tools in my English learning.              |
|                      | AUTO2 | I am free to share my thoughts and preferences regarding the use of GenAI tools in my English studies. |
|                      | AUTO3 | My perspectives and feelings about using GenAI tools are acknowledged in the learning process.         |
|                      | AUTO4 | I feel I can use GenAI tools in ways that suit my personal learning style and needs.                   |
| Competence           | COMP1 | My classmates think I'm good at using GenAI tools for learning English.                                |
|                      | COMP2 | I often get compliments from classmates on how well I use GenAI tools in my English studies.           |
|                      | COMP3 | Most days, I feel a sense of achievement when I use GenAI tools to support my English learning.        |
| Relatedness          | REL1  | I feel supported by my classmates when I use GenAI for English learning.                               |
|                      | REL2  | My classmates encourage me to use GenAI tools in English class.                                        |
|                      | REL3  | I feel connected to my classmates through using GenAI.                                                 |
|                      | REL4  | I enjoy collaborating with classmates when we use GenAI for language tasks.                            |
| Behavioral Intention | BI1   | I intend to continue using GenAI tools for English learning in the future.                             |
|                      | BI2   | I will always try to use GenAI tools in my English studies.                                            |
|                      | BI3   | I plan to continue to use GenAI tools frequently for my English learning.                              |
|                      | BI4   | I intent to use GenAI tools to help complete my English learning task.                                 |
| Actual Use           | AU1   | I consider myself a regular user of GenAI tools.                                                       |
|                      | AU2   | I prefer to use GenAI tools when available.                                                            |
|                      | AU3   | I complete most of my English learning tasks using GenAI tools.                                        |
|                      | AU4   | I tend to use GenAI tools whenever possible.                                                           |

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# Student Reflections on 360-Degree Video for Pseudo-Synchronous Collaborative Problem Solving in Online Mathematics Learning

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## Abstract

Online learning offers increased flexibility to students but also poses new complexities. For example, there are challenges in digitizing teaching approaches that rely on the co-construction of knowledge through social interaction and collaboration between learners. This study explores a novel pseudo-synchronous approach using 360-degree video to improve access to collaborative mathematical problem solving for online students. We trialed the use of 360-degree video extracts of authentic collaborative problem-solving situations to offer online learners the opportunity to engage with different approaches and methods in various mathematical problem-solving situations. Data were collected through online surveys and analyzed using descriptive statistics and thematic analysis to examine student experiences. The findings suggest students prefer face-to-face collaborative problem solving but see the value of having the 360-degree video as a support when face-to-face interaction is not available or for students choosing to engage in an online environment. The study demonstrates that pseudo-synchronous 360-degree video can provide meaningful collaborative learning experiences for asynchronous online learners.

*Keywords:* 360-degree video; Pseudo-synchronous learning; Online problem solving; Collaborative problem solving; Mathematics

Albrecht, A., O’Keeffe, L., & White, B. (2025) Student reflections on 360-degree video for pseudo-synchronous collaborative problem solving in online mathematics learning. *Online Learning*, 29(4), 341-366. <https://doi.10.24059/olj.v29i4.4292>

## Introduction

In the current landscape of higher education, there is a growing demand for more online offerings. Online learning environments offer students increased access and flexibility, allowing them to pursue education while accommodating various constraints, such as work commitments, family responsibilities, geographical barriers, and more. However, from a teaching perspective, online learning introduces new challenges. One of the key complexities is ensuring that students receive equivalent learning outcomes and experiences, whether they are engaged in face-to-face or online modes of course delivery. This problem is particularly acute for teaching approaches that rely on social interaction among learners.

To address this challenge, we devised an approach we have termed *pseudo-synchronous* that bridges the gap between synchronous and asynchronous online learning. Unlike standard asynchronous learning, which typically presents static, predetermined video content, pseudo-synchronous learning uses immersive 360-degree video to emulate collaborative in-class experiences within an online problem-solving framework that students can engage with asynchronously. This pseudo-synchronous approach aligns with Picciano's (2017) argument that online education has evolved as a subset of learning in general rather than a subset of distance learning. Rather than simply digitizing traditional distance education methods, our 360-degree video framework draws upon established collaborative learning principles to create meaningful educational experiences. The goal is to preserve the essential social and cognitive dimensions of face-to-face problem solving while accommodating the flexibility required by online learners.

Social interactions in online learning can be either synchronous or asynchronous. In synchronous online collaboration, students come together in real time within virtual environments, such as virtual classrooms, video conferencing platforms, or live text-based chat rooms. While studies such as Choi and Walters (2018) found that students in fully online K-12 environments demonstrated an increase in their mathematical performance when engaged in synchronous environments, the real-time participation requirements inherently limit accessibility for students. Synchronous collaboration requires that all participants are available at the same time, which can be a barrier for some online learners and potentially contradicts the concept of flexible learning. An alternative is asynchronous collaboration, where students contribute at their own pace and on their own schedules, typically through mediums like online forums and discussion boards. However, due to their ordered and time-spaced nature, asynchronous interactions often miss the spontaneity of early idea generation and can become more focused on finished products and solutions rather than the dynamic, in-the-moment development and analysis of various approaches.

Group work, a particular type of social interaction, can be challenging for online learners and can lead to disengagement or even withdrawal from the course (Gillett-Swan, 2017). Researchers have found that asynchronous online communication does not always support cooperative learning processes, and that those who collaborate asynchronously have lower perceptions of belonging and higher negative affect (Peterson et al., 2009). Even for synchronous online learners, traditional approaches to group work can be inadvertently alienating as assumptions are often made that students inherently know how to effectively collaborate in groups and that they are fluent with the different technologies required for group work in online environments (Gillett-Swan, 2017). As such, facilitating and supporting social

interaction and relationship development needs to be a priority in online learning (Gillett-Swan, 2017; Jaques & Salmon, 2007; Stoessel et al., 2015).

In relation to group work in online learning environments, Graham and Misanchuk (2004, p.184) distinguish between students functioning as “work groups” or as “learning groups.” In work groups, the collaboration is product-oriented with a focus on the outcome. Group members take on tasks that reflect their existing skills and strengths so as to maximize opportunities for successful completion of the task. In learning groups, the collaboration is learning-oriented with a focus on the process. Group members take on tasks to gain skills they have not already acquired so as to maximize opportunities for learning. The authors noted several challenges for instructors of online learning groups, including the design of learning activities and facilitation of group interactions.

This study was motivated by the prospect of having to transition a face-to-face mathematical problem-solving course into an online format that allowed students to engage asynchronously. Our primary objective was to ensure that online learners would not only achieve similar learning outcomes but would also be engaged in educational experiences that mirrored those offered in the face-to-face setting. In particular, we wanted to preserve the essence of collaborative mathematical problem-solving experiences that emphasized process over product.

The aim of this study is to examine how 360-degree video might support both the social and cognitive dimensions of collaborative problem solving for online learners, specifically addressing the research question:

In what ways can 360-degree video be useful for emulating collaborative mathematical problem solving for asynchronous online learners?

In this paper we present our findings of the effectiveness of this approach.

### ***360-Degree Video as a Tool for Learning***

360-degree videos, also known as immersive videos, are a type of video recording that captures a view in every direction at the same time. The videos can be played back with different levels of immersion, from desktop to head-mounted displays. When playing back a 360-degree video, the viewer can control the perspective and interactively explore the entire scene, allowing them to feel present in the scene rather than merely observing it from a fixed point like in traditional video.

From a systematic review of the literature, Rosendahl and Wagner (2023) identified three main purposes for using 360-degree videos as a medium for teaching and learning: delivering educational content, creating immersive and interactive learning experiences, and facilitating reflection purposes (by both self and peers). The authors also highlighted the following potentials for using 360-degree videos in education: supporting multi-perspective observational and reflective learning, increasing motivation and interest amongst learners, creating authentic and realistic learning experiences, and fostering interactive and immersive learning processes. 360-degree video has been used across a range of disciplines, particularly those involving situated learning, such as supporting in-service and pre-service teachers of

mathematics to develop and refine their practice (O’Keeffe et al, 2020; O’Keeffe & White, 2022; Balzaretto et al., 2019). Integrating video (of any form) in online teaching and learning platforms has shown to be effective in creating a sense of community (Borup et al., 2012).

### ***Mathematical Problem Solving***

Problem solving is a crucial skill in both modern work and everyday life (English & Gainsburg, 2015) and is a fundamental part of mathematics curricula around the world (Olivares et al., 2021). Research suggests that teaching mathematical content through problem solving is an effective practice for developing conceptual understanding and procedural skills, as well as positive beliefs about mathematics (Lester & Cai, 2016).

General frameworks for mathematical problem solving came to prominence with the work of Pólya (1945/2004), who described four stages: understanding the problem; devising a plan; carrying out the plan; looking back. Influenced by Pólya’s work, Mason, Burton and Stacey (1982/2010) structured the process of tackling a problem into three phases: entry, attack, and review. Neither of these frameworks is intended to be linear as authentic problem-solving involves what NCTM describes as “engaging in a task for which the solution method is not known in advance” (NCTM, 2000, p. 52), and thus oscillates between getting to grips with the problem and pursuing lines of possible attack while constantly monitoring the degree to which these efforts are fruitful.

While these frameworks describe the nature of problem solving, questions remain about how best to support students in developing these capabilities. There is some disagreement in the research literature as to whether mathematical problem-solving strategies can be taught. Schoenfeld’s pioneering work (1985) on teaching problem-solving courses at the college level found that students became more effective problem solvers and could solve more challenging, unfamiliar problems, however teaching general problem-solving strategies (e.g. draw a diagram) proved less successful (Lesh & Zawojewski, 2007). Schoenfeld suggested a focus on teaching more specific tactics, a view also supported and elaborated by Foster (2023).

Facilitating problem-solving experiences can be challenging for teachers. In many mathematics classrooms and textbooks, problem solving is reduced to a checklist with general problem-solving skills being taught without students fully appreciating why, when and how to apply them to specific problems (Stacey, 2022; English & Gainsburg, 2015). Stacey (2022) argues that the need for strategies should arise from well-selected problems. Foster (2019) describes the challenge of deciding when and how to intervene as students face difficulties. He advocates scaffolding the problem-solving process rather than the specific problem itself, directing support and discussions towards more generic aspects of problem solving. To encourage reflection, he suggests asking questions to help students “reflect on what worked and what did not, and why, so that they talk not just about the mathematical content but about their approaches to solving the problem” (p. 9); this also helps activate students’ metacognition.

Metacognition—thinking about one’s own thinking—is crucial for successful problem solving. Schoenfeld (1992) revealed metacognitive differences in how novices and experts worked on unfamiliar problems. Novices often exhibited a lack of metacognitive awareness and persisted with ineffective approaches, while experts monitored their progress and made informed decisions about when to change strategy. Schoenfeld found that, with regular



metacognitive coaching (i.e. asking questions designed to prompt student reflection), novices' problem-solving behavior became more expert-like.

### ***Collaborative Mathematical Problem Solving***

Recognizing that collaboration is a crucial skill in today's workplaces, in 2015 the Programme for International Student Assessment (PISA) introduced its first-ever assessment of collaborative problem solving to address the lack of internationally comparable data in the field. The results of PISA 2015 showed that competency in collaborative problem solving is associated with higher mathematics achievement. PISA 2015 defined collaborative problem-solving competency as "the capacity of an individual to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution" (OECD 2017, p. 47). Collaborative problem solving requires learners to jointly orchestrate their activities, mutually building upon each other's contributions (Hesse et al., 2015). They must also work together to negotiate and create shared group meaning (Stahl et al., 2014).

The framework for collaborative problem-solving skills, as presented by Hesse et al. (2015), has both social and cognitive dimensions. The social dimension is the *collaborative* part and relates to managing participants, including oneself. The cognitive dimension is the *problem solving* part and relates to managing the task at hand. In collaborative mathematical problem solving, the social dimension includes aspects like negotiating possible approaches, listening to and making sense of the ideas of others, responding to and building on contributions, and maintaining awareness of group dynamics, whereas the cognitive dimension is mainly individual mathematical problem solving as discussed earlier.

Ham and Hwang (2021) describe how new mathematical content can be learned through collaborative problem solving, emphasizing the importance of dialogical interactions in helping students to develop and refine their understanding of mathematical concepts. Participating in group discussions improves students' capacity to articulate and justify their thinking. Students gain insights from hearing and seeing the diverse range of approaches and strategies of their peers and, as a result, may access knowledge through peer support that would have been out of their reach had they been learning independently. Results from PISA 2015 showed that students who are regularly asked by teachers to discuss their work in class are likely to have more positive attitudes towards collaborating with others (OECD, 2017). Beyond its cognitive benefits, social interaction in mathematics also plays a motivational role, enhancing students' engagement and positive emotions toward mathematical learning (Schukajlow et al., 2023).

### ***Bridging Theory to Practice: 360-Degree Video for Collaborative Mathematical Problem Solving***

While the theoretical frameworks of collaborative problem solving and metacognition provide a strong foundation for mathematics education, their implementation in online learning environments presents unique challenges. As noted by Balzaretto et al. (2019), one of the fundamental challenges with standard video recording is that decisions need to be made about where to point the camera, creating researcher or teacher bias that predetermines what might be worth observing. When used for teaching purposes, this means students are limited to a single,

predetermined perspective, potentially constraining the collaborative dimensions identified by Hesse et al. (2015). To address these limitations, this study examines how 360-degree video technology can create immersive learning environments that support both the social and cognitive dimensions of collaborative problem solving.

The design of this study operationalizes key theoretical frameworks within the 360-degree video experience. For instance, Pólya's four-stage problem-solving framework is supported through the environment's ability to allow students to observe multiple approaches to understanding problems, see various planning strategies from different group members' perspectives, follow the implementation of solutions from multiple viewpoints, and engage in comprehensive reflection by revisiting the entire collaborative process. Mason, Burton and Stacey's (2010) three phases were embedded in the design by structuring different experiences of initial problem engagement (entry), strategic development and testing (attack), and reflective evaluation of strategies (review). The theoretical foundation for this approach draws from socio-constructivist learning theory, where knowledge is constructed through social interaction and shared meaning-making (Stahl et al., 2014). The technology-enhanced approach in this study supports online independent learners to experience some form of collaborative (albeit mediated) problem solving. Within this framework, 360-degree video serves as a technological tool that facilitates collaborative learning by providing a shared, immersive reference point for mathematical problem-solving activities. This use of 360-degree video offers several advantages over traditional video for supporting collaborative problem solving in online environments. The immersive nature eliminates the camera bias inherent in conventional recording by providing comprehensive scene capture rather than predetermined focal points (Balzaretti et al., 2019). Additionally, the multi-perspective accessibility enables learners to explore different aspects of the mathematical problem space whilst maintaining shared context, supporting the metacognitive reflection processes identified by Schoenfeld (1992) and as recommended by Foster (2019).

## Methodology

This study employs an exploratory survey design to investigate how 360-degree video can emulate collaborative mathematical problem solving for asynchronous online learners. The survey design incorporated both closed-ended questions (analyzed quantitatively using descriptive statistics) and open-ended questions (analyzed qualitatively through thematic analysis) to provide comprehensive insights into student experiences. The comparative element enables examination of differences between face-to-face and online problem-solving experiences within the same participant group, which is essential for understanding whether and how the 360-degree video intervention affected their experiences. We also explicitly categorized participants according to their past experiences learning mathematics in online mode, as this prior experience may influence their perceptions of and engagement with the pseudo-synchronous approach.

In this project we take a novel approach to designing learning experiences for asynchronous online learners by making use of 360-degree video recordings of on-campus students engaging in problem-solving tasks in mathematics. This approach is innovative in two key ways: (1) using authentic recordings of real peer collaboration rather than instructor-created

content, and (2) enabling pseudo-synchronous engagement where asynchronous learners can virtually participate in genuine collaborative mathematical problem solving even though they are working at their own pace and location. To investigate this approach, the broader project used the online problem-solving framework in three different formats with three different cohorts of mathematics pre-service teachers. The first configuration explored collaborative mathematical problem solving, in both in-class and online learning environments, with students studying a mathematics course in face-to-face mode. The second configuration added an individual problem-solving activity in an online environment as part of a face-to-face course. The third configuration centered on problem-solving reflections in a mathematics course with students who either studied entirely online or entirely face-to-face. This paper reports on the first configuration, by introducing the online problem-solving framework and reporting on its use with one group of students to compare their problem-solving experiences in both online and face-to-face mode. This phase is guided by the research question:

RQ: In what ways can 360-degree video be useful for emulating collaborative mathematical problem solving for asynchronous online learners?

### **Context**

*Developing Mathematical Thinking* is a problem-solving course for mathematics pre-service teachers (PSTs). The course adopts a *learning group* philosophy (Graham & Misanchuk, 2004) with students engaging in sessions aimed at working together to tackle unfamiliar problems, chosen to illuminate a particular problem-solving strategy. Each activity is followed by a whole-class discussion to emphasize and draw out aspects of the problem-solving process. A primary objective of this pedagogical approach is for students to experience, appreciate and normalize the messy, non-linear nature of authentic problem solving. This includes recognizing that there are typically several different possible starting points, ways of organizing and representing work, and approaches to tackling the problem—some of which may prove less fruitful or lead to a dead end. The collaborative nature is pivotal, as it exposes students to more ways of thinking about a problem. The collaborative setting also encourages students to articulate and justify their thinking, actively listen to and interpret the ideas of others, and critically evaluate the merits of each approach while negotiating the path that will be taken by the group, that is, engaging in both the social and cognitive dimensions of collaborative problem solving (Hesse et al., 2015). The role of the teacher is to choose problems that reveal particular elements of problem solving, ask questions designed to help students internalize metacognitive skills, facilitate whole-class discussion to reflect on the learning experience, and ensure there is a shared understanding of the key outcomes from the activity.

### **Participants and Process**

At the time of this study, there were 56 pre-service teachers enrolled in two separate classes, with 28 students in each class. The course was entirely conducted on campus in face-to-face mode and was of 13 weeks duration. In Week 5 of the course, each class was assigned and tackled a different group-based task. Class A tackled Problem A, referred to as the *3Ms problem*, inspired by M, M, and M from NRich (n.d.), while Class B worked on Problem B, the *Cool Years problem* developed by the first author (see Figure 1). Both problems were chosen as they rely on the problem-solving strategy of *working systematically*, specifically, and listing solutions in an ordered way. Students collaborated in small groups of three or four, with

360-degree cameras recording the activities of groups who had agreed to participate in the study.

The 360-degree videos were then edited by the authors to create a series of excerpts to highlight aspects of the problem-solving process. Segments were chosen to highlight different problem-solving methods, show authentic student conversations about mathematics, and capture moments where students encountered difficulties, made errors, or achieved insights. These excerpts were subsequently used to create an online problem-solving framework for each problem, which will be detailed in a following section. In the closing stages of the course, during Week 12, students from each class individually engaged with the other problem outside of class time using an online framework, that is, Class A tackled Problem B and Class B tackled Problem A.

Ethical approval for this study was obtained from the University of South Australia Human Research Ethics Committee (Approval No. 203331). All participants provided informed consent prior to participation.

### ***Data Collection***

Students were asked to complete an online survey after each problem-solving experience (Weeks 5 and 12) as part of their regular coursework. The surveys included questions related to their previous choices about studying mathematics in face-to-face or online mode, their problem-solving approaches, the ways in which they used group members' ideas as well as the perceived difficulty of the task (rated on a scale of 1-10 where 1 represents *not difficult at all*, and 10 signifies *extremely difficult*). Additionally, students were asked to indicate their level of agreement with statements such as

- Hearing how other students approached the problem has improved your problem solving skills
- Working with a partner/group was useful to tackle the problem
- It was useful to communicate directly with your peers about challenges as you encountered them
- It was useful to be able to observe other groups' approaches to the problem as it helped you to get started or prompted ideas
- It was useful to be able to observe other groups' approaches to the problem as it helped you to refine your solution

Students were encouraged to provide open-ended responses to all scale-type survey questions, and all participants did so. In the final survey, students were also asked to express their preferred mode of learning for problem solving in mathematics, whether online or face-to-face.

All 56 students completed the group-based in-person task. For the online problem-solving task, 19 students from Class A completed Problem A and 12 students from Class B

completed Problem B. This component was not mandatory, and some students opted not to participate. It should be noted here that seven of the 19 who completed Problem A in online mode, and four of the 12 who completed Problem B in online mode, had previously studied mathematics courses at the university in online mode. We recorded students' past experience with online learning modes, as this prior experience may have influenced their comfort level with the technology, their expectations for online support, and their engagement with the 360-degree video features, potentially making them more receptive to the pseudo-synchronous approach. All students were invited to take part in a focus group or interview, of which two students agreed to participate. However, the timing posed a challenge, with the course finishing just as students embarked on their teaching placements. Despite multiple efforts to reschedule, the interviews could not be completed.

### ***Data Analysis***

Given the exploratory nature of this study, a mixed-methods approach was used for data analysis. To gauge whether students thought the 360-degree videos were useful in emulating collaborative mathematical problem solving, ratings and closed questions from the online survey were subjected to quantitative analysis, with results reported using descriptive statistics (predominantly proportions and measures of central tendency and dispersion). Independent sample t-tests were also applied to compare mean responses between Problem A and Problem B across five Likert scale statements measuring student agreement with various aspects of the video experience.

Descriptive statistics were chosen as the primary quantitative approach due to the exploratory nature of this study and the small sample sizes. The quantitative analysis served to identify patterns in student responses that guided our qualitative investigation. For example, the high percentages of students finding videos useful for getting started (94% for Problem A, 83% for Problem B) directed our thematic analysis to explore how students used videos strategically. Similarly, the lower percentages for feeling less alone (47% for Problem A, 75% for Problem B) prompted deeper examination of social presence themes in the qualitative data. The non-significant differences found in the t-tests (p-values ranging from 0.25 to 0.80) suggested consistent experiences across problems, allowing thematic analysis across both conditions.

The thematic analysis employed an inductive approach, allowing themes to emerge from the data rather than analysing against predetermined categories. When coding discrepancies arose between researchers, these were resolved through discussion and consensus. This analytical approach directly addresses our research question by examining both the quantitative indicators of video usefulness and the qualitative insights into the specific ways students engaged with the pseudo-synchronous experience.

### ***Design of the Online Problem-Solving Framework***

The online problem-solving framework was created within a lesson activity module within the Moodle platform. The lesson activity allowed for a branching structure where students were directed to specific pages based on their responses. The online problem-solving framework designed for each problem followed the three phases of work detailed by Mason et al. (2010): entry, attack, and review. The workflow design reflects Picciano's (2017) principle that pedagogical objectives should drive technological approaches. By structuring the

experience around Mason et al.'s entry-attack-review phases while embedding 360-degree video supports strategically rather than prescriptively, we aimed to address both the social and cognitive dimensions identified by Hesse et al. (2015).

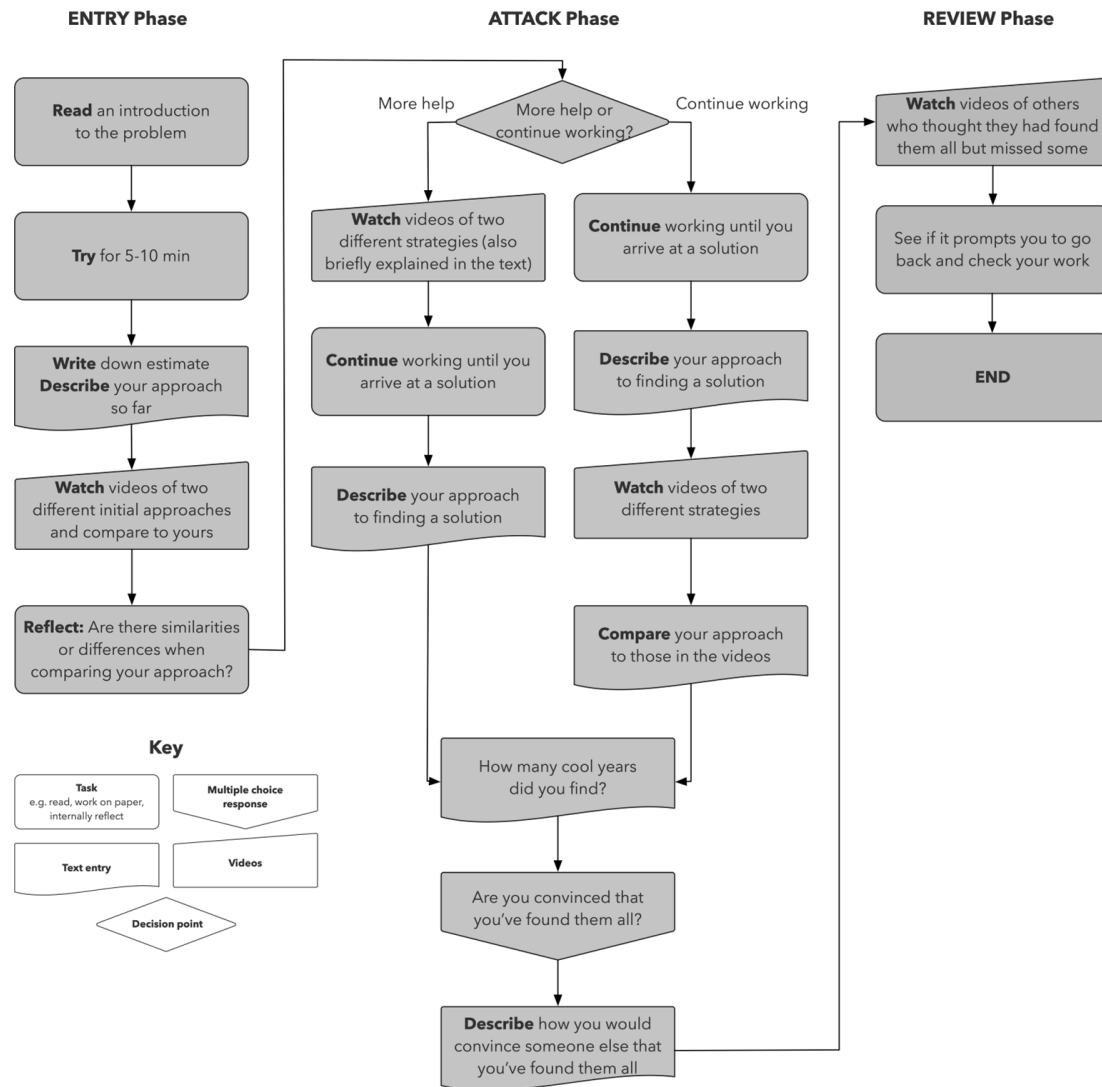
For the purpose of describing the design of the online problem-solving framework, we refer to the Cool Years problem, as illustrated in Figure 1. The workflow is shown in Figure 2 and, in line with Foster (2019), is designed to scaffold the problem-solving process, not the problem itself. The entry phase starts with an introduction to the problem, which students are encouraged to independently tackle for five to ten minutes. Students are then prompted to write a text-based description of their approach. Next, they are directed to watch and reflect on short video clips showcasing various initial problem-solving approaches employed by other groups. Videos of key moments in the collaborative problem solving of other groups are also used during the attack and review phases. For the Cool Years problem, these six clips range from 12 seconds to 2.5 minutes, keeping segments brief to support sustained attention while capturing key collaborative moments. Questions designed to prompt reflection on the problem-solving process are embedded along the way and designed to replicate the types of questions that would be asked in class by the instructor to activate students' metacognition.

The inclusion of videos is intended to help address both the social and cognitive aspects of collaborative problem solving as outlined by Hesse et al. (2015). The videos guide students in refining their problem-solving processes in multiple ways: for example, assisting them when they get stuck, encouraging them to consider other approaches, prompting them to make sense of the ideas of others. Using 360-degree videos aims to help students feel part of the learning group, rather than participating as an external observer, thereby achieving the pseudo-synchronous experience that bridges the gap between asynchronous flexibility and synchronous collaborative engagement.

**Figure 1**

*Extract from the Cool Years Problem as Presented on the Moodle Platform*

|                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>An introduction to the 'Cool Years' problem</p> <p>A <u>cool year</u> is one whose individual digits add up to a square number.</p> <p>For example:</p> <p>2020 is a cool year because:</p> $2 + 0 + 2 + 0 = 4$ <p>and 4 is a square number.</p> <p>However, 1980 is not a cool year because:</p> $1 + 9 + 8 + 0 = 18$ <p>and 18 is not a square number.</p> <p style="text-align: right;"><input type="button" value="NEXT"/></p> | <p>Entry Phase: Start the 'Cool Years' problem</p> <p>To start the 'Cool Years' problem-solving task:</p> <ol style="list-style-type: none"> <li>1. Estimate how many cool years you think there will be in the 21st century</li> <li>2. Have a go at working out how many cool years there will be in the 21st century</li> </ol> <p>Once you have worked on the problem for <b>5-10 minutes</b> (or you have found a solution), click the <b>CONTINUE</b> button below.</p> <p>(As a reminder, a <u>cool year</u> is one whose individual digits add up to a square number.)</p> <p style="text-align: right;"><input type="button" value="CONTINUE"/></p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Figure 2***The Workflow for the Cool Years Problem***Findings**

The quantitative data obtained after students completed problems in the face-to-face and online learning environments are presented in Table 1. This data shows the number of students ( $n$ ) who completed each problem, the average perceived difficulty of the problem from 1 (*not difficult at all*) to 10 (*extremely difficult*) and the amount of time spent on each problem.

**Table 1***Quantitative Data From Students' Problem-Solving Experiences*

| Problem       | n  | Learning environment | Difficulty rating (1-10) | Duration (min), [Median, Range] |
|---------------|----|----------------------|--------------------------|---------------------------------|
| Problem A (M) | 24 | in-class             | 4.50                     | ~18 min                         |
|               | 19 | online               | 4.34                     | 86 min, [22.4, 195.0]           |
| Problem B (C) | 28 | in-class             | 5.07                     | ~28 min                         |
|               | 12 | online               | 4.67                     | 42.3 min, [19.5, 77.0]          |

It is important to note that in-class time was influenced by the duration of the workshop, while online time represents browser window activity duration which, as noted in the limitations, may overestimate actual engagement. Despite this, the longer time spent in online mode suggests students were investing significant effort in the pseudo-synchronous experience, potentially reflecting the self-paced nature of asynchronous learning. While the additional time could suggest videos made problems more challenging, the video content comprised only a small portion of the total online time (approximately 19 minutes of video within 86 minutes total for Problem A, and 9 minutes within 42 minutes for Problem B). This, combined with students' positive feedback, indicates the extended time reflects deeper engagement with both mathematical and collaborative learning components rather than confusion or inefficiency.

As evident from Table 1, both problems received a similar average difficulty rating, regardless of the learning environment. Students' open responses indicated that overall, they perceived the pitch of both problems to be suitable, regardless of the learning mode. They generally agreed that Problem A presented a manageable challenge, with one student noting the problem was "not difficult as such, finding the correct number of possibilities and justifying my answer effectively was where the activity became more difficult." On the other hand, responses regarding the difficulty of Problem B were more varied, with some finding it challenging and others deeming it relatively easy. For example, one student summarized the challenge of Problem B as "I did not find this task very difficult, as there was a clear pattern shown once you started the question. The hardest part was if you could see the pattern or not."

Students were also asked to indicate their level of agreement with five statements aimed at better understanding their difficulty ratings. The data is summarized in Table 2 below which presents the mean score response from a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Independent samples t-tests show that there are no statistically significant differences in the mean responses with regard to problems A and B across any of the statements ( $p = 0.25$ ,  $p = 0.66$ ,  $p = 0.80$ ,  $p = 0.40$ ,  $p = 0.80$ ), suggesting no variation due to differences in the tasks.

In general, students found it somewhat challenging not being able to communicate with peers and their lecturer (as evident the first three statements in Table 2). Students also found observing other groups' approaches via the 360-degree videos to be useful in getting started and in refining their solutions.



**Table 2***Number and Percentage of Students Who Agreed with the Following Statements*

| Statement                                                                                                                        | Problem A<br>(n=19) | Problem B<br>(n=12) |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|
| 1. Not being able to hear, in real time, how other students approached the problem limited how much I learned from the problem.  | 5 (26%)             | 6 (50%)             |
| 2. It was difficult not being able to communicate directly with my peers about challenges as I encountered them.                 | 12 (63%)            | 8 (66%)             |
| 3. It was difficult not being able to communicate directly with my lecturer about challenges as I encountered them.              | 10 (52%)            | 7 (58%)             |
| 4. It was useful to be able to observe other groups' approaches to the problem as it helped me to get started or prompted ideas. | 18 (94%)            | 9 (75%)             |
| 5. It was useful to be able to observe other groups' approaches to the problem as it helped me to refine my solution.            | 17 (89%)            | 10 (83%)            |

Students were also invited to reflect on their problem-solving experiences in the two different learning environments. However, given that the focus of this paper is to better understand the potential of the framework to support students studying in online mode, the remainder of this section focuses on students' perceptions from experiences working online: the usefulness of the videos, their preferred learning mode, and their recommendations about potential video enhancements.

### *How did you use the videos?*

Analysis of student responses across both problems revealed three distinct patterns of video usage:

- Group 1 (Did not/would not use) comprised students who either could not access the videos due to technical issues, or chose not to use them because they solved the problem without assistance and saw no value in viewing them.
- Group 2 (Did not use but could see the potential) comprised students who solved the problem without using the videos but recognized their potential value for situations where additional support might be needed.
- Group 3 (Found them helpful) comprised students who actively used the videos and found them beneficial for their problem-solving process, whether for confirmation, clarification, or gaining new approaches.

Seventeen of the 19 students who completed Problem A in online mode (and completed all elements of the post-project reflection) watched the videos. The two who did not reported technical issues, indicating they could not get the videos to load. These students fall into Group 1 (technical barriers rather than choice). No students fell into Group 2 for Problem A. The remaining 17 students all belong to Group 3, as they indicated they found the videos helpful. Individual student responses include:

- “I used the videos initially to make comparisons with my answers, then I used them for gaining ideas and clarification of problems.”
- “Help[ed] with my thinking and to ensure I was on the right track and thinking the same as others.”
- “Once I knew I was doing it correctly, I skipped along. The videos were more of a clarification rather than feeling like I was involved in a classroom environment.”
- “At first I didn't use much of the videos, it wasn't until later where they asked deeper questions which prompted me to think of other ways of thinking.”
- “I watched each of the videos at least once, I found attempting the problem, watching the video and their approaches and then re-attempting the problem effective. Watching others not only solve it but make mistakes are good because it makes you consider why their approach is not correct.”
- “I used the videos to watch how my peers approached the problem after I had reached my solution. It was a bit frustrating knowing certain aspects of the problem that I could say to help them but not being able to.”
- “Watching others not only solve it but make mistakes are good because it makes you consider why their approach is not correct.”

These responses demonstrate that students used the videos for multiple purposes: comparison and verification (quotes 1 and 2), selective engagement based on their confidence level (e.g. quote 3), adaptive use responding to prompts and evolving needs (quote 4), iterative learning cycles of attempt-watch-reattempt (quote 5), and post-solution analysis for deeper understanding (quotes 6 and 7). Rather than passive consumption, students exercised metacognitive autonomy over their learning, choosing when to skip content, when to engage deeply, and how to integrate video observations with their own problem-solving approaches.

The twelve students who completed Problem B in online mode (and completed all elements of the post-project reflection) were distributed across all three groups. Two students fell into Group 1, indicating they thought the problem was 6 to 7 out of 10 in terms of difficulty but solved it without issue and didn't need to use the videos. One of these students did watch the videos but felt their approach was so different from hers that it confused her. Five students belonged to Group 2, solving the problem without using the videos. However, they did watch them and indicated they could see the potential of the videos if they had needed additional support. Student comments include

I think if I had gotten stuck the videos would have been helpful”; I used the videos to see how others solved it which was interesting to see that one group did it similar to me....I believe they would of been helpful if I did get stuck.

The remaining five students comprised Group 3, all indicating they found the videos very helpful in completing Problem B. The responses and usage patterns are varied, ranging from just using the first video to help them get started to “I was fascinated by other approaches and wondered if they would have helped me solve this more quickly,” and “I was on the wrong path and the videos helped.”

Overall, the 360-degree videos offered students unique affordances compared to conventional videos, including the ability to control their viewing perspective and explore different aspects of the collaborative problem-solving environment. This created a more immersive experience that allowed them to feel present in the learning group rather than simply observing from a fixed viewpoint.

### ***Getting Stuck***

Students undertaking both problem-solving tasks were asked to indicate if the videos were helpful, or could be helpful, if they got stuck. Twelve of the students doing Problem A indicated that they did get stuck, and all found the videos helpful, adding comments such as “I only used the videos when I got stuck or was unsure. Which helped me to come up with ideas or to reaffirm my pattern of thinking,” “I feel like initially I didn't get stuck, but after the final video it made me realize I may have the wrong answer after all but it was still helpful to have to realize where I went wrong,” and “The videos did help. I saw a few things that I forgot to think about when attempting the problem.” Five of the students completing Problem B indicated they got stuck and they too all found the videos useful.

### ***Using Videos in Online Problem Solving***

We were interested in students' perceptions as to whether having access to videos, such as the 360-degree videos provided in this project, would be useful if they were required to complete a problem-solving course in external/online mode. The student perception data, in response to these five statements, is provided in Table 3, with students organized according to the problem they had completed in an online learning environment. Students were asked to indicate whether they agreed that the videos were helpful in relation to a number of statements.

**Table 3**

*Number and Percentage of Students Who Agreed That Videos Were Helpful in Relation to Each of the Following Statements*

| Statement                                                                        | Problem A<br>(n=19) | Problem B<br>(n=12) |
|----------------------------------------------------------------------------------|---------------------|---------------------|
| 1. Getting a feel for what was happening in the internal version of the class.   | 16 (84%)            | 9 (75%)             |
| 2. Providing guidance/support if it was difficult to get started with a problem. | 18 (95%)            | 10 (83%)            |

|                                                                 |          |         |
|-----------------------------------------------------------------|----------|---------|
| 3. Providing guidance/clarity around how to approach a problem. | 17 (89%) | 9 (75%) |
| 4. Providing guidance/clarity around solutions.                 | 13 (68%) | 7 (58%) |
| 5. Making them to feel less alone as an external student.       | 9 (47%)  | 9 (75%) |

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### ***Which Mode Did You Prefer?***

From their experiences of working on two problems, students were asked to reflect on their preferred mode for problem solving: online or in-class. As a reminder, seven of the 19 students who completed Problem A and four of the 12 students who completed Problem B in online mode have previously studied mathematics courses at the university in external/online mode.

#### ***Problem A***

Of the 18 students, 14 (of which seven had previously studied mathematics in an online mode) who responded to this question indicated a preference for problem solving in face-to-face mode. Responses include:

I much prefer working in a face-to-face group in comparison to online. Problem solving was quite similar, except that not all ideas can be extracted from video, in comparison to in-person. With face-to-face, you are also able to obtain visual representation of problem solving, whether it is gaining assistance or giving in.

I prefer face to face for the reason that you can all write things down together and discuss in real time, however if I had to do this online, this way of doing things would be more than ok to complete these sort of workshops.

Of the remaining four, three indicated that working with the videos in external mode was a similar problem-solving experience for them. One of these students had previously studied in online mode and they added, “however you somehow feel isolated as you can’t share your ideas with your peers and bounce off of their ideas in a way that makes problem solving seem fun.” The other student noted a preference for working independently, so they don’t have a preference for either online or face to face, adding that working in online mode can be “quicker to get through the content because I was not getting distracted by others, however, it would be more difficult if I was to get stuck and needed assistance.” This student had not studied mathematics in online mode before.

#### ***Problem B***

Of the 12 students, nine (of which four had previously studied mathematics in an online mode) indicated a preference for problem solving in face-to-face mode. Responses include “I prefer face to face as I like to also have the social aspect of class but with the maths I found it to be 50/50 I liked hearing other people’s point of view and help me start the problem”; “I think

face to face is much better. I believe you learn more working in groups and ways to solve a problem that you wouldn't necessarily think of" and

I found working face to face easier as I can find help to the specific question that arise from me. I had questions about the groups I was viewing and it was frustrating no being able to interact with the people in the video for explanations or clarifications. The problem-solving process took longer and was less fun than working with others. However, the video was more beneficial than working completely alone.

Of the remaining three students (none of whom had previously studied mathematics in online mode), one student indicated that the mode didn't really matter to him, noting that "both required independence and problem-solving skills. Face to face just allows for further communication if needed." Another indicated they prefer working independently, so online is their preferred option, adding "It was definitely a different kind of experience [using the videos] but was easy enough to overcome. Maybe if the problem was more difficult, I would have benefited from face-to-face discussion." Similarly, the third student said

It was a different problem-solving experience, I did like this way however as I was able to use the videos to help understand the question. I would struggle however if the video did not explain the problem very well and then I wouldn't be able to work with others to discover how to attempt the problem.

In summary, of the 31 students, 23 expressed a preference for face-to-face problem solving. Sixteen of these 23 students highlighted that real-time or synchronous communication with peers and instructors influenced their choice. These students liked that they could talk to someone else to guide their thinking, for example, "The online support [the 360-degree videos] was useful for tackling the problem independently, however I am not able to ask questions and have meaningful conversations." Additionally, seven of these 23 students noted that face-to-face problem solving allowed them to see others' work, and that they preferred having this visual component to problem solving. While they preferred face-to-face problem solving, six students commented that, if they had to study online, the problem-solving framework and the videos would help them to succeed. Only three of the 31 students preferred online mode for problem solving, citing its efficiency and lack of distractions. However, the students also noted that if the problem had been more difficult, they might have preferred a face-to-face discussion.

### ***Are There Modifications or Changes That Would Make the Videos More Useful?***

Students were asked to reflect on what would make the 360-degree video snippets more useful. The most common suggestion (n=9) raised by students was to include a greater emphasis on student written work, for example, "greater emphasis on what students are writing ... recorded working out as well as discussions. Listening to their reasoning was good but I couldn't visualise what they meant sometimes." Only one other suggestion was made by more than one student, and that was to confirm some more specific detail about the problem such as explaining the intent/purpose as well as clarifying if the group in the video is working on the most efficient approach. This comment suggests that the student was focused more on solving the problem, rather than learning about the problem-solving process, as detail about the latter is provided alongside each video in the online framework. One student suggested more videos

would be helpful adding “the more opinions and ideas, the better” and another suggested more students from other groups interjecting and challenging ideas of the group within a video would be helpful.

Some students also made note of the quality of the audio being inconsistent, particularly in relation to hearing the lecturer address the whole class. Another student suggested adding subtitles to help with audio issues. A technical issue was raised about playing the videos on particular types of phones or tablets. Both of these comments are worth consideration as they raise questions about access to the knowledge and information being disseminated in online form.

## Discussion

The initial findings suggest that the majority of students prefer a face-to-face learning environment. They feel secure having others with whom to discuss and ask questions. In-the-moment availability of a teacher or peers also emerged as a key factor. The perceived importance of having peers or an educator at hand is not surprising, particularly in the context of the students’ previous learning experiences in this course, which was very collaborative in nature. The premise is also well aligned with the view of Borko et al. (2008) and Ham and Hwang (2021) that knowledge and meaning can be co-constructed or refined through the social practices of discussion and peer-to-peer explanation. The preference for immediate social interaction parallels the findings of Choi and Walters (2018), who found that while synchronous discourse sessions improved mathematical performance in online environments, students still required real-time coordination for meaningful collaboration.

Collectively, these findings underscore the rationale for developing pseudo-synchronous learning approaches that bridge the gap between the flexibility of asynchronous learning and the immediate social support valued in synchronous environments. Our 360-degree video approach appears to occupy a middle ground, providing access to collaborative processes when face-to-face interaction is unavailable while acknowledging that technological solutions may serve best as supplements to, rather than replacements for, the immediacy of in-person collaboration. Such an approach supports Picciano's (2017) argument that effective online education requires thoughtful integration of multiple modalities rather than simple translation of face-to-face methods.

As discussed earlier, group work in asynchronous learning is complex with studies (e.g. Peterson et al., 2009) highlighting how poor or limited communication contributes to disengagement, lower perceptions of belonging, and higher negative affect. The insights provided by students clearly demonstrate that the social components of learning remain critical in online learning environments, regardless of student’s stated preference for face-to-face or online learning modes. Thus, the findings in this pilot align with the arguments presented by Gillett-Swan (2017) and Stoessel et al. (2015) regarding the importance of prioritizing social interaction and relationship development in online learning environments. Regardless of the chosen learning mode, students need to feel connected to their learning, peers, and educators. The pseudo-synchronous approach trialed in this study is one attempt to foster a sense of connection among online learners.

While the data indicates that the majority of students felt the use of 360-degree video excerpts would not sway them to choose an online mode over face-to-face mode, they did indicate that, if compelled to study online, these videos would have helped them have a sense of how other students might be thinking and working. This finding aligns with social presence theory, which emphasizes how learners' sense of connection and awareness of others can enhance learning engagement (Garrison et al., 2000). The 360-degree videos appear to facilitate vicarious learning, allowing students to observe and learn from peer strategies and approaches even in the absence of direct interaction. Additionally, they felt the videos would help alleviate feelings of isolation, especially in the context of challenging problem-solving tasks. Students recognized the value of having pre-planned 360-degree video snippets as a tool, particularly when they needed guidance on getting started or if they got stuck. This observation echoes the findings of Barfield (2016) and O'Leary and Wood (2019), suggesting that the collaborative component adds an extra layer of feedback on one's own approaches (informally from group members) and creates more opportunities to see other approaches and ways of thinking.

Importantly, students demonstrated metacognitive autonomy in their engagement with the videos, using them strategically rather than passively. Rather than watching all content sequentially, some students made deliberate decisions about which parts of videos to engage with based on their own requirements, such as using them for comparison after reaching solutions, for clarification when stuck, or skipping ahead when confident in their approach. This strategic engagement reflects both the social and cognitive dimensions of collaborative problem solving (Hesse et al., 2015), where students gain insights from peer approaches whilst engaging in individual reflection and self-regulated learning.

The findings also demonstrate how these videos can support the social dimension of collaborative problem solving (Hesse et al., 2015), even in asynchronous contexts. When students encountered difficulties and turned to the videos for support, they were effectively accessing peer perspectives and collaborative strategies, extending the benefits of group problem solving beyond traditional synchronous settings. However, while the 360-degree videos supported many aspects of collaborative learning, there were (surprisingly) some limitations in relation to the social dimension of collaborative problem solving. Although Hesse et al. (2015) emphasize the importance of real-time negotiation and dynamic interaction, the videos could only provide one-way observation (leading to some frustration at being unable to interact with people) rather than the reciprocal exchange required for true collaboration. The students who preferred online problem solving did so primarily because they perceived it to be more efficient, suggesting they were primarily focused on completing the task (the *work group* mentality) rather than learning about other ways of solving problems (the *learning group* mentality). This focus underscores the challenge of fostering genuine collaborative learning in online environments, where the social dimension of problem solving can easily be overshadowed by task completion. The findings also highlight the importance, in a collaborative learning environment context, of choosing tasks that are at the level of challenge that require students to *need* to work with others—that is, moving students out of *work group* mode and into *learning group* mode (Graham & Misanchuk, 2004). Thus, the level of challenge presented by the problem should contribute to a learning-group oriented focus, shifting emphasis from end-product to process. Reflecting on the student data makes it clear that specific design choices within the online framework are crucial in supporting this shift in thinking from *work group* to *learning group*. Key design elements that appeared to drive this shift included the strategic

positioning of videos at decision points rather than as passive content, embedded reflective questions that prompted metacognitive thinking, and the optional nature of video supports that required students to make deliberate choices about their engagement. Over-scaffolding can reduce or eliminate the problem-solving aspect of the task. Therefore, a key insight of this project from an educator perspective is that the level of scaffolding or structure provided must be carefully tailored, with its pitch being just as significant as the difficulty level of the problem itself.

On average, students spent more time engaging in online problem solving than their in-class peers. We see three potential reasons for this that need further investigation: (1) the in-class time allocated to the problem is directed by the teacher/educator and there may have been individuals who would have liked more time to work on the problem; (2) the online collaborative problem-solving environment included more in-built reflection and required more processing time (Balzaretto et al., 2019; Rich & Hannafin, 2009) and hence students needed more time to work through the problem; (3) the mechanics of working through an online platform to submit and move through the stages of the learning framework may have added more time. These findings suggest several design recommendations for future online delivery, including developing more intuitive navigation systems to reduce time spent on platform mechanics, creating faster transitions between framework stages, and providing scaffolding feedback that helps students gauge appropriate time investment for different phases of problem solving. Additionally, incorporating timing guidance or optional pacing suggestions could help students manage their engagement more effectively while preserving the flexibility that asynchronous learning offers.

Studies such as Ham and Hwang (2021) point to the limitations of focusing on the end-product in collaborative mathematical problem solving. In this study, the videos served as optional supports during each phase of problem solving. For instance, during the entry phase, students who were unsure of how to get started had the option of hearing and seeing the initial discussions from one of the in-class groups, thereby redirecting the focus from worked solutions to idea generation. Similarly, during the attack phase, students could review alternative approaches through the 360-degree video prompts without being exposed to the answer or solution. This is particularly important in the context of mathematical problem solving, where a key part of the learning is in knowing what to do when you don't know what to do. Over-scaffolding by providing solutions too early removes opportunities to challenge and extend students' thinking. This approach contrasts with the worked-example effect (Sweller et al., 1998), which emphasizes the benefits of showing complete solutions to reduce cognitive load for novice learners. While worked examples can be effective for skill acquisition, our design deliberately withholds full solutions to maintain the productive struggle essential for developing problem-solving competence. This creates a tension between providing sufficient guidance to support learning and preserving the exploratory nature that fosters deeper mathematical thinking and metacognitive development.

Additionally, the design of these video supports aligns with Foster's (2019) principles of scaffolding the problem-solving process rather than the specific problem itself, providing guidance on approach rather than solutions. Students, particularly those in Problem A, highlighted that the videos helped them make comparisons between their work and that of others, clarify their own thinking processes, and think of other ways of approaching the



problem. The students' ability to reflect on and evaluate their own thinking processes echoes the metacognitive awareness that Schoenfeld (1992) identified as crucial for effective problem solving.

The student comments highlighted that 360-degree video excerpts provided authentic experiences (Rosendahl & Wagner, 2023). Rather than polished examples, they featured actual students working through the various stages of solving a problem. This was an intentional decision by the teaching team to underscore a focus on the process, rather than a solution or end-product. Emphasizing that authentic problem solving is inherently messy and non-linear was also important, as being good at problem solving is not necessarily about finding a straightforward path to the solution — a point that can get lost when studying in isolation without exposure to the difficulties that others may be encountering. In some ways this is a pseudo-synchronous interpretation of Ham and Hwang's ideas (2021) of learning through dialogical interactions and the importance of developing and refining understanding of mathematical concepts. Our intention was that students might gain insights from hearing and seeing the diverse range of approaches and strategies of their peers. The findings indicate that seeing the “forwards and backwards” of group discussion, including mistakes, helped reassure some students working in online mode. However, it appears that the success of this approach is problem-dependent, as students who perceived the problem as too easy tended to skip over the details presented in the 360-degree videos. This highlights some limitations of the 360-degree video approach. The risk of passive viewing emerged when students found problems insufficiently challenging, suggesting that the immersive format alone cannot guarantee active engagement. Additionally, some students may have experienced cognitive overload from processing both the mathematical content and the 360-degree video simultaneously, a challenge for immersive learning environments as discussed by Mayer (2020). This warrants further investigation. Future research should systematically examine how problem characteristics—such as complexity level, solution pathways, and cognitive demand—affect student engagement with 360-degree video supports to improve pseudo-synchronous collaborative learning experiences.

While the 360-degree videos showed promise in supporting both social and cognitive dimensions of collaborative problem solving, our findings reveal both the potential and complexity of translating face-to-face collaborative benefits to online environments. The technology appears most effective when thoughtfully integrated with appropriately challenging tasks and careful scaffolding design, suggesting that pseudo-synchronous approaches can serve as valuable supplements to, rather than replacements for, traditional collaborative learning experiences.

### ***Limitations***

This study has limitations that should be considered when interpreting the findings. The survey response rate for the online problem solving was 68% for Problem A and 43% for Problem B. Non-response bias may limit the generalizability of results. Some students chose not to respond to the survey and hence are not represented in our understanding of the overall student experience. The voluntary nature of participation also introduces self-selection bias, as students who chose to engage with the online problem-solving framework may have been more

motivated, technologically comfortable, or generally more engaged with the course content, limiting generalizability to the broader population of mathematics pre-service teachers.

Technical and measurement issues also posed limitations. While we noted that two students experienced issues with the 360-degree videos, other students may have had similar problems that influenced their decision not to participate or respond to surveys. Such technical barriers could impact both the quality of the learning experience and students' willingness to engage fully with the online components, potentially affecting our assessment of the pedagogical approach's effectiveness. Our measurement of online engagement time was based on browser window activity rather than actual problem-solving time. Students may have left windows open while attending to other tasks, meaning that our time data may overestimate actual engagement and limit our understanding of the relationship between time investment and learning outcomes.

The qualitative analysis process, while following established procedures, has methodological constraints. The coding process was conducted primarily by two researchers, and inter-rater reliability was not formally assessed, which may affect the consistency and credibility of the thematic analysis. Additionally, the study relied solely on survey data and did not include follow-up interviews with participants, which significantly limited data triangulation and our ability to explore student experiences and perspectives in greater depth or to clarify ambiguous survey responses. Finally, our statistical analysis methods, while appropriate for the data collected, were limited to descriptive statistics due to the small sample size precluding more sophisticated analyses.

These limitations suggest that future research should employ larger, more representative samples with mandatory participation, systematic documentation of technical issues, and more rigorous qualitative analysis procedures including inter-rater reliability assessments and interview data.

## Conclusion

The importance of collaborative learning opportunities is well-established in educational contexts, with benefits including communication, interpersonal skills, metacognitive thinking, and problem solving. This study confirms that these skills are equally important for students who opt for or need to learn via online learning environments, despite the challenges of prioritizing collaboration in asynchronous modes.

Our findings directly address the research question (*In what ways can 360-degree video be useful for emulating collaborative mathematical problem solving for asynchronous online learners?*) by demonstrating that the pseudo-synchronous experiences facilitated by 360-degree video and piloted in this study were deemed by students as useful and worthwhile, and could enhance their sense of connection to their coursework, their educators, and their peers. Students referred to the opportunities created to “check in” on processes and progress via the videos, which served as viable alternatives to checking in with peers or teachers. While acknowledging that the pseudo-synchronous experiences are not identical to face-to-face or synchronous interactions, students found value in using the videos as they allowed them to validate their own

approach and observe their peers' work (albeit not necessarily the finished product)—tasks typically confined to face-to-face or synchronous modes of learning.

The wider project in which this paper is situated explores strategies to support students in online learning environments to engage in collaborative mathematical problem solving, which poses a significant pedagogical challenge. However, refining our online pedagogical skillset is becoming increasingly important, not only because more students seek to flexibly engage in higher education but also to enable teachers and educators across all sectors to be ready to respond to shifting learning activities online as and when needed.

## References

- Balzaretti, N., Ciani, A., Cutting, C., O’Keeffe, L., & White, B. (2019). Unpacking the Potential of 360degree Video to Support Pre-Service Teacher *Development. Research on Education and Media*, 11(1), 63–69. <https://doi.org/10.2478/rem-2019-0009>
- Barfield, A. (2016). Collaboration. *ELT Journal*, 70(2), 222–224. <https://doi.org/10.1093/elt/ccv074>
- Borko, H., Jacobs, J., Eiteljorg, E., & Pittman, M. E. (2008). Video as a tool for fostering productive discussions in mathematics professional development. *Teaching and Teacher Education*, 24(2), 417–436. <https://doi.org/10.1016/j.tate.2006.11.012>
- Borup, J., West, R. E., & Graham, C. R. (2012). Improving online social presence through asynchronous video. *The Internet and Higher Education*, 15(3), 195–203. <https://doi.org/10.1016/j.iheduc.2011.11.001>
- Choi, J., & Walters, A. (2018). Exploring the impact of small-group synchronous discourse sessions in online math learning. *Online Learning*, 22(4), 47-64. <https://doi.org/10.24059/olj.v22i4.1511>
- English, L., & Gainsburg, J. (2015). Problem solving in a 21st-century mathematics curriculum. In *Handbook of International Research in Mathematics Education* (3rd ed.). Routledge.
- Foster, C. (2019). The fundamental problem with teaching problem solving. *Mathematics Teaching*, 265, 8–10.
- Foster, C. (2023). Problem solving in the mathematics curriculum: From domain-general strategies to domain-specific tactics. *The Curriculum Journal*. <https://doi.org/10.1002/curj.213>
- Gillett-Swan, J. (2017). The challenges of online learning: Supporting and engaging the isolated learner. *Journal of Learning Design*, 10(1), 20–30.
- Graham, C. R., & Misanchuk, M. (2004). Computer-mediated learning groups: Benefits and challenges to using groupwork in online learning environments. In T. S. Roberts (Ed.), *Online collaborative learning: Theory and practice* (pp. 181–202). Idea Group.
- Ham, Y., & Hwang, J. (2021). Mathematical literacy and collaborative problem-solving: comparison between Korean and U.S. *Journal of Educational Research in Mathematics*, 31(3), 299–320. <https://doi.org/10.29275/jerm.2021.31.3.299>
- Hesse, F., Care, E., Buder, J., Sassenberg, K., & Griffin, P. (2015). A framework for teachable collaborative problem solving skills. In P. Griffin & E. Care (Eds.), *Assessment and teaching of 21st century skills: Methods and approach* (pp. 37–56). Springer.
- Jaques, D., & Salmon, G. (2007). *Learning in groups: A handbook for face-to-face and online environments*. Routledge.

- Lesh, R., & Zawojewski, J. (2007). Problem solving and modeling. *Second handbook of research on teaching and learning*, 2, 763-804.
- Lester, F. K., & Cai, J. (2016). Can mathematical problem solving be taught? Preliminary answers from 30 years of research. In P. Felmer, E. Pehkonen, & J. Kilpatrick (Eds.), *Posing and solving mathematical problems: advances and new perspectives* (pp. 117–135). Springer International Publishing. [https://doi.org/10.1007/978-3-319-28023-3\\_8](https://doi.org/10.1007/978-3-319-28023-3_8)
- Mason, J., Burton, L., & Stacey, K. (2010). *Thinking mathematically* (2<sup>nd</sup> ed.) Prentice Hall. (Original work published 1982)
- Mayer, R. E. (2020). *Multimedia learning* (3rd ed.). Cambridge University Press. <https://doi.org/10.1017/9781316941355>
- National Council of Teachers of Mathematics [NCTM] (2000). *Principles and standards for school mathematics*. NCTM
- NRICH. (n.d.). *M, M and M*. <https://nrich.maths.org/problems/m-m-and-m>
- OECD (2017). *PISA 2015 assessment and analytical framework: Science, reading, mathematics, financial literacy and collaborative problem solving*. OECD Publishing.
- Olivares, D., Lupiáñez, J. L., & Segovia, I. (2021). Roles and characteristics of problem solving in the mathematics curriculum: A review. *International Journal of Mathematical Education in Science and Technology*, 52(7), 1079–1096. <https://doi.org/10.1080/0020739X.2020.1738579>
- O’Keeffe, L., Alessandra, R. Vannini, I., & White, B. (2020). Promote informal formative assessment practices in Higher Education: The potential of video analysis as a training tool. *Form@re: Open Journal per la formazione in rete*, 20(1), 43-61.
- O’Keeffe, L., & White, B. (2022). Supporting mathematics pre-service teacher reflection with 360degree video and the knowledge quartet. *Australian Journal of Teacher Education*. 47(3).
- O’Leary, M., & Wood, P. (2019). Reimagining teaching excellence: Why collaboration, rather than competition, holds the key to improving teaching and learning in higher education. *Educational Review*, 71(1), 122–139.
- Peterson, A. T., Beymer, P. N., & Putnam, R. T. (2019). Synchronous and asynchronous discussions: Effects on cooperation, belonging, and affect. *Online Learning*, 22(4), 7-25. <https://doi.org/10.24059/olj.v22i4.1517>
- Picciano, A. G. (2017). Theories and frameworks for online education: Seeking an integrated model. *Online Learning*, 21(3), 166-190. <https://doi.org/10.24059/olj.v21i3.1225>
- Pólya, G. (2004). *How to solve it: A new aspect of mathematical method* (Vol. 85). Princeton University Press. (Original work published 1945)

- Rich, P. J., & Hannafin, M. (2009). Video annotation tools: Technologies to scaffold, structure, and transform teacher reflection. *Journal of Teacher Education*, 60(1), 52–67.  
<https://doi.org/10.1177/0022487108328486>
- Rosendahl, P., & Wagner, I. (2023). 360° videos in education – A systematic literature review on application areas and future potentials. *Education and Information Technologies*.  
<https://doi.org/10.1007/s10639-022-11549-9>
- Schoenfeld, A. H. (1985). *Mathematical problem solving*. Academic Press.
- Schoenfeld, A. H. (1992). Learning to think mathematically: Problem solving, metacognition, and sense-making in mathematics. In D. Grouws (Ed.), *Handbook for research on mathematics teaching and learning* (pp. 334–370). New York: MacMillan.
- Schoenfeld, A. H. (2016). Learning to think mathematically: problem solving, metacognition, and sense making in mathematics (Reprint). *Journal of Education*, 196(2), 1–38.  
<https://doi.org/10.1177/002205741619600202>
- Schukajlow, S., Rakoczy, K., & Pekrun, R. (2023). Emotions and motivation in mathematics education: Where we are today and where we need to go. *ZDM-Mathematics Education*, 55(2), 249–267. <https://doi.org/10.1007/s11858-022-01463-2>
- Stacey, K. (2022). Looking back on Pólya’s teaching of problem solving. *Teaching Mathematics and Computer Science*, 20(2), 207–217.
- Stahl, G., Koschmann, T., & Suthers, D. (2014). Computer-supported collaborative learning. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (2nd ed., pp. 479–500). Cambridge University Press. <https://doi.org/10.1017/CBO9781139519526.029>
- Stoessel, K., Ihme, T. A., Barbarino, M-L., Fisseler, B., & Sturmer, S. (2015). Sociodemographic diversity and distance education: Who drops out from academic programs and why? *Research in Higher Education*, 56, 228–246.
- Sweller, J., van Merriënboer, J. J. G., & Paas, F. G. (1998). Cognitive architecture and instructional design. *Educational Psychology Review*, 10, 251–296.

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# EFL Learners' Writing Performance and Perception in a Flipped Classroom Model with Self-Regulated Strategy Development Instructions

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## Abstract

The use of the flipped classroom has increased in the context of learning English as a Foreign Language (EFL). However, only a few studies have reported on how to expand flipped classroom instructional strategies in EFL writing classes. Meanwhile, prior studies have examined the effect of self-regulated strategy development (SRSD) on improving students' writing performance by applying self-regulation procedures. This study proposes an extension of the classic flipped classroom model by combining it with SRSD. To investigate the effect of SRSD instruction on students' writing performance in a flipped classroom, we conducted an experimental design study with three classes involving 90 students across 13 weeks. The first group received flipped classroom model (FCM) with SRSD instruction, the second group received the FCM, and the control group received regular classroom writing activities. The results indicated that the first group demonstrated better writing performance and positive student perceptions. Findings suggested that a strong potential effectiveness of flipped classroom combined with SRSD instruction in cultivating students' writing performance.

**Keywords:** Flipped classroom; Higher education; Self-regulated strategy development; Writing performance

Diningrat, S., Bachri, B., & Cinantya, I. (2025) EFL learners' writing performance and perception in a flipped classroom model with self-regulated strategy development instructions. *Online Learning*, 29(4), 367-388. <http://doi.10.24059/olj.v29i4.4268>

## Introduction

The FCM has been widely used in higher education to foster student-centered learning and active learning processes (Chen et al., 2025; Chen W., 2024). This instructional model has also been broadly implemented among undergraduate students across disciplines. The major advantages it offers are related to the development of students' deep understanding of the materials by providing them with more control and helping them strengthen their conceptual understanding (Al-Samarraie et al., 2020). The FCM is becoming increasingly popular in the field of English language teaching; indeed, a growing body of literature suggests its increased use in English Language Training of English as a Foreign Language (ELT/EFL) (Shahnama et al., 2021; Turan & Akdag-Cimen, 2019). The flipped classroom offers educational benefits that potentially affect the development of foreign language skills and support the implementation of communicative and student-centered learning environments in the EFL classroom (Mehring, 2016). For example, Öztürk & Çakıroğlu (2021) indicated that the flipped classroom could improve EFL skills such as speaking, reading, writing, and grammar test scores.

While promising, the FCM unfortunately may not always be effective in writing instruction, especially if it is not well-implemented into the course (Brewer & Movahedazarhouli, 2018). Its design is not a replacement of lectures with video; rather, it requires a complete redesign of the student learning experience with a focus on student-centered learning processes that coherently link learning activities in pre- and in-class sessions (Chiang & Wu, 2021). Writing, in particular, is one of the most complex learning activities in EFL learning (Ruan, 2014; Teng et al., 2022). More research regarding design and implementation to examine its effectiveness and strengthen the theory underlying the flipped classroom in higher education is much needed (Chiang & Wu, 2021; Shahnama et al., 2021).

Another promising instructional strategy for improving students' writing performance is self-regulated strategy development (SRSD). SRSD was designed to improve students' English writing ability by incorporating writing strategies, knowledge or skill, and self-regulation procedures into writing instruction (Harris et al., 2013). Prior studies have evaluated the effectiveness of SRSD in writing and suggested that it benefits students in terms of writing length, elements, and quality (De La Paz & Graham, 2002; Harris et al., 2006, 2012; Wong et al., 2008). In addition, previous research in the FCM has shown that students' success in writing courses is connected to their self-regulated learning—a proactive process through purposeful goal setting, strategy execution and monitoring, and reflection to continuously improve learning (Zimmerman, 2002). Thus, it becomes essential to suggest a unique solution for enhance performance in writing through pre- and in-class sessions of the flipped classroom.

In the FCM, it is difficult for students to manage how and when they should study or how to evaluate their learning session (Zou et al., 2020). Therefore, teachers in the classroom potentially benefit more from SRSD (Öztürk & Çakıroğlu, 2021), and a model associating the SRSD and writing sub-skills is much needed to guide them (Li, 2025). Both pre- and in-class sessions of the FCM should be redesigned to support students' writing performance



through SRSD instruction. Although previous research has investigated the use of the FCM in EFL courses, the conditions under which SRSD strategies foster the students' performance in writing remain unclear (Cengiz & Ataş, 2025; Nouraei Yeganeh & Nemati, 2025; Öztürk & Çakıroğlu, 2021). Therefore, this paper aims to bridge this gap in the literature by investigating the effect of the FCM combined with SRSD on students' writing performance and perception. The following research questions guided this research:

1. How do students perceive the FCM combined with SRSD?
2. How does the writing performance of EFL students in the experimental condition compare with such performance for the control condition?

## Literature Review

### *Flipped Classroom and Student Perception*

The traditional method of higher education usually involves lectures wherein students focus on basic thinking tasks such as recalling information (Anderson et al., 2001), while more complex cognitive tasks are done independently at home. However, in the FCM, students are provided with a pre-class session as preparatory material, allowing them to focus on more interactive and complex tasks such as problem-solving activities during the in-class session. Therefore, this instructional model shifts simple cognitive tasks to be completed outside class, leaving class time for deeper learning via analysis, evaluation, or creation with support from teachers and peers (Kwong et al., 2024; Zdravković et al., 2025). Studies suggested that the FCM enhances students' comprehension and engagement with higher-order thinking activities (DeRuisseau, 2016; McLaughlin et al., 2014), such as encouraging students to contribute to the generalizing and justifying of argumentation (Özcan & Zengin, 2024).

A systematic review of the literature on FCM based on an analysis of 34 published articles indicated that it not only improved students' academic performance but also developed their self-regulation, confidence, and higher-order thinking skills (Zou et al., 2020). Similarly, Turan & Akdag-Cimen (2019) also emphasized the advantages of the flipped classroom in EFL courses such as enhancing engagement, writing skills, reading comprehension, and as well as listening and speaking skills.

However, in regard to the satisfaction and learning outcomes, a previous study showed that the FCM effect is not as significant in general and there is a great variation in effect size between studies (van Alten et al., 2019). Several FCM in EFL indicated that the students performed the same or even worse than in a regular classroom (Al-Harbi & Alshumaimeri, 2016; Fraga & Harmon, 2014). This could be explained by the study of Turan & Akdag-Cimen (2019), where they found that challenges faced by the implementation of the FCM in English language teaching were extra workloads for both teachers and students as well as writing anxiety. Therefore, Shahnama et al. (2021) suggested about the implementation of FCM in the EFL field in which it has the potential to improve students' achievement if appropriately designed and implemented. In addition, the FCM is not simply

using videos to replace lectures; it requires an alignment between the learning activities in pre- and in-class sessions while focusing on the student-centered learning process. It is not a surprise that the continuous investigation of the design and implementation of the FCM helps examine its effectiveness and strengthens the theory underlying it (Chiang & Wu, 2021; Shahnama et al., 2021).

In recent years, the promising potential of the FCM has drawn the attention of some researchers interested in writing pedagogy (Rad et al., 2021). Writing is an essential ingredient for students to be academically, professionally, and socially successful. However, during the last decade, writing has reportedly been one of the most complex activities students deal with in the process of learning EFL. Although the challenges in improving EFL writing are multidimensional, researchers claimed that one reason may be the lack of writing strategies (Ruan, 2014; Teng et al., 2022).

Although the concept of the FCM has garnered considerable attention, further research is still needed to assess students' perception of learning (Roach, 2014). Since this paper is a first attempt at motivating the research of FCM implementation in the EFL Ma & Luo (2021) suggested the research should focus on the perceptions of students during the adoption of new teaching models.

### ***Self-Regulated Strategy Development in Writing Instruction***

One of the promising instructional strategies in improving students' writing performance is self-regulated strategy development (SRSD). SRSD aims to promote students' independent use of strategies for accomplishing targeted writing tasks, such as planning, revising, as well as the knowledge and self-regulation procedures that are needed to manage these strategies, processes, and behaviours (Harris & Graham, 2009; Sun et al., 2022). SRSD was designed to enhance students' English writing ability by integrating writing strategies, knowledge or skill, and self-regulation procedures into writing activities (Harris et al., 2013).

A large body of literature has evaluated the effectiveness of SRSD in writing and concluded that students benefited from its instruction in terms of writing length, elements, and quality. For example, De La Paz & Graham (2002) found that it helped students in the treatment group produce longer persuasive and informative writings than students in the comparison condition. Another example found that students included significantly more elements in stories, persuasive writing, or narrative writing than their counterparts in the control group did (Harris et al., 2006, 2012). In regard to the writing quality, Wong et al. (2008) found that after receiving a seven-week SRSD instruction, students in the treatment condition tended to produce clearer and more organized writing than students in the comparison group. Previous research regarding the FCM has shown that students' success is related to their self-regulated learning (SRL). The study conducted by Öztürk & Çakıroğlu (2021) examined the development of students' writing skills in a flipped classroom designed with self-regulated learning strategies. The findings demonstrated that the application of self-regulated learning strategies had a positive impact on the enhancement of writing skills within the context of a FCM. However, for generalization, further studies are needed to

investigate the flipped classroom designed with self-regulated learning strategies with specific instructional units about EFL (Öztürk & Çakıroğlu, 2021).

## Method

### *Participants*

This study was conducted at a public university in Indonesia. Participants were associate degree students who took an argumentative writing course in the 2022/2023 academic year. All participants were majoring in English. Student participants (N=90) were recruited from three intact classes in the argumentative writing course in State Polytechnic of Malang.

### *The Conceptual Framework of Flipped Classroom Combined with SRSD Instruction*

Argumentative writing is a core module for the university's undergraduate students majoring in EFL. A FCM model combined with SRSD is aligned with the curriculum objective of developing students' writing skills. A FCM combined with SRSD is a modified flipped classroom model in which the learning stages in self-regulated strategy development are organized into pre-class and in-class sessions (see Figure 1).

**Figure 1**

*A Flipped Classroom Model with Self-Regulated Strategy Development Strategy*

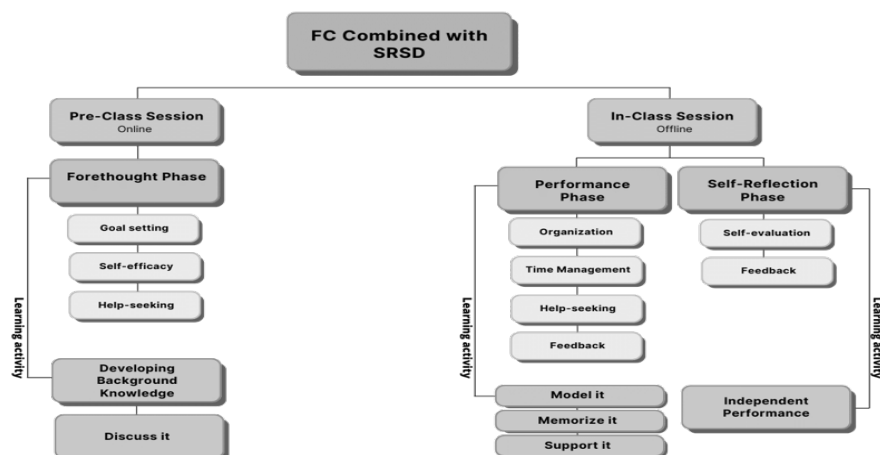
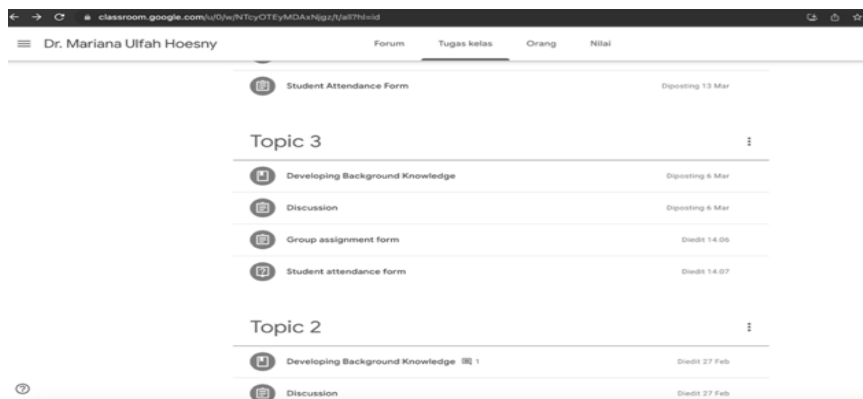


**Figure 2**

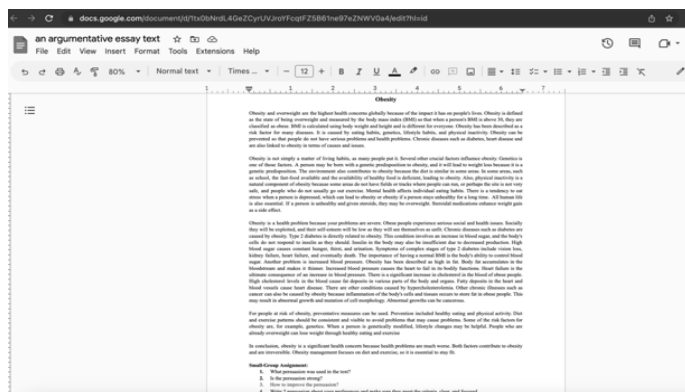
*A screenshot of Pre-class Learning Activity*



In the pre-class session, the first lesson began with an introduction of the general goals for each instruction, followed by an analysis of exemplar texts about argumentative essays to activate students' background knowledge. In this lesson, students watched videos and read course materials posted by teachers on virtual learning environments such as Google Classroom (see Figure 2). In the first learning activity, *Developed background knowledge*, by exploring the course materials activities may begin development of self-regulation and introduction goal setting. In the second activity, *discuss it*, teachers presented the questions for evaluating an argumentative essay text and guided students to focus on evaluating the comprehensiveness and quality of argumentative elements (see Figure 3). The students worked collaboratively in small groups in order to prepare the learning activity for the next classroom session. These activities could establish role of student effort and strategy use as well as self-regulation of help-seeking when each of the students within a group needed help.

**Figure 3**

*A Screenshot of Discussion Activity in Pre-class Learning Activity*



During the in-class session, the learning activity was divided into two parts. The first part was the performance phase and the second was the self-reflection phase. In the performance phase (see Figure 4), the teachers modelled making meaningful evaluations, such as evaluation of the students' work, to elicit from students' reflection on their work. Students used the evaluation question as guidance to identify and revise problems in the text and were encouraged to memorize it to monitor their use of the strategies.

In addition, individualized support was provided for students who were confronted with difficulties in reviewing exemplar text and answering the questions posed by the teacher. These activities may help to develop self-regulation strategies of organization, help-seeking, and feedback. In the self-reflection phase, students revised their written texts on their own in order to use writing and self-regulation strategies independently. However, the teachers' role is to monitor and support as necessary. These activities may help to develop self-regulation strategies of self-evaluation and feedback.

#### **Figure 4**

*An Example of Performance Phase During In-Class Activity*



#### **Research Design**

The research design was quasi-experimental with three (intact) conditions (Tuckman & Harper, 2012). Classrooms were randomly assigned to conditions: the control group and the experimental groups. In the control condition ( $n=30$ ), the students received their regular writing activities (A). In one experimental condition ( $n=30$ ), the students received writing activities through the FCM (B). In the other experimental condition ( $n=30$ ), the students received writing activities through the FCM combined with SRSD (C).

This study was approved by the Health Research Ethics Committee Faculty of Medicine at Brawijaya University (No. 263/EC/KEPK/12/2022). We strictly followed the ethics guidelines for data collection and analysis, such as anonymity and voluntary participation. Prior to the study, we informed the students about the research design and obtained consent from all the participants, and that they could opt out of the study at any time during the process.

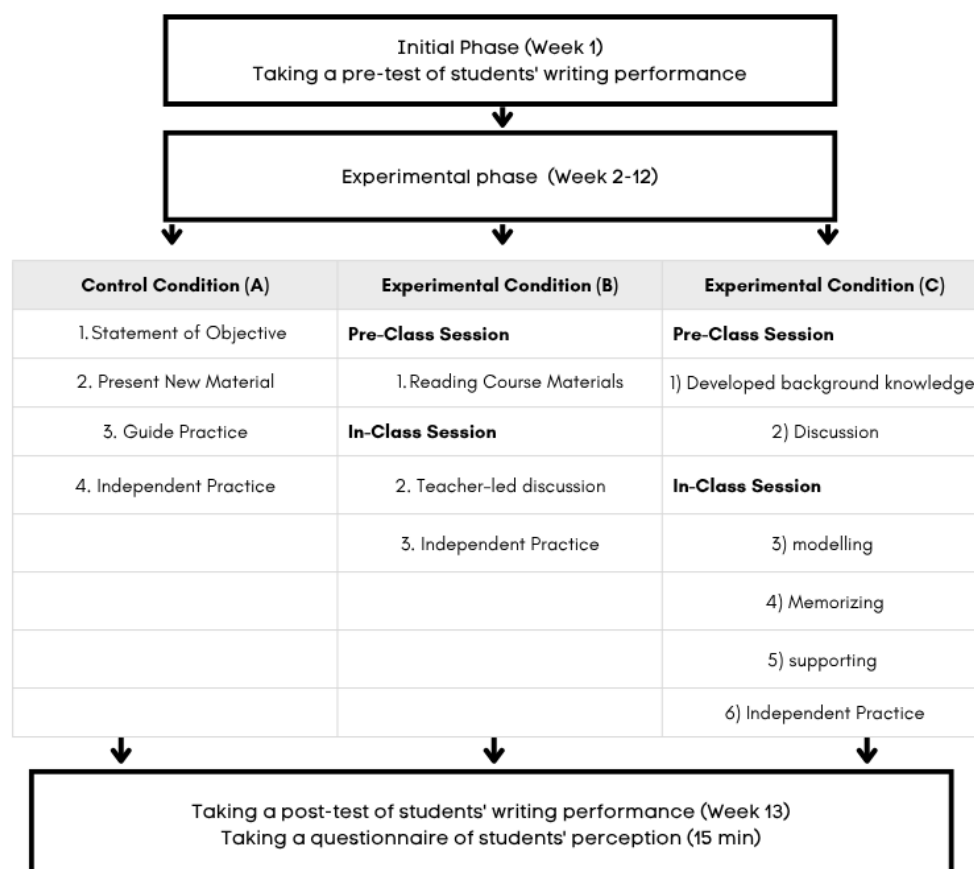
## *Learning Procedures*

The primary instructional design of the 13-week writing activities was followed by three intact classes. The quasi-experimental design was structured into two phases (see Figure 5). The first week was designed as an initiation where the experimenter administrated the writing performance across the control group (A), experimental group (B), and the other experimental group (C). An administration of pre-test writing performance took 90 minutes.

During the control group (A) students participated in the regular writing classroom activities (direct instructions) led by a teacher with a doctorate in English Language Education and an average of five years of teaching experience, as seen in Figure 5. First, the teacher clearly communicated the learning objectives for the argumentative writing course; second, they introduced the new concepts, skills, and examples about the argumentative writing course; and third, they observed students' performance closely and provided feedback as needed. Lastly, they allowed students to practice the skills independently.

In the experimental group (B), students participated in the FCM which consisted of two-phase learning sessions and was led by a teacher with a doctorate in English Language Education and an average of two years of teaching experience in a flipped classroom. The first activity was students reading course materials that were posed by the teacher in an online learning platform (e.g., Google classroom). The second activity was a teacher-led discussion, in which students raised questions and made comments regarding the course material that was posted in the pre-class session. Students were then allowed to practice the skill independently, as seen in Figure 5.

In the other experimental group (C), students worked in the FCM combined with SRSD activities led by a teacher with a doctorate in English Language Education and an average of two years of teaching experience in a flipped classroom. In addition, the teacher in Group C was trained by the researcher in one week to understand the implementation of SRSD instruction in the flipped classroom. In the first activity—the pre-class session,—students developed background knowledge and discussed the argumentative essay posed by the teacher in Google Classroom, as seen in Figure 3. For the development of background knowledge, students watched videos related to the course of argumentative writing, as seen in Figure 6. After watching the videos, the teacher separated the students into small groups and asked them to actively discuss the argumentative essay text posed by the teachers, including how the author managed to meet the writing evaluation criteria. Students were then directed to complete the questions below the texts, as seen in Figure 3. SRL strategies for the forethought phase such as goal setting, self-efficacy, and help-seeking, were embedded in the pre-class session. In the second activity—the in-class session—students received modelling in making meaningful evaluations, encouraging students to memorized the learning content, and support them when they face challenges. Students should revise their written texts independently and teachers should monitor and support as necessary, see Table 1. Therefore, The implementation of SRL strategies during in-class learning activities are as follows: performance phase and self-reflection phase.

**Figure 5***The Research Procedures*

In the final phase, the post-test was administered by two researchers assisted by teachers in week 13. Initially, the students were provided with information about the test rules, after which they had 90 minutes to write an essay on the topic of sex education for early childhood. The researchers also administrated students' perception of their experience after the implementation of flipped classroom with SRSD.

**Table 1***The Procedures of Learning Activity*

| Conditions       | Instructional Model                  | Learning Activities                                                               |                                                                       |                     |
|------------------|--------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------|
|                  |                                      | Pre-class Session                                                                 | In-class session                                                      | After-class session |
| Experimental (C) | A FCM combined with SRSD Instruction | Developing Background Knowledge: student quired the knowledge and skill needed to | Model it: Teacher demonstrated the use of self-regulation strategies. | None                |

|                  |                           |                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                      |                                                                      |
|------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|                  |                           | apply strategy for writing through videos and textbook.<br>Discuss it: students discuss how the author manage to meet the writing evaluation criteria<br>Student complete the questions in the essay text. | Memorize it:<br>Teacher provide prompts for students to use evaluation criteria.<br><br>Support it: Teacher scaffold students' use of self-regulation strategies and provide individualized support.<br><br>Independent performance:<br>Students revise independently without support from teachers. |                                                                      |
| Experimental (B) | A Flipped Classroom Model | Student learn basic knowledge from video and textbook individualized.<br>Student complete the resume Quiz.                                                                                                 | Students clarify any misunderstandings concerning the topics in the videos and textbook and discuss it with teachers and peers.                                                                                                                                                                      | None                                                                 |
| Control (A)      | Regular Writing Classroom | None                                                                                                                                                                                                       | State objectives.<br>Introduction of new materials.<br>Students practice on writing. activities guided by the teacher.                                                                                                                                                                               | Students practice the skills independently (e.g., writing an essay). |

First, the teacher clearly communicated the learning objectives for the argumentative writing course. Second, they introduced the new concepts, skills, and examples about the argumentative writing course. Third, they observed the student's performance closely and provided feedback as needed. Lastly, they allow students to practice the skills independently.

### ***Instruments***

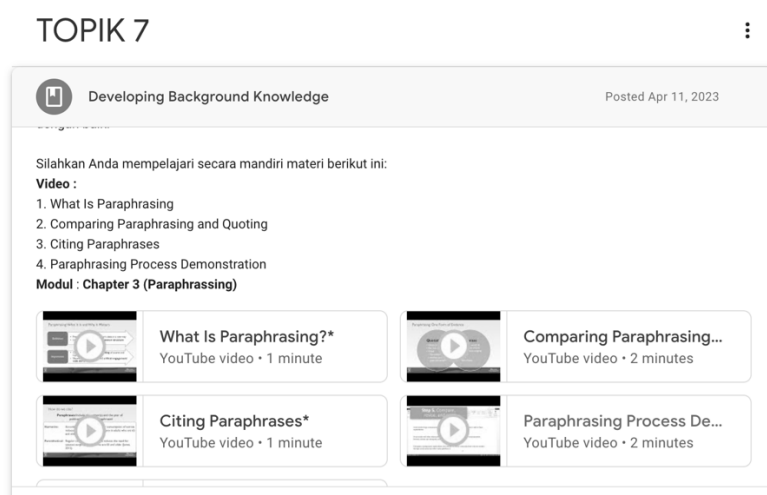
A 10-item questionnaire, which was adopted from the questionnaires of McNally et al., (2017), was used in this study. The questionnaire captured students' perceptions of their



learning experiences in the flipped classroom with SRSD. The questionnaire is comprised of two parts. The first part consisted of four questions for the pre-class learning session and the second part consisted of six questions for the in-class learning session. These questions were scored on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire had been piloted on 40 EFL students in the English department from the same university who had similar characteristics to the main sample. Reliability estimates (Chronbach's alpha) were calculated for two parts (pre- and in-class) and it showed that there were satisfactory results for the pre-class ( $\alpha = 0.75$ ) and in-class ( $\alpha = 0.81$ ).

**Figure 6**

*A Screenshot of Developed Background Knowledge*



In regard to the pre- and post- test of argumentative performance, steps were taken to secure topics likely to be of interest to participants. The argumentative writing instructors reviewed the list of the current topics and it was then distributed to all classes through Google Forms, a free online tool for data collection and analysis of surveys and to identify two topics that were of the greatest interest to them. Based on their responses, the topics with the most votes and the one with the second most votes, which the potential participants had enough background knowledge about and general interest in, were used in the pre-test (Should Kids be Social Media Influencers?) and post-test (Is Sex Education Necessary for Early Childhood Students?), respectively.

The scoring rubric was used to rate students' pre- and post-test of argumentative essay texts. The rubric was adopted from the Ozfidan & Mitchell (2022) which consisted of nine dimensions of argumentative writing (organization, thesis statement, integrating academic sources, finding evidence, writing counterclaims, writing refutation paragraphs, punctuation, grammar, and vocabulary) were rated on a five points scale for each dimension. All recorded students' performance of writing from pre-test and post-test were collected by the researcher and graded by the two instructors from the expert in argumentative writing. Initially, the researchers submitted students' grading to analyze the inter-rater reliability to increase the dependability of the data and both pre- and post-test essays were scored by two raters and inter-

rater reliability was computed. The results of the coefficients were .87 and .86 for the pre-test and post-test, respectively, suggesting that the reliability of measurement was robust.

### ***Data Analysis***

The data obtained from the questionnaires and the pre-test and post-test were analyzed using SPSS 26. Regarding the data questionnaires, the data was examined by descriptive statistics to explore mean and standard deviation. Regarding the data of the pre- and post-test, analysis of variance (ANOVA) was applied to analyze the differences in the three groups' writing performance as the distribution of scores in the pre-test and post-test did not violate measurement assumptions for normality and homogeneity variance and was followed by Tukey HSD post hoc analysis after significance. For effect size, we reported the d-statistic (Cohen, 1988) in which the findings were classified as follows: small for  $d = 0.20$ , medium for  $d = 0.05$ , and large for  $d = 0.80$ , respectively.

## **Results**

### ***Students' Perception of Their Learning Experiences***

The results of the questionnaire are presented in Table 2 below. We combined 'strongly disagree' and 'disagree' as negative responses, and 'agree' and 'strongly agree' as positive responses. The data revealed that students show an overwhelmingly positive response toward the teaching approach of FCM with SRSD. Most students felt that the pre-class session was helpful to their learning and prepared them for the in-class session where they developed writing, learning, and studying skills, applied pre-class session knowledge, and improved their groupwork.

**Table 2**

*Students' Experiences of Flipped Classroom Combined with SRSD Instruction*

| Items                                           | (n=30)   |           |
|-------------------------------------------------|----------|-----------|
|                                                 | <i>M</i> | <i>SD</i> |
| Pre-class activities in this course:            |          |           |
| Were helpful to my learning                     | 4.50     | 0.50      |
| Motivated me to learn more                      | 4.33     | 0.71      |
| Enabled me to learn at my own pace              | 4.20     | 0.76      |
| Prepared me for in-class session                | 4.47     | 0.50      |
| The in-class activities helped me:              |          |           |
| Clarify what I had learned in pre-class session | 4.30     | 0.79      |
| Apply what I had learned in pre-class session   | 4.47     | 0.62      |
| Improve my group work skills                    | 4.43     | 0.56      |
| Develop writing skills                          | 4.67     | 0.47      |
| Improve my communication skills                 | 4.30     | 0.79      |
| Develop better learning and study skills        | 4.50     | 0.57      |

### *Students' Writing Performance*

As the first step to check the normality of the data, a Shapiro-Wilk test was run, the results of which are shown below. Table 3 shows that the Sig. in this test for the pre-test in control condition (A), experimental condition (B), and the other experimental (C) equaled .14, .37, .16 and for the post-test in control condition (A), experimental condition (B), and the other experimental (C) equaled .07, .07, .09 respectively, and all three groups both in pre- and post-test were greater than 0.05, which shows the normality of the data in pre- and post-tests for all groups.

**Table 3**

#### *Results of Test for Normality Data*

|                     | Scores    | Groups                     | Shapiro-Wilk |    |      |
|---------------------|-----------|----------------------------|--------------|----|------|
|                     |           |                            | statistic    | df | Sig. |
| Writing performance | Pre-test  | Control condition (A)      | .94          | 30 | .14  |
|                     |           | Experimental condition (B) | .96          | 30 | .37  |
|                     |           | Experimental condition (C) | .94          | 30 | .16  |
|                     | Post-test | Control condition (A)      | .93          | 30 | .07  |
|                     |           | Experimental condition (B) | .93          | 30 | .07  |
|                     |           | Experimental condition (C) | .94          | 30 | .09  |

To check the variance homogeneity of the data, a Levene test was run, the results of which are shown below. Table 4 shows that the Sig. for the pre- and post-test equaled .92 and .96 respectively, and the Sig. values were greater than 0.05, which shows the variance homogeneity of the data in pre- and post-test.

**Table 4**

#### *The Levene Statistic for Variance Homogeneity*

|                     | Scores    |               |           | Levene |     |      |
|---------------------|-----------|---------------|-----------|--------|-----|------|
|                     |           |               | Statistic | df1    | df2 | Sig. |
| Writing performance | Pre-test  | Based on mean | .075      | 2      | 87  | .92  |
|                     | Post-test | Based on mean | 2.41      | 2      | 87  | .96  |

In the next step, the pre-test results' descriptive statistics were evaluated to see the potential differences in the students' writing performance among the experimental and control groups before running the interventions. The results are presented in Table 5. The mean scores across the groups for the pre-test were the same, and standard deviations in the two groups were close. Thus, writing performances were almost identical across the groups,  $F(2,87) = .57$ ,  $p = .56$ .

**Table 5**

*The Descriptive Statistic and Results of ANOVA for Pre-test Scores*

|                     | Groups                     | Number | Mean | Std. deviation | ANOVA |      |
|---------------------|----------------------------|--------|------|----------------|-------|------|
|                     |                            |        |      |                | F     | Sig. |
| Writing performance | Control condition (A)      | 30     | 2.28 | 0.18           | .575  | .565 |
|                     | Experimental condition (B) | 30     | 2.33 | 0.19           |       |      |
|                     | Experimental condition (C) | 30     | 2.32 | 0.20           |       |      |

The post-test results' descriptive statistics were also evaluated to see the potential differences in the students' writing performance. The means and standard deviations are presented in Table 6 below. The result of the one-way analysis of variance for the post-test revealed a significant effect of the teaching and learning model on students' writing performance,  $F(2,87) = 225.21$ ,  $p = .00$ . The effect size, eta squared, was 0.83, indicating a larger effect.

**Table 6**

*The Descriptive Statistic and Results of ANOVA for Post-test Scores*

|                     | Groups                     | Number | Mean | Std. deviation | ANOVA   |       |          | Post-hoc Tukey                     |
|---------------------|----------------------------|--------|------|----------------|---------|-------|----------|------------------------------------|
|                     |                            |        |      |                | F       | Sig.  | $\eta^2$ |                                    |
| Writing performance | Control condition (A)      | 30     | 3.61 | 0.33           | 225.216 | .000* | .83      | (C) > (B)*, (C) > (A)*, (B) > (A)* |
|                     | Experimental condition (B) | 30     | 5.30 | 0.47           |         |       |          |                                    |
|                     | Experimental condition (C) | 30     | 5.64 | 0.36           |         |       |          |                                    |

Note: Significance \* $p < .05$ .

Furthermore, to answer our second research question about how the writing performance of EFL students in the experimental condition compares with the control condition, a post-hoc Tukey HSD test was conducted. The results indicated that the group of experimental condition C was significantly higher in writing performance than both groups of experimental condition B ( $p < 0.001$ ) and group of control condition A ( $p < 0.001$ ). The group of experimental condition B

scored significantly higher in writing performance than the group of control condition A ( $p < 0.001$ ).

## Discussion

In this section, we offer a combined FCM with SRSD on students' perception and writing performance based on the components of flipped classroom model presented by (Strayer, 2017) and (Diningrat et al., 2023) and self-regulated strategy development presented by (Harris et al., 2013). In addressing this instructional model, we begin by discussing the first research question: how do students perceive the flipped classroom model with SRSD? Based on findings focusing on the second research question, we emphasized the necessity to use a FCM combined with SRSD in improving students' writing performance.

The first objective of this study was to explore the perception of FCM with SRSD by students of EFL in Indonesia by examining the mean and standard deviation in student ratings. The instructional model was well-received by students and we can conclude that the flipped classroom with SRSD has generally been characterized by participants as helpful to their learning and preparation for the in-class session. These positive results are consistent with the finding of Roach (2014), with most students stating that videos, discussion with classmates and ability to rewind the videos helped them learn. Meanwhile, in a traditional writing classroom, teachers often use a lecture strategy, therefore students may not have to prepare anything for the class.

The participants also perceived that the in-class session could develop writing skills, be used to apply what they had learned in pre-class session and develop better learning and study skill as well as improve their group work skills. These results are consistent with the finding of McNally et al. (2017), who suggested that FCM have higher expectations to participate actively in class discussions, for the instructor to employ new, unusual class activities, teaching techniques, and assignments, and to interact with other students in class and be reliant on other students to succeed in the class. In accordance to the study of (Chiang & Wu, 2021), participants could perceive improvements in their communication and collaboration skills in the flipped classroom model due to the curriculum design, which in this study, emphasized group work.

So, in conclusion, it is reasonable to say that the utilization of the FCM with SRSD can develop positive perception about the learning process for classroom writing because it is based on the robust theoretical framework of SRSD. It was supported by Shahnama et al. (2021) who stated that using the FCM in the EFL field has the potential to improve and develop positive attitudes toward the learning process when it designed and implemented appropriately.

The second objective of this study was to explore the effect of the FCM with SRSD on the writing performance of students of EFL in Indonesia. The present study found that stronger writing performance for the experimental condition compared with the control group. As for the students' writing performance across conditions demonstrated a statistically significant difference. However, no difference was found between the two experimental conditions. The absence of difference between the two experimental conditions may be due to the comparable activities across them. An important and shared foundation in both approaches is the presence of pre- and in-class learning activities that can provide the opportunity for students to actively

construct knowledge by themselves rather than receiving the information passively in the classroom (Khojasteh et al., 2021). The FCM can cultivate interactive class time for teachers and enable them to invest more in academic practice in writing, instead of asking students to spend a substantial amount of time each week. These findings are in line with the results of the study conducted by Turan & Akdag-Cimen (2019), who found that the flexible nature of the FCM allows diverse needs in the classroom to be met by providing students with extra time out of the classroom and helping teachers understand the aspects of writing in which their students needed further reinforcement.

Although the FCM in the EFL field has the potential to improve students' achievements, including in writing performance, it requires appropriate course design and implementation. In this study, we found that the FCM with SRSD instruction had a significant effect on the students' writing performance compared to both the flipped classroom model and conventional method. The importance of SRSD instruction for writing performance is frequently highlighted in the literature (J. Chen et al., 2022; De La Paz & Graham, 2002; Graham & Harris, 2005; Harris et al., 2012; Harris & Graham, 2009; Wong et al., 2008). Briefly described, SRSD is an effective method for teaching writing strategies to students. The instruction is a powerful strategy for writing both across and within genres and purposively developing self-efficacy and motivation for writing, and attribution to strategy knowledge and effort (Harris et al., 2013).

These results are in line with findings from the few prior studies that investigate students' writing performance after the implementation of SRSD instruction. For example, Harris et al. (2006) found that after receiving the SRSD instruction, students in the treatment group tended to produce more persuasive and informative writing than students in the comparison condition. Wong et al. (2008) found that after receiving a seven-week SRSD instruction, students in the treatment condition tended to produce clearer and more organized writing than students in the comparison conditions. Washburn et al. (2016) found that after 11 weeks of SRSD instruction students made a significant and meaningful improvement in writing quality compared to students in the comparison group.

In summary, when SRSD instruction is integrated in the FCM, it could positively affect the development of foreign language skills (Öztürk & Çakıroğlu, 2021). As Öztürk & Çakıroğlu (2021) indicated, the group working with the FCM with SRSD outperformed in writing test scores because this instructional model can provide flexible access to learning resources and interactivity and support students in managing their own learning.

This study contributed to the literature in two ways: it adopted the under-researched area of FCM with SRSD instruction in writing courses and explored employing SRSD instruction in the FCM learning environment to develop students' writing performance, which has not been examined in an associate degree program.

Findings suggested that the effect of the FCM combined with SRSD instruction on students' writing performance were promising. Nevertheless, this study is not without limitations. We acknowledge that sample size in this study was limited to the associate degree and students in a single department. In addition, the number of participants was relatively small. In view of these limitations, the results of this study might not be able to be generalized.

## Conclusion

To close, the research suggests that integration of the SRSD instruction into the FCM is a promising approach to enhance EFL students' writing performance in associate degree programs. The present study also suggests that students perceived that the FCM combined with SRSD instruction as helpful to their learning and prepared them for the in-class session. Thus, the in-class session could develop writing skills, used to apply what they had learned in pre-class session and develop better learning and study skills as well as improve their group work skills.

As the findings of the present study further the understanding of the FCM combined with SRSD, several practical implications can be drawn from pedagogical innovation effort in this research. Firstly, setting up a FCM combined with SRSD instruction has the potential to replace or complement the classic FCM, insofar as it can prove more effective in enhancing students' writing performance than the FCM and conventional method. Secondly, when implementing SRSD instruction into the FCM, the *Developed background knowledge* and *Discuss it* stages may be delivered in the pre-class activity in an online session with online support from teachers and peers. In this way, teachers can save time implementing writing activities such as *Model it*, *Memorize it*, and *Support it* during the in-class session by supporting their independent performance activities and providing feedback for students. Finally, a successful FCM combined with SRSD requires teachers and students to change their way of thinking. In a flipped classroom combined with SRSD, teachers should be well aware of the increasingly important role they play to raise questions and support the development of writing skills, while students should change their passive learning habits and actively participate instead.

It may be valuable for future studies in several areas. First, the FCM combined with SRSD instruction should be further examined in the future on a larger scale with other subject and topics. Second, future researchers should examine the utilization of an FCM with SRSD over a longer time period (e.g., one semester). Third, investigating social and collaborative learning: beyond individual self-regulation, future research could explore the impact of peer feedback, co-regulated learning, and collaborative writing tasks during the in-class sessions. This would provide a more holistic understanding of how learning is scaffolded in this environment. Fourth, employing qualitative/process-oriented methods: to gain deeper insights beyond quantitative outcomes, qualitative or mixed-methods designs could be used.

## Declarations

### *Informed Consent of Participation*

Informed consent of participation was obtained from each participant

### *Conflict of Interest*

The authors declare that they have no conflict of interest. The authors certify that the submission is original work and is not under review at any other publication

### ***Acknowledgements***

This research was supported by the Ministry of Higher Education, Science, and Technology of Indonesia through Fundamental Research Funding in 2025 under contract numbers 090/C3/DT.05.00/PL/2025.



## References

- Al-Harbi, S. S., & Alshumaimeri, Y. A. (2016). The flipped classroom impact in grammar class on EFL Saudi secondary school students' performances and attitudes. *English Language Teaching*, 9(10), 60. <https://doi.org/10.5539/elt.v9n10p60>
- Al-Samarraie, H., Shamsuddin, A., & Alzahrani, A. I. (2020). A flipped classroom model in higher education: A review of the evidence across disciplines. *Educational Technology Research and Development*, 68(3), 1017–1051. <https://doi.org/10.1007/s11423-019-09718-8>
- Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). Revised Bloom's Taxonomy. In L. W. Anderson, D. R. Krathwohl, K. A. Cruikshank, R. E. Mayer, P. R. Pintrich, J. Rath, & M. C. Wittrock (Eds.), *A taxonomy for learning, teaching, and assessing: a revision of Bloom's Taxonomy of educational objectives*. Longman.
- Brewer, R., & Movahedazarhouli, S. (2018). Successful stories and conflicts: A literature review on the effectiveness of flipped learning in higher education. *Journal of Computer Assisted Learning*, 34(4), 409–416. <https://doi.org/10.1111/jcal.12250>
- Cengiz, B. C., & Ataş, A. H. (2025). Exploring the correlation and influential factors of online self-regulation and in-class co-regulation in a flipped EFL writing classroom. *Computer Assisted Language Learning*, 38(4), 951–986. <https://doi.org/10.1080/09588221.2024.2342869>
- Chen, F.-Z., Chen, L.-A., Tseng, C.-C., Pai, C. H., Tsai, K.-E., Liang, E.-C., Chen, Y.-F., Chen, T.-L., Liu, S.-Y., Lee, P.-C., Lai, K.-C., Liu, B. R., Fouad, K. E., & Chen, C.-W. (2025). Enhancing student engagement and learning outcomes in life sciences: implementing interactive learning environments and flipped classroom models. *Discover Education*, 4(1), 102. <https://doi.org/10.1007/s44217-025-00501-x>
- Chen, J., Zhang, L. J., & Parr, J. M. (2022). Improving EFL students' text revision with the Self-Regulated Strategy Development (SRSD) model. *Metacognition and Learning*, 17(1), 191–211. <https://doi.org/10.1007/s11409-021-09280-w>
- Chen, W. (2024). The impact of flipped classroom on English proficiency of first-year Chinese urban and rural pre-service teachers. *Frontiers in Psychology*, 15. <https://doi.org/10.3389/fpsyg.2024.1347826>
- Chiang, F.-K., & Wu, Z. (2021). Flipping a classroom with a three-stage collaborative instructional model (3-CI) for graduate students. *Australasian Journal of Educational Technology*, 37(4), 64–80. <https://doi.org/10.14742/ajet.6330>
- De La Paz, S., & Graham, S. (2002). Explicitly teaching strategies, skills, and knowledge: Writing instruction in middle school classrooms. *Journal of Educational Psychology*, 94(4), 687–698. <https://doi.org/10.1037/0022-0663.94.4.687>

- DeRuisseau, L. R. (2016). The flipped classroom allows for more class time devoted to critical thinking. *Advances in Physiology Education*, 40(4), 522–528.  
<https://doi.org/10.1152/ADVAN.00033.2016>
- Diningrat, S. W. M., Setyosari, P., Ulfa, S., & Widiati, U. (2023). The effect of an extended flipped classroom model for fully online learning and its interaction with working memory capacity on students' reading comprehension. *Journal of New Approaches in Educational Research*, 12(1), 77. <https://doi.org/10.7821/naer.2023.1.1073>
- Fraga, L. M., & Harmon, J. (2014). The flipped classroom model of learning in higher education: an investigation of preservice teachers' perspectives and achievement. *Journal of Digital Learning in Teacher Education*, 31(1), 18–27.  
<https://doi.org/10.1080/21532974.2014.967420>
- Graham, S., & Harris, K. R. (2005). Improving the writing performance of young struggling writers. *The Journal of Special Education*, 39(1), 19–33.  
<https://doi.org/10.1177/00224669050390010301>
- Harris, K. R., & Graham, S. (2009). Self-regulated strategy development in writing: premises, evolution, and the future. *British Journal of Educational Psychology*, 2(6), 113–135.  
<https://doi.org/10.1348/978185409X422542>
- Harris, K. R., Graham, S., Friedlander, B., & Laud, L. (2013). Bring powerful writing strategies into your classroom! Why and how. *The Reading Teacher*, 66(7), 538–542.  
<https://doi.org/10.1002/TRTR.1156>
- Harris, K. R., Graham, S., & Mason, L. H. (2006). Improving the writing, knowledge, and motivation of struggling young writers: effects of self-regulated strategy development with and without peer support. *American Educational Research Journal*, 43(2), 295–340.  
<https://doi.org/10.3102/00028312043002295>
- Harris, K. R., Lane, K. L., Driscoll, S. A., Graham, S., Wilson, K., Sandmel, K., Brindle, M., & Schatschneider, C. (2012). Tier 1, teacher-implemented self-regulated strategy development for students with and without behavioral challenges. *The Elementary School Journal*, 113(2), 160–191. <https://doi.org/10.1086/667403>
- Khojasteh, L., Hosseini, S. A., & Nasiri, E. (2021). The impact of mediated learning on the academic writing performance of medical students in flipped and traditional classrooms: scaffolding techniques. *Research and Practice in Technology Enhanced Learning*, 16(1), 17. <https://doi.org/10.1186/s41039-021-00165-9>
- Kwong, R., Kwok, M. L. J., & Wong, H. (2024). Autonomous and controlled motivation in a flipped-classroom approach. *Asia Pacific Education Review*.  
<https://doi.org/10.1007/s12564-024-09983-0>
- Li, A. W. (2025). Self-regulated strategy development with and without peer interaction: improving high school students' L2 persuasive essay revisions. *Written Communication*, 42(1), 9–46. <https://doi.org/10.1177/07410883241286903>

- Ma, W., & Luo, Q. (2021). Pedagogical practice and students' perceptions of fully online flipped instruction during COVID-19. *Oxford Review of Education*, 00(00), 1–21. <https://doi.org/10.1080/03054985.2021.1994382>
- McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L. M., Esserman, D. A., & Mumper, R. J. (2014). The flipped classroom: a course redesign to foster learning and engagement in a health professions school. *Academic Medicine*, 89(2), 236–243. <https://doi.org/10.1097/ACM.0000000000000086>
- McNally, B., Chipperfield, J., Dorsett, P., Del Fabbro, L., Frommolt, V., Goetz, S., Lewohl, J., Molineux, M., Pearson, A., Reddan, G., Roiko, A., & Rung, A. (2017). Flipped classroom experiences: student preferences and flip strategy in a higher education context. *Higher Education*, 73(2), 281–298. <https://doi.org/10.1007/s10734-016-0014-z>
- Mehring, J. (2016). Present research on the flipped classroom and potential tools for the EFL classroom. *Computers in the Schools*, 33(1), 1–10. <https://doi.org/10.1080/07380569.2016.1139912>
- Nouraei Yeganeh, L., & Nemati, M. (2025). *The impact of self-regulated learning strategies on argumentative writing in flipped learning environments*. <https://doi.org/10.20944/preprints202502.1019.v2>
- Özcan, Ş., & Zengin, Y. (2024). Teachers' use of rational questioning to support students' collective argumentation through 5e-based flipped classroom approach using geogebra. *Science & Education*. <https://doi.org/10.1007/s11191-024-00573-5>
- Ozfidan, B., & Mitchell, C. (2022). Assessment of students' argumentative writing: a rubric development. *Journal of Ethnic and Cultural Studies*, 9(2), 121–133. <https://doi.org/10.29333/ejecs/1064>
- Öztürk, M., & Çakıroğlu, Ü. (2021). Flipped learning design in EFL classrooms: implementing self-regulated learning strategies to develop language skills. *Smart Learning Environments*, 8(1), 2. <https://doi.org/10.1186/s40561-021-00146-x>
- Rad, H. S., Roohani, A., & Domakani, M. R. (2021). Flipping EFL learners' writing classroom through role-reversal and discussion-oriented models. *Language Learning and Technology*, 25(2), 158–177.
- Roach, T. (2014). Student perceptions toward flipped learning: new methods to increase interaction and active learning in economics. *International Review of Economics Education*, 17, 74–84. <https://doi.org/10.1016/j.iree.2014.08.003>
- Ruan, Z. (2014). Metacognitive awareness of EFL student writers in a Chinese ELT context. *Language Awareness*, 23(1–2), 76–91. <https://doi.org/10.1080/09658416.2013.863901>
- Shahnama, M., Ghonsooly, B., & Shirvan, M. E. (2021). A meta-analysis of relative effectiveness of flipped learning in English as second/foreign language research.

*Educational Technology Research and Development*, 69(3), 1355–1386.  
<https://doi.org/10.1007/s11423-021-09996-1>

- Strayer, J. (2017). Designing instruction for flipped classroom. in C. Reigeluth, B. Beatty, & R. Myers (Eds.), *Instructional-design theories and models: The learner-centered paradigm of education* (4th ed.). Routledge.
- Sun, T., Wang, C., & Wang, Y. (2022). The effectiveness of self-regulated strategy development on improving English writing: Evidence from the last decade. *Reading and Writing*, 0123456789. <https://doi.org/10.1007/s11145-022-10297-z>
- Teng, M. F., Qin, C., & Wang, C. (2022). Validation of metacognitive academic writing strategies and the predictive effects on academic writing performance in a foreign language context. *Metacognition and Learning*, 17(1), 167–190. <https://doi.org/10.1007/s11409-021-09278-4>
- Tuckman, B. W., & Harper, B. E. (2012). *Conducting educational research* (Sixth). Rowman & Littlefield Publishers, Inc.
- Turan, Z., & Akdag-Cimen, B. (2019). Flipped classroom in english language teaching: a systematic review. *Computer Assisted Language Learning*, 33(5–6), 590–606. <https://doi.org/10.1080/09588221.2019.1584117>
- van Alten, D. C. D., Phielix, C., Janssen, J., & Kester, L. (2019). Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. *Educational Research Review*, 28(May), 100281. <https://doi.org/10.1016/j.edurev.2019.05.003>
- Washburn, E., Sielaff, C., & Golden, K. (2016). The use of a cognitive strategy to support argument-based writing in a ninth grade social studies classroom. *Literacy Research and Instruction*, 55(4), 353–374. <https://doi.org/10.1080/19388071.2016.1165319>
- Wong, B. Y. L., Hoskyn, M., Jai, D., Ellis, P., & Watson, K. (2008). The comparative efficacy of two approaches to teaching sixth graders opinion essay writing. *Contemporary Educational Psychology*, 33(4), 757–784. <https://doi.org/10.1016/j.cedpsych.2007.12.004>
- Zdravković, V., Lazarević, T., Momčilović, M., & Gavrilović-Obradović, D. (2025). Flipped classroom as a model for improving students' cognitive performance and reducing misconceptions. *Research in Science Education*. <https://doi.org/10.1007/s11165-025-10252-2>
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: an overview. *Theory Into Practice*, 41(2), 64–70. [https://doi.org/10.1207/s15430421tip4102\\_2](https://doi.org/10.1207/s15430421tip4102_2)
- Zou, D., Luo, S., Xie, H., & Hwang, G.-J. (2020). A systematic review of research on flipped language classrooms: theoretical foundations, learning activities, tools, research topics and findings. *Computer Assisted Language Learning*, 0(0), 1–27. <https://doi.org/10.1080/09588221.2020.1839502>

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# A Critical Analysis of GAI Learning Research: From Theory to Implementation Risks

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## Abstract

While existing literature documents the benefits and concerns of Generative Artificial Intelligence (GAI) for learning processes, it largely overlooks fundamental learning theories such as Cognitive Load Theory, Constructivism, Activity Theory, and Bloom's Taxonomy. This study employs a scoping review methodology to identify current research gaps from the perspective of these theories, examining potential risks associated with uncritical GAI usage in learning environments. The results demonstrate that the current discourse focuses on operational aspects, while the learning fundamentals are largely overlooked. The identified risks include the bypassing of essential cognitive processing, fostering illusions of understanding, disrupting social and collective learning dynamics, compromising authentic motivation, and interfering with knowledge transfer and application. These risks manifest differently across various learner profiles, from K-12 students to professionals, with implications extending beyond individual learning outcomes to organizational effectiveness and information quality in broader societal contexts. The findings indicate the necessity for a structured, level-appropriate approach to GAI implementation in educational and professional settings. Future research should investigate long-term impacts of GAI on learning outcomes across different educational levels and diverse cultural and socioeconomic contexts, focusing on developing strategies that mitigate risks and support, rather than circumvent, essential learning processes identified by major learning theories. This research offers a theoretically grounded perspective that can inform more nuanced policy approaches to balance technological advancement with educational effectiveness across diverse global contexts.

*Keywords:* Generative artificial intelligence; Learning; Risks; Learning fundamentals

Artemova, I. (2025). A critical analysis of GAI learning research: From theory to implementation risks. *Online Learning*, 29(4), 390-417.  
<https://doi.10.24059/olj.v29i4.4895>

## Introduction

The growing influence of Generative Artificial Intelligence (GAI) across all sectors, including education, is occurring at a rapid pace. As is often the case with technological advancements, its growth and impact are outpacing our ability to fully comprehend its implications from fundamental perspectives in each field where it is being deployed (Crawford, 2021). This rapid integration aligns with global educational technology trends, with various international organizations taking distinct positions. UNESCO (2021) emphasizes AI-enhanced personalization, automation of routine tasks, and data-driven decision making. The OECD (2023) advocates for AI literacy and integration frameworks, while UNESCO's Recommendation on the Ethics of AI (2022) highlights the urgent need for research-informed approaches to AI implementation in learning contexts. Meanwhile, the European Commission's Digital Education Action Plan (2021-2027) focuses on the transformative potential of AI technologies in education.

Since November 2022, research on ChatGPT and GAI in education has increased exponentially, emphasizing the necessity for aligning AI with pedagogical principles. This includes considerations of learners' intrinsic motivation (Luckin & Cukurova, 2019; Dogan et al., 2023; Artemova, 2024), ethical use and academic integrity (Cacho, 2024), and support for self-directed learning (Li et al., 2024). However, research directions on GAI tend to overlook its alignment with fundamental learning principles described by Cognitive Load Theory (Sweller, 1988), Constructivism (Piaget, 1952; Vygotsky, 2012), Activity Theory (Leontiev, 1978; Engeström, 1987), and Bloom's taxonomy (Bloom et al., 1956)—theories that remain pertinent for understanding the complexities of human learning.

The aim of this study is to critically examine the intersection between GAI and fundamental learning theories by identifying research gaps in current literature and exploring potential risks of uncritical GAI implementation. This research has two primary objectives: first, to conduct a comprehensive scoping review that identifies how current research addresses essential learning principles across different learner profiles and second, to perform a contrasting analysis between GAI characteristics and established learning theories to identify how uncritical GAI usage might disrupt fundamental learning processes. The study seeks to establish a theoretical foundation for thoughtful GAI integration that preserves essential cognitive, social, and motivational aspects of learning.

Investigating the convergence of foundational learning theories with GAI is crucial to ensure these tools align with cognitive processes and facilitate meaningful learning while preventing excessive technology reliance and preserving learner autonomy. The following sections outline the theoretical background of learning theories, describe the scoping review methodology, present findings on learner profiles and GAI benefits and concerns, analyze contrasts between GAI and learning fundamentals, discuss theoretical gaps and risks, and conclude with empirical and theoretical implications.

## Theoretical Background

A narrative review (Cumming et al., 2023) of the fundamental theories provides a comprehensive overview of foundations of human learning processes.

Cognitive Load Theory (Sweller, 1988) posits that human cognitive architecture has limited working memory capacity and that information presentation can either facilitate or impede learning. This theory emphasises designing instructional materials that minimise cognitive load on learners (Sweller, 1988). Long-term memory serves as the primary learning mechanism, enabling information integration into cognitive structures through schema formation (van Merriënboer & Sweller, 2005). Without long-term memory storage, learning would be impossible, as information would remain ephemeral (Kirschner et al., 2010). As Willingham (2021) emphasises, "Memory is the residue of thought," indicating that genuine learning occurs when information is processed deeply enough for long-term storage. Knowledge transfer, pattern recognition, and expertise development depend on this storage capacity (Anderson, 2000).

Schema formation in long-term memory reduces working memory burden (Sweller, 1988), enabling efficient processing of new information. This explains the contrasting approaches between experts and novices in problem solving. Experts possess well-developed memory for problem states, enabling rapid categorization based on experience and effective strategy deployment through sophisticated schemas. In contrast, novices rely on superficial structures and less effective methods, lacking the schemas necessary for efficient problem classification and resolution (Sweller, 1988).

The various currents of constructivism, exemplified by Piaget (1952) and Vygotsky (2012), have been re-examined in specific educational applications. Draganoudi et al. (2023) applied constructivist principles to analyze video game-based learning environments and their impact on knowledge construction, while Veresov & Veraksa (2022) examined how digital tools affect social interaction patterns in early childhood development. Piaget's theory aligns with Sweller's schema theory, providing complementary explanations of how schemas are constructed and modified through developmental stages (van Merriënboer & Sweller, 2005).

Learning occurs through assimilation and accommodation (Piaget, 1952). Assimilation involves incorporating new information into existing schemas (Piaget, 1976), while accommodation involves modifying cognitive structures to integrate new information (Piaget, 1970). These processes interact through "equilibration," driving cognitive development (Piaget, 1980; von Glasersfeld, 1995).

Vygotsky's sociocultural theory presents a comprehensive framework for understanding learning as fundamentally rooted in social interaction and cultural context. Vygotsky (2012) posits that learning is not merely an individual cognitive process; rather, it occurs initially on the social plane before being internalised by the individual. This process is mediated through cultural tools, particularly language, which serves as the primary tool for developing higher mental functions. This concept has been revisited by Leontjev & deBoer (2022) in the context of second language learning.

A fundamental concept in Vygotsky's theory is the Zone of Proximal Development (ZPD), which represents the distance between what learners can accomplish independently and what they can achieve with guidance from more knowledgeable others (Vygotsky, 2012). This concept emphasises that effective learning occurs when learners are challenged within their ZPD through the provision of appropriate scaffolding by skilled partners (Wood et al., 1976). The ZPD concept provides a framework for understanding how social interaction



drives cognitive development. It suggests that learners gradually internalise the support strategies provided by others, integrating these strategies into their own cognitive repertoire. One of the most recent examples of this concept being applied is in McCoy and Lynam (2022), who demonstrated how teachers develop their technology integration skills through guided interactions within their ZPD, utilising classroom contexts and digital tools to enhance their professional practice.

Furthermore, Vygotsky (1986) underscored the crucial role of language in cognitive development. He put forth the proposition that language initially serves as a conduit for social communication but subsequently becomes internalised as an internal monologue, thereby functioning as a tool for cognitive processes and self-regulation. This process of internalisation extends beyond language to encompass other cultural tools and practices, thereby illustrating how higher mental functions develop through social interaction within cultural contexts (Wertsch, 1988). Moreover, Vygotsky distinguished between scientific concepts, which are acquired through formal instruction, and everyday concepts, which develop through daily experience. These two types of concepts interact and influence each other, thereby contributing to the development of complex understanding through their integration.

Activity Theory, which has been developed over several generations from Leontiev (1978) to Engeström (1987, 2001), provides a framework for understanding learning as a complex, socially embedded process. The theory emphasises that learning cannot be considered in isolation from its broader social, cultural, and historical context. Instead, it is viewed as a dynamic system of interactions between the learner, tools, community, rules, and division of labour (Engeström, 1987).

Leontiev's (1978) foundational contribution was the development of a hierarchical model of activity, comprising three levels: activity (driven by motives), actions (guided by conscious goals), and operations (influenced by conditions). He highlighted that learning activities are driven by motives that may emerge through the process of exploration itself. This implies that the process of searching for information always precedes the definition of a specific learning subject matter, which is a crucial aspect of the learning process. This hierarchical structure elucidates the way learning activities evolve and transform through engagement with the environment. What initially manifests as a conscious action may subsequently become an automatic operation, and conversely, an operation may become a conscious action when conditions change (Leontiev, 1981).

Engeström (2001) developed expansive learning theory to explain how communities learn to perform new activities. This process is underpinned by several key principles, including multivoicedness (the presence of multiple perspectives within the activity system), historicity (an understanding of how practices evolve over time), contradictions (tensions that drive development), and expansive cycles (transformation through collective questioning and innovation). In accordance with this theoretical framework, learning is understood to occur through the interaction of these components and principles. This perspective emphasises that learning is not merely the acquisition of pre-existing knowledge; rather, it is a process of transforming activity systems through collective endeavour and the creation of new cultural tools (Engeström & Sannino, 2010).

Finally, Bloom's Taxonomy (Bloom et al., 1956), later revised by Anderson and

Krathwohl (2001), provides a hierarchical model of cognitive processes that are essential for learning. These processes are arranged in six levels, from lower to higher order thinking skills. The first level is remembering, which involves retrieving knowledge. The second level is understanding, which involves constructing meaning. The third level is applying, which involves using procedures. The fourth level is analysing, which involves determining relationships. The fifth level is evaluating, which involves making judgments. The sixth level is creating, which involves generating new patterns or structures. A re-examination of these theoretical foundations by Maani and Shanti (2023) revealed that the integration of video-based learning with Bloom's taxonomy results in a cost-effective and accessible learning environment.

Entry points into these cognitive levels vary by learner expertise (Krathwohl, 2002). While novices typically start at the “remember” level, experienced learners may enter at higher levels and engage multiple levels simultaneously, utilizing existing knowledge structures for higher-order thinking (Marzano & Kendall, 2006).

The taxonomy posits that meaningful learning necessitates engagement with progressively intricate cognitive processes, irrespective of the initial point of entry. Each level is constructed upon and integrated with those that precede it, thereby facilitating a more profound comprehension and a more nuanced mode of reasoning. This framework acknowledges that learning is a dynamic process, whereby prior knowledge facilitates higher-level entry points and learning can occur at multiple levels concurrently, contingent on the learner's domain expertise, familiarity with related concepts, and level of cognitive development (Anderson & Krathwohl, 2001).

This article acknowledges GAI's potential benefits in learning contexts, such as providing instant feedback (Lindsay et al., 2023) and enhancing analytical abilities through rapid processing of complex datasets (Ifenthaler & Schumacher, 2023). However, the present study focuses on identifying research gaps in how GAI implementation relates to fundamental learning principles across different learner profiles, and examining risks associated with uncritical GAI use. To achieve this aim, a scoping review addresses three key questions: Who are the learners being studied? What benefits are identified regarding GAI implementation across different profiles? What are the concerns? This approach reveals whether current research acknowledges essential learning processes such as schema development, social knowledge construction, and motivational dynamics. This systematic mapping, combined with a contrastive analysis between learning theories and current GAI research, identifies theoretical gaps in the literature. Building on these findings, the study then addresses potential risks of uncritical GAI implementation from a theoretical perspective. The following method section details this methodological framework.

## Method

As a first step, a scoping literature review was conducted in social sciences using the SCOPUS database from November 2022 (ChatGPT's public release) to October 2024, including advance publications through December 2024. This review explored the range and nature of learner profiles, benefits, and concerns related to GAI in educational contexts (Casale et al., 2021).

Figure 1 illustrates the substantial growth in GAI education research during the review

period.

### Figure 1

*Publication Trends on GAI in Education: SCOPUS Database (January 2023-October 2024)*

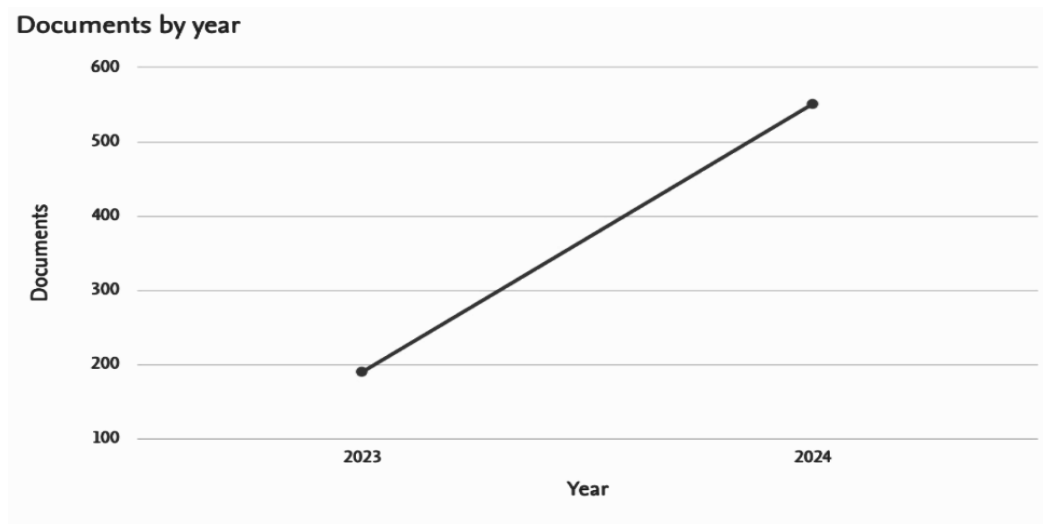
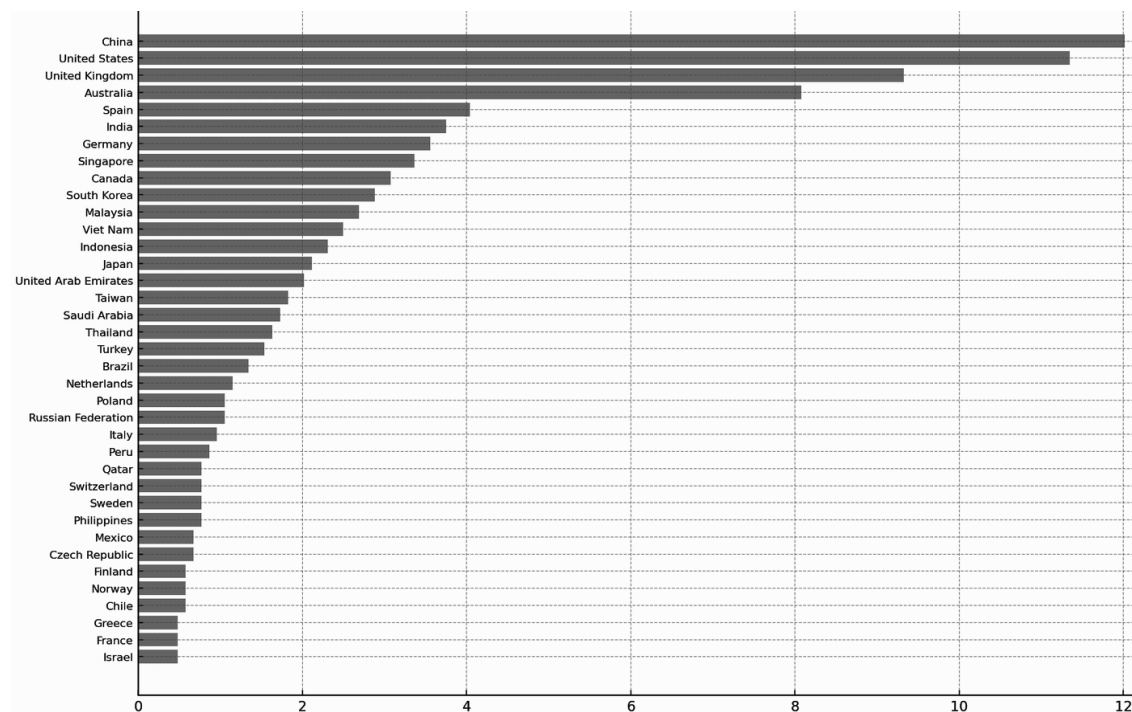


Figure 2 demonstrates the global interest in GAI education research.

**Figure 2**

*Geographic Distribution of GAI in Education Research: Top 50% of Contributing Countries by Author Affiliation*

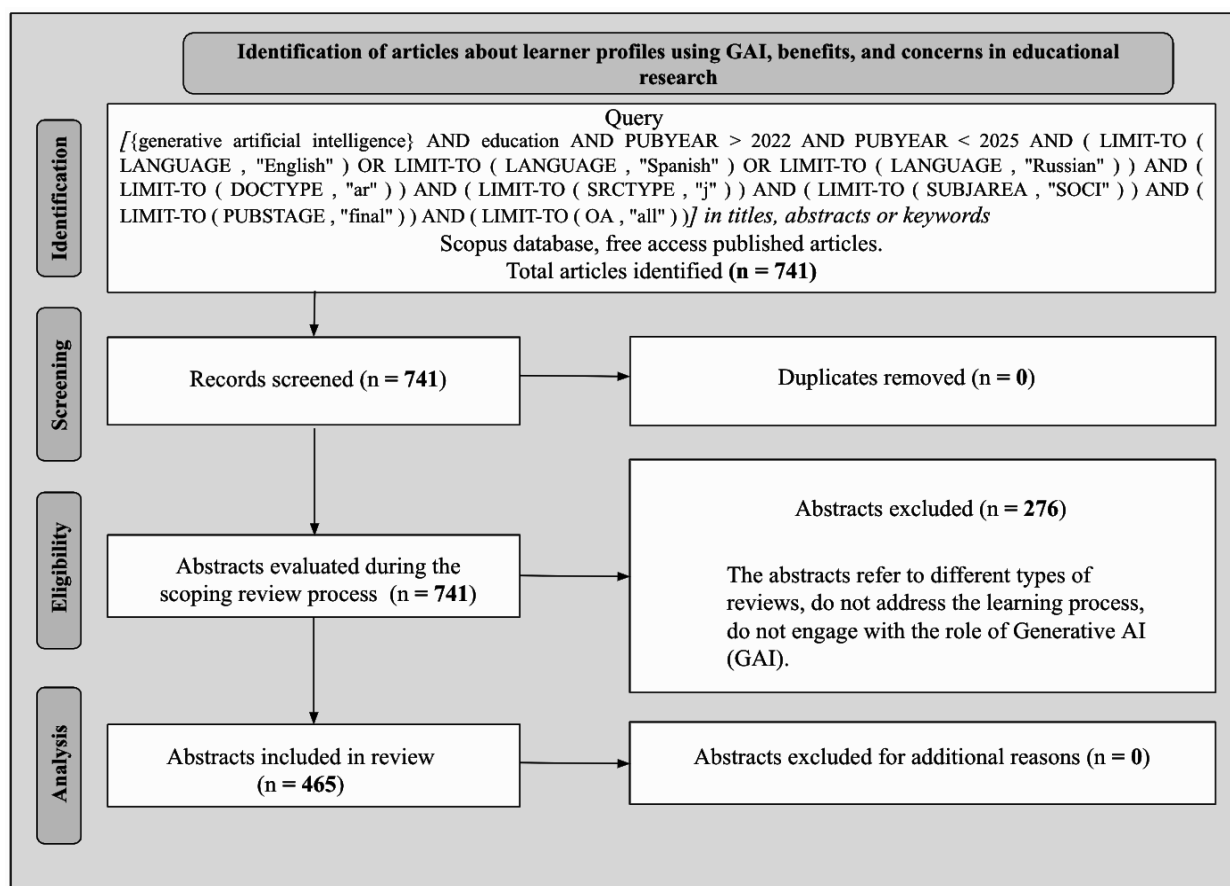


*Note.* The figure shows the normalized percentage of publications from each country among the top 50% of contributors to GAI in education research (SCOPUS). Values reflect relative share, not raw counts—for example, China contributes just over 12% within this group.

The scoping review methodology followed Arksey and O'Malley's (2005) framework:

- 1) Research questions were defined: What profiles of learners utilize GAI? What benefits regarding GAI in learning processes are identified in the literature? What are the concerns?
- 2) Identification of pertinent literature.

Figure 3 shows the flowchart outlining the steps of the literature search and analysis process.

**Figure 3***Flowchart of the Literature Search and Analysis Process*

A cross-disciplinary search for articles on GAI in education was conducted in the SCOPUS database using the following query: {generative artificial intelligence} AND education AND PUBYEAR > 2022 AND PUBYEAR < 2025 AND ( LIMIT-TO ( LANGUAGE , "English" ) OR LIMIT-TO ( LANGUAGE , "Spanish" ) OR LIMIT-TO ( LANGUAGE , "Russian" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( SUBJAREA , "SOC" ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( OA , "all" ) ). For the scoping review, the broader term "education" was used to capture relevant research where learning processes might not be explicitly mentioned.

The search was limited to English, Spanish, and Russian (languages within the author's expertise) to ensure full-text readability when abstract information was insufficient. The search focused on social studies and was further refined to include only published articles, following the flexible approach permitted by scoping review methodology (Belt et al., 2022). This process identified 741 articles. The resulting dataset, including article titles and thematic categorizations, is openly available at Zenodo [<https://doi.org/10.5281/zenodo.15257517>].

3) Clear inclusion and exclusion criteria were defined to refine the sample. All types of literature reviews—systematic, scoping, and bibliographic—were excluded. Two main inclusion criteria required abstracts to address the learning process and GAI. Although GAI was part of the search query, not all retrieved studies focused on it as an object of study. This filtering narrowed the corpus to 465 abstracts, spanning various educational levels and disciplines, in line with the study's focus.

4) Recording of the results across sources. This stage was conducted using Microsoft Excel, where data were recorded according to three analytical categories: a) the profile of learners using GAI, b) the reported benefits of its use, and c) concerns identified in the literature regarding GAI in the learning process.

Steps three and four were supported by ChatGPT, especially in step three, where it enabled a more efficient and accurate evaluation of a large initial sample of abstracts (Miranda et al., 2023). Each abstract was evaluated based on three questions: 1) Does it report any type of review (systematic, scoping, or bibliographic)? 2) Does it address the learning process? 3) Does it involve GAI? ChatGPT generated Yes/No responses for each question and the results were reviewed and validated by the author, resulting in a final dataset of 465 abstracts.

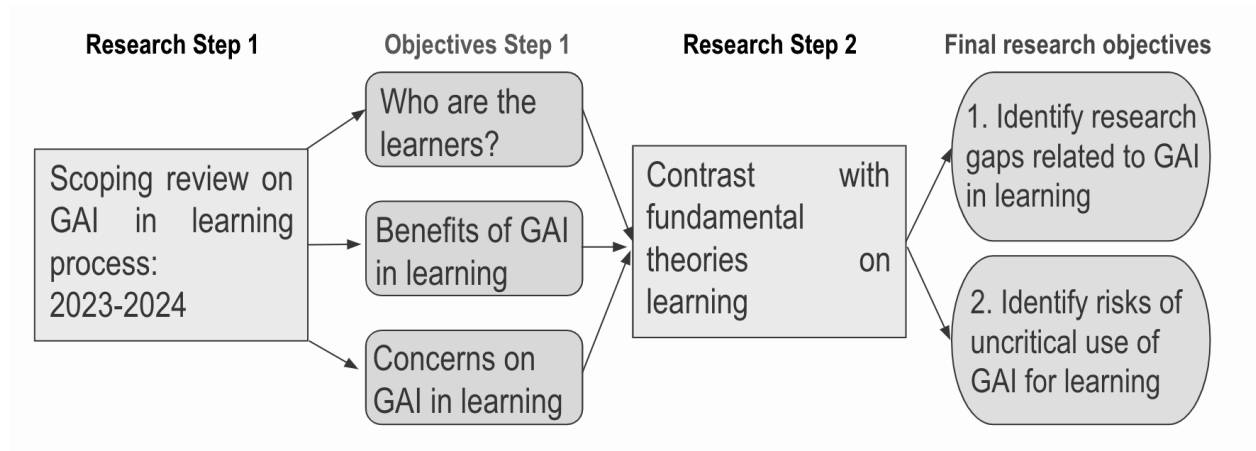
The process drew on insights from Cardoso Sampaio et al. (2024), whose research examined the benefits and limitations of GAI in scoping reviews. In line with this, GAI was initially used to apply exclusion criteria, while the author thoroughly evaluated the remaining abstracts in step four.

The selected abstracts were analysed with ChatGPT, organized around three analytical categories: 1) learner profiles—identifying who uses GAI in learning, 2) benefits—advantages linked to its use, and 3) concerns—issues raised by researchers. Although most abstracts followed a structured format, the author carefully reviewed all generated responses. ChatGPT notably reduced the time required for organizing and drafting responses, and the results are summarized in the accompanying Excel database.5) Summarizing the findings. The final stage is outlined in the Results section.

Figure 4 illustrates the methodological approach employed in the present study.

**Figure 4**

*Methodological Workflow: Analysis of GAI Learning Research Gaps and Associated Risks*



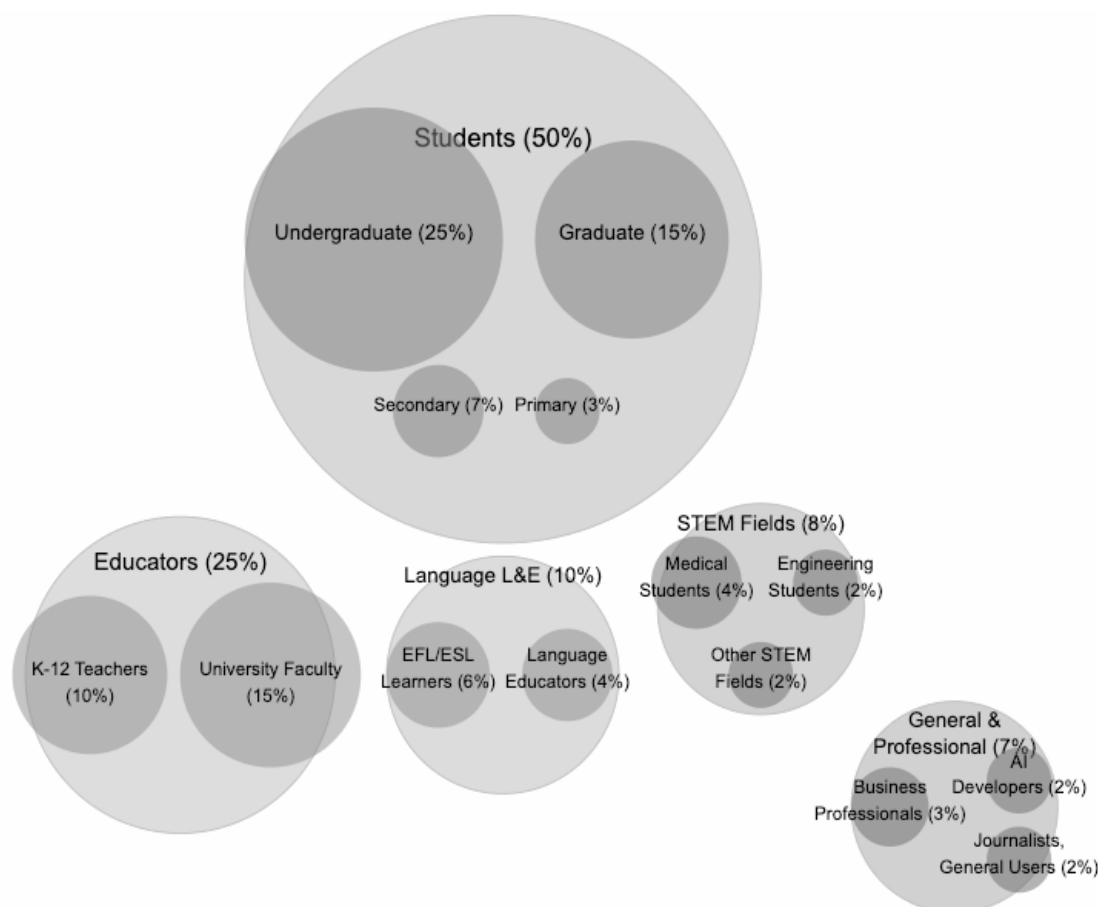
## Results

### *Scoping Review*

The findings of the scoping review are presented in Figure 5.

**Figure 5**

*The Learners Profile of the Users of GAI for Learning Purposes.*



The results indicate that students represent the largest segment of users, comprising 50% of the total. Undergraduate and graduate students are the most active users of AI, employing it for research, essay writing, and project support. Educators, representing 25% of users, employ GAI for curriculum design, lesson planning, and academic research. K-12 teachers (10%) and university faculty (15%) are among those who recognise its potential to enhance teaching practices. A further 10% of users are language learners and educators who employ GAI for language acquisition, translation, and the creation of interactive materials, particularly among those learning English as a foreign language or as a second language (6%). In the field of STEM, 8% of users explore AI for specialised learning and technical tasks while 4% of medical students and 2% of engineering students do the same. It is noteworthy that, although the research was conducted in the field of education, other types of users were also identified. These include general and professional users (7%) who include AI developers (2%), business professionals (3%), and journalists (2%), who rely on GAI for content creation and data analysis.

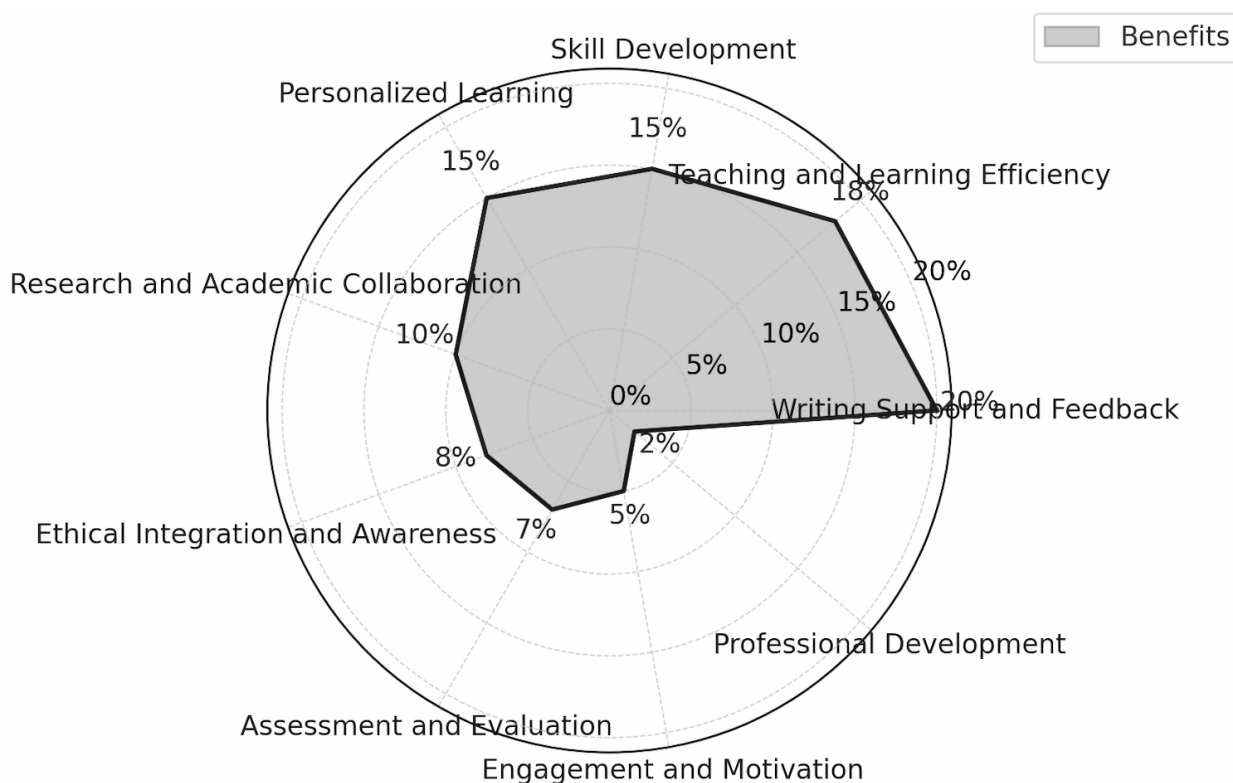


### *What Are the Corresponding Benefits?*

Figure 6 represents the results on benefits that the researchers find for the learners.

**Figure 6**

*The Benefits of GAI for Learners*



As evidenced by the results, the integration of GAI in an educational context offers a range of benefits to its users. Among these, the provision of writing support and feedback accounts for 20% of the reported advantages. The utilisation of GAI serves to enhance the competencies associated with the written expression of ideas, facilitating improvements in grammatical correctness, organisational proficiency, and stylistic elegance. Furthermore, the provision of personalised feedback serves to mitigate the anxieties commonly experienced by learners and to facilitate effective revision. The automation of routine tasks, such as grading and content creation, enables educators to streamline processes and provide more personalised instruction, thus enhancing the efficiency of teaching and learning (18%).

GAI fosters both skill development and personalised learning (15% each). Furthermore, users benefit from improved research and academic collaboration (10%) which facilitates the discovery of resources and the synthesis of knowledge. Other advantages include the promotion of ethical integration and awareness (8%), the enhancement of assessment and evaluation (7%)

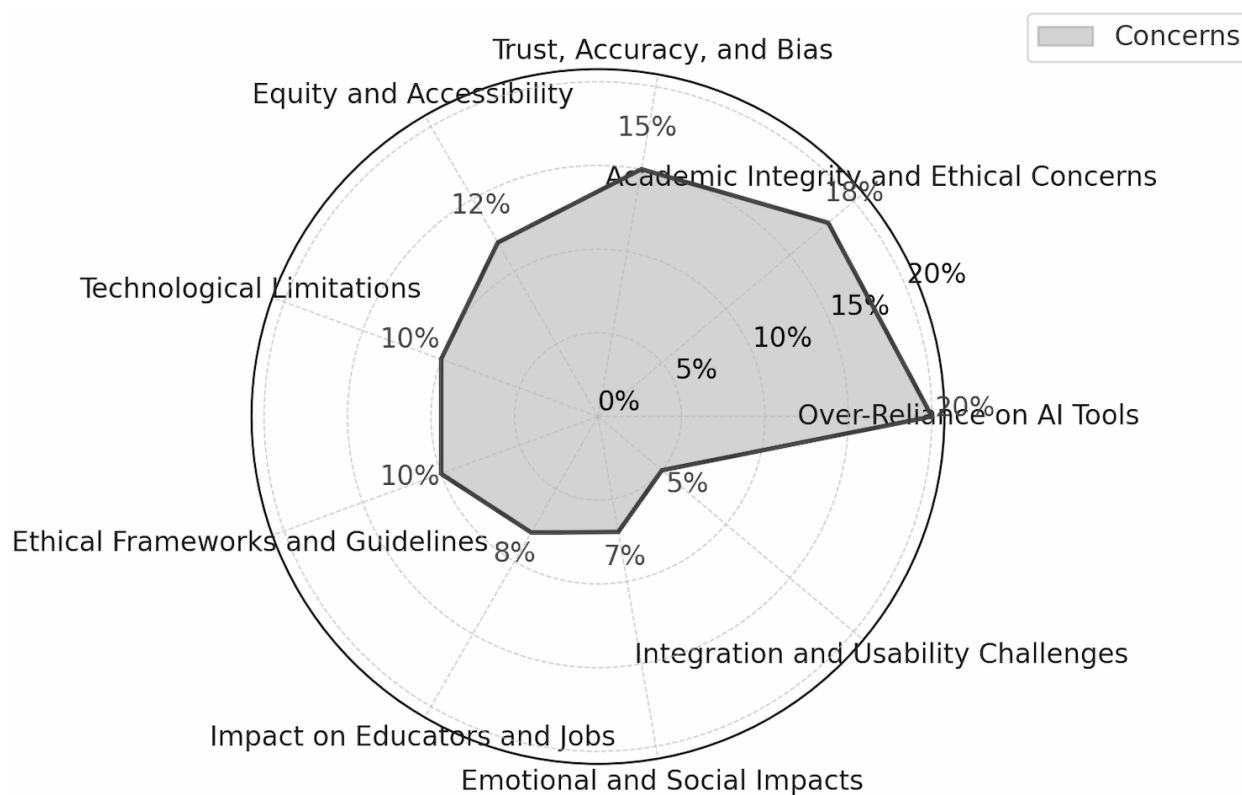
through automation, and the encouragement of engagement and motivation (5%). Although professional development accounts for a minor proportion (2%), it plays an invaluable role in equipping educators with the knowledge and skills required to integrate AI effectively into their teaching practice.

### ***What Concerns Have Been Identified in the Research Literature with Regard to the Utilisation of GAI in the Learning Process?***

Figure 7 illustrates the types of concerns that have been identified in the research literature regarding the utilisation of GAI in the learning process.

**Figure 7**

*The Concerns Around the Use of GAI for Learners.*



The utilisation of GAI in the learning process gives rise to several queries, with the most pressing being the over-reliance on AI tools (20%). A reliance on AI may impede the development of critical thinking, creativity, and self-regulated learning by redirecting attention from manual problem-solving to automated solutions. Such an over-reliance carries the risk of replacing essential human interaction in education. Furthermore, academic integrity and ethical concerns (18%) are significant issues, with potential risks of plagiarism, cheating, and ethical challenges regarding equitable access and privacy. Furthermore, issues pertaining to the reliability of AI, the fabrication of references, and the potential perpetuation of stereotypes through biased models have been identified (15%). The challenge of ensuring equity and

accessibility (12%) highlights the disparity in access to AI tools across socioeconomic and geographical boundaries, which can exacerbate existing inequalities.

Other concerns include the technological limitations of AI. Specifically, its capacity for handling nuanced reasoning and ensuring consistency (10%) and its lack of ethical frameworks and guidelines for responsible AI integration (10%) leave educators without clear standards for such integration. The potential impact on educators and employment (8%) contributes to concerns about job displacement and resistance to transformative technologies. Furthermore, the potential for reduced collaboration, emotional detachment, and waning enthusiasm for traditional learning methods is indicated by the emotional and social impacts (7%), which also highlight the possibility of adverse effects on the social and emotional well-being of learners. Finally, the integration and usability challenges (5%) indicate obstacles to institutional preparedness, training, and AI literacy for both students and educators. These concerns collectively underscore the necessity for a prudent, equitable, and rigorously regulated integration of GAI in educational settings.

After analysing the learning profiles, benefits, and concerns surrounding GAI implementation in the learning process, the study now proceeds to a contrasting analysis. By comparing GAI characteristics with the fundamentals of human learning processes, this analysis identifies how uncritical GAI usage may potentially disrupt essential learning mechanisms across different contexts.

### ***Contrasting Analysis***

The use of NLP by GAI models such as ChatGPT enables them to understand and generate human language, thereby facilitating engagement in natural conversations and the production of coherent text across various genres (Liao et al., 2023). The models are pre-trained on extensive datasets and fine-tuned for specific tasks, thereby enabling them to generate high-quality content (Jin, 2023). Furthermore, these models can adapt to diverse learning contexts and providing personalised educational experiences, thus enhancing the learning process for students (Liu et al., 2023). Additionally, these models are designed to process and respond to inputs almost instantaneously, ensuring that learners receive immediate feedback or information.

Despite their pedagogical potential, GAI models often conflict with established cognitive learning principles, particularly in how they manage information processing and schema construction.

The uncritical application of GAI in learning contexts gives rise to significant contradictions with Sweller's Cognitive Load Theory, particularly regarding the way the human cognitive architecture processes and stores information for meaningful learning.

The principal contradiction arises from the impact of GAI utilisation on the management of working memory and the construction of schemas. While Sweller (1988) emphasises that learning requires careful management of cognitive load to facilitate the transfer of information from working memory to long-term memory, GAI often provides excessive information without consideration for cognitive processing limitations. This can result in an overload of information

for working memory, particularly in novice learners who have not yet developed the capacity to process complex information efficiently. While Willingham notes that "memory is the residue of thought" (Willingham 2021: 41), GAI-generated content often circumvents the essential deep processing that creates this residue.

Moreover, the utilisation of GAI has the potential to impede the organic evolution of expertise. When learners rely on GAI to provide immediate solutions, they circumvent the essential process of schema construction and refinement. This is a particularly problematic issue, as van Merriënboer and Sweller (2005) elucidate, as meaningful learning necessitates the gradual construction and modification of schemas in long-term memory. The provision of ready-made solutions by GAI may create the impression of understanding, while failing to support the cognitive processes necessary for the development of genuine expertise.

Additionally, the utilisation of GAI can impede the transfer of learning, which Cognitive Load Theory identifies as a pivotal aspect for the development of expertise. As Anderson (2000) posits, effective learning facilitates the transfer of knowledge across contexts and the recognition of patterns in novel situations. However, should learners depend on GAI for solutions without engaging in the requisite cognitive processing, they may fail to develop the robust schemas that facilitate such transfer. This can result in a superficial understanding that is unable to support the application of knowledge in novel situations, which is contrary to the fundamental goal of building expertise through schema development (Kirschner et al., 2010).

The indiscriminate application of GAI in educational contexts is fundamentally at odds with Piaget's tenets of cognitive development, as evidenced by several significant discrepancies. In accordance with Piaget's theory (1952), learning is achieved through active engagement with information and experiences, resulting in the construction of knowledge through the processes of assimilation, accommodation, and equilibration. However, should learners rely primarily on GAI, they run the risk of bypassing these essential cognitive processes.

The fundamental contradiction arises from the fact that GAI can substitute active knowledge construction with passive information reception. While Piaget emphasises that meaningful learning requires learners to grapple with concepts, identify inconsistencies, and construct understanding personally (von Glasersfeld, 1995), GAI provides immediate, ready-made answers. This circumvents the crucial cognitive conflict that Piaget identified as necessary for development (Piaget, 1976). To illustrate, when students employ GAI to devise solutions without undergoing the problem-solving process, they bypass the indispensable phase of schema modification and cognitive restructuring that occurs during genuine accommodation.

Furthermore, the utilisation of GAI can impede the natural equilibrium process by furnishing data that has not been adequately integrated into the existing cognitive structures. As Piaget (1980) observed, cognitive development necessitates a harmonious interplay between assimilation (the incorporation of novel information into extant schemas) and accommodation (the modification of schemas to align with new information). The assimilation of GAI-generated content without a connection to the learner's personal experiences or existing knowledge structures carries the risk of developing a fragmented understanding rather than integrated, meaningful learning (Wadsworth, 2003). This is a particularly problematic

phenomenon, as it can create an illusion of understanding without the deep cognitive processing that is essential for genuine learning and development.

The indiscriminate application of GAI in the context of learning processes gives rise to several inconsistencies when viewed through the lens of Vygotsky's sociocultural theory of learning and development. The primary contradiction can be found in social interaction and mediation. While Vygotsky (2012) posits that learning occurs initially on the social plane through interaction with more knowledgeable others, GAI provides information without the genuine social interaction that characterises human learning. This circumvents the indispensable process of social meaning-making and the gradual internalisation of knowledge through dialogue and shared understanding. When learners primarily utilise GAI, they fail to consider the nuanced social cues, emotional responses, and cultural context that Vygotsky (1988) identified as pivotal for cognitive development.

Moreover, the utilisation of GAI has the potential to impede the optimal functioning of the ZPD. While Vygotsky's theory emphasises the importance of carefully calibrated scaffolding provided by skilled partners who can assess and respond to a learner's current understanding (Wood et al., 1976), GAI typically provides standardised responses that may not accurately target a learner's ZPD. This can result in either an overwhelming influx of information that exceeds the learner's current capabilities or a lack of sufficient challenge. The dynamic and responsive nature of human scaffolding, which allows for gradual adjustments to align with the learner's evolving understanding, is challenging to replicate through GAI interactions.

The development of language and thought, which Vygotsky (1986) identified as intimately connected through the process of internalisation, may also be adversely affected. Although GAI can provide language input, it is unable to facilitate the kind of meaningful dialogue essential for the development of inner speech and self-regulation. The absence of authentic social interaction and cultural context in GAI-mediated learning may impede the development of higher mental functions that Vygotsky identified as emerging through social interaction and cultural mediation.

The indiscriminate deployment of GAI in learning contexts gives rise to considerable tensions with Activity Theory as articulated by Leontiev and Engeström, particularly about its impact on the intricate dynamics of socially embedded learning processes.

From the perspective of hierarchical activity structure as developed by Leontiev (1978), the usage of GAI can disrupt the natural emergence and development of learning motives. While Activity Theory posits that a learning path commences and is directed by the motive, in the process of searching for a subject matter that aligns with a learner's interests, GAI's immediate responses circumvent this pivotal process of motive formation, objectives, and subject matter identification. This may impede learners from developing authentic motivational engagement with the subject matter and hinder the natural transformation of conscious actions into automated operations through practice and experience (Leontiev, 1981).

In accordance with Engeström's (2001) expansive learning theory, the utilisation of GAI has the potential to significantly contravene several pivotal principles. The principle of multivoicedness is undermined when GAI replaces the diverse perspectives and contradictions that naturally arise in community interaction with standardised responses. Similarly, the historical development of practices (historicity) may be overlooked when GAI provides decontextualised solutions that fail to account for the evolution of knowledge and practices over time. Most significantly, GAI may impede the constructive contradictions that Engeström identifies as vital drivers of development and change. Rather than engaging learners in grappling with contradictions, it tends to offer definitive solutions (Engeström & Sannino, 2010).

Moreover, the utilisation of GAI can impede the collective nature of knowledge creation, which is a pivotal aspect of Activity Theory. While the theory emphasises learning as a transformation of activity systems through collective effort and the creation of new cultural tools, GAI might promote individual, isolated interaction that bypasses the essential collective processes of questioning existing practices, analysing contradictions, and developing new solutions through community engagement (Engeström, 1987).

The indiscriminate application of GAI in educational contexts gives rise to considerable inconsistencies regarding Bloom's Taxonomy of cognitive development and learning processes.

The principal contradiction arises from the way GAI utilisation can impede the natural progression through the cognitive levels. While Bloom's Taxonomy emphasises the importance of building from foundational knowledge through increasingly complex cognitive processes (Bloom et al., 1956), GAI provides immediate high-level responses that bypass essential lower-level cognitive development. This is particularly problematic for novice learners, who require the establishment of a robust foundation of understanding before engaging with more complex cognitive tasks. When students employ GAI to generate analyses or evaluations without first developing their own understanding, they bypass the essential processes of knowledge construction and comprehension (Anderson & Krathwohl, 2001).

Moreover, the utilisation of GAI can impede the genuine advancement of higher-order thinking abilities. Although the taxonomy posits that the generation of new ideas and the evaluation of existing ones should emerge from a profound comprehension of the subject matter (Krathwohl, 2002), GAI can facilitate the production of sophisticated outputs without necessitating the learner's engagement in authentic analytical or evaluative thinking. This is a significant issue because it can create the impression of proficiency at higher cognitive levels without the underlying development of essential thinking skills. To illustrate, when students employ GAI to generate creative or evaluative content, they may circumvent the indispensable processes of analysing the relationships between concepts, evaluating evidence, and synthesising novel ideas derived from their own understanding (Marzano & Kendall, 2006).

## Discussion

The research identified several key findings regarding concerns related to the use of GAI in the learning process, as well as the potential risks associated with its uncritical

application in learning.

### ***Theoretical Gaps in GAI Learning Research: Beyond Operational Concerns***

The scoping review revealed a significant gap between current research focus and core principles of learning. Most studies emphasize operational concerns—such as over-reliance on AI tools (20%), academic integrity (18%), and accuracy issues (15%)—while largely neglecting deeper pedagogical implications.

Reported benefits are similarly framed around practical advantages like writing support (20%), teaching efficiency (18%), and skill development (15%), rather than addressing how GAI aligns with or disrupts fundamental learning processes.

This gap becomes more evident when viewed through established learning theories. Cognitive frameworks such as Piaget's developmental model and Cognitive Load Theory stress natural knowledge construction and schema development—areas scarcely addressed in current GAI literature. Although some studies acknowledge social aspects (7%) or collaboration benefits (10%), they rarely explore how GAI may disrupt authentic social learning or cultural meaning-making, as emphasized by Vygotsky. Likewise, while engagement (5%) and personalized learning (15%) are often cited, research fails to critically assess the impact on cognitive progression and motivation formation, central to Activity Theory and Bloom's Taxonomy.

These theoretical oversights are particularly relevant when considering learner profiles. For novice learners (K–12), uncritical use may hinder the formation of foundational cognitive structures. Among undergraduates and graduates (50% of users), reliance on GAI without theoretical grounding may limit deep cognitive engagement necessary for expertise development. For educators in the role of learners (25%), weak integration strategies risk undermining the quality of learning and reinforcing questionable behaviour patterns. The findings highlight the need to expand research beyond operational themes to critically examine how GAI shapes, supports, or disrupts the mechanisms of human learning and development. Without this shift, the risks of uncritical adoption in educational contexts may outweigh the benefits.

### ***Risk of Bypassing Essential Cognitive Processing***

When learners employ GAI without adequate pedagogical direction, they frequently bypass fundamental cognitive processes emphasized by major learning theories. Sweller's Cognitive Load Theory emphasises the importance of deep processing for schema construction, while Piaget's theory highlights active knowledge construction, and Bloom's taxonomy stresses the necessity of sequential cognitive development (Sweller, 1988; Piaget, 1952; Bloom et al., 1956). To illustrate, a first-year student engaged in the composition of a literature analysis may utilise GAI to generate sophisticated interpretations without first developing an understanding of the text's fundamental themes and structure.

The circumvention of essential cognitive processing is particularly problematic for novice learners encountering new subjects, as they are less equipped to navigate the complexities of such unfamiliar terrain. Consider the case of a high school student learning

calculus who employs GAI to solve complex problems without first acquiring a fundamental understanding of the underlying concepts. Although they may achieve the correct answers, they fail to engage in the essential process of developing mathematical schemas and problem-solving strategies, which Sweller identifies as crucial for genuine learning and subsequent application (van Merriënboer & Sweller, 2005).

To mitigate this risk, educators can implement a structured approach requiring students to demonstrate their cognitive processing before using GAI. For example, a calculus instructor might require students to first manually solve simpler versions of problems, explaining their reasoning in writing, before allowing GAI verification of complex calculations. Similarly, literature professors could mandate initial self-generated interpretations of texts, with GAI used only to compare against the student's established analysis. This scaffolding preserves schema development and frames GAI as a support tool.

In online education, where restricting access to generative AI is challenging, instructors can promote authentic engagement by requiring voice or video reflections and personal process explanations (e.g., “What did you struggle with most?”). These formats are more difficult to delegate to AI and foster deeper student engagement with the learning material. However, the objectives for such practices must be set thoughtfully, aimed at enhancing the cognitive processes that support learning, rather than solely focused on deterring students from using generative AI.

### ***Risk of Illusion of Understanding***

Learning theories show how GAI can create a false sense of understanding without genuine comprehension. Sweller's expertise development, Piaget's equilibration, and Bloom's hierarchy all stress the need for progressive cognitive engagement (van Merriënboer & Sweller, 2005; Wadsworth, 2003; Krathwohl, 2002). For example, a computer science student might use GAI to produce intricate code without grasping core programming principles—an illusion exposed when debugging or modifying code independently.

This misperception of comprehension is especially problematic in advanced academic contexts. It is possible that graduate students may utilise GAI to construct sophisticated academic arguments without developing the requisite deep analytical skills for genuine scholarly work. The theories collectively indicate that this circumvention of genuine cognitive engagement hinders the formation of robust mental models and schemas, which are essential for true expertise development.

To counter this, educators can use assessments that test real comprehension. Coding instructors might allow GAI use but require students to fix errors or adapt code independently. Research mentors can ask students to explain methodology choices verbally, without relying on AI. These strategies ensure GAI supports rather than replaces learning.

In online contexts, such methods are essential. Video explanations, oral defenses, and reflective prompts help reveal genuine thinking. Tools like tablets and styluses also encourage handwritten work on platforms like Moodle, showcasing process-based thinking in various subjects like math, design, or journaling—keeping GAI as a scaffold, not a shortcut.



### ***Risk of Disrupting Social and Collective Learning***

Multiple learning theories highlight the risk that GAI may inadvertently isolate learners from essential social learning. Vygotsky's sociocultural theory, Leontiev and Engeström's Activity Theory, and aspects of Piaget's work emphasize the central role of interaction in cognitive development (Vygotsky, 2012; Engeström, 2001; Wertsch, 1988). For example, undergraduate students in a group project might use GAI individually, missing the cognitive benefits of discussion, negotiation, and collective problem-solving.

This concern is especially relevant in language learning and early education. A language student relying on GAI for translation and writing may bypass the social exchanges Vygotsky deemed critical for acquiring both native and foreign languages. Such isolation can hinder the development of communication skills, cultural understanding, and collaborative reasoning.

To protect these dynamics, educators can redesign group tasks to integrate GAI while emphasizing interpersonal interaction. For instance, language instructors might ask students to co-create original content, then evaluate GAI suggestions together, focusing on cultural nuances the AI overlooks. Likewise, project-based learning can feature "AI-free" brainstorming sessions, followed by collaborative critique of AI-generated outputs.

### ***Risk of Compromising Authentic Motivation and Exploration***

Learning theories converge on the importance of natural curiosity and motivation in the learning process. The concept of motive formation as proposed by Leontiev (1978), Piaget's (1976) emphasis on discovery learning and Vygotsky's (1976) idea of scaffolded exploration all emphasise the importance of genuine learning emerging from authentic engagement with challenges. A science student who immediately turns to GAI for experimental design may fail to appreciate the value of the process of hypothesis formation, trial and error, and the natural development of scientific curiosity that arises from grappling with research questions.

The impact on motivation is particularly evident in project-based learning scenarios. When students rely on GAI to provide immediate solutions or creative ideas, they fail to engage in the essential process of developing intrinsic motivation through exploration and discovery. To illustrate, an art student utilising GAI to devise design concepts may fail to gain the invaluable experience of developing their artistic identity through experimentation and personal expression.

To safeguard intrinsic motivation, educators can establish clear boundaries for GAI usage that preserve exploratory learning. For example, science teachers might restrict GAI access during initial hypothesis formation and experimental design, allowing its use only after students have developed their own approaches. Art instructors could implement a rule where GAI is used only after students have generated multiple original concepts, positioning it as a creative dialogue partner rather than an idea generator. These strategies maintain the essential motivational benefits of struggle and discovery while introducing GAI as a reflective tool that extends rather than replaces authentic exploration.

### ***Risk of Interfering with Knowledge Transfer and Application***

The theories collectively emphasise that the utilisation of GAI can impede the development of transferable knowledge and skills. The emphasis placed by Sweller on schema development, the focus of Bloom on higher-order thinking skills, and the concept of internalisation proposed by Vygotsky all indicate the significance of developing flexible and applicable understanding (Anderson, 2000; Krathwohl, 2002; Engeström & Sannino, 2010). A business student who relies on GAI for case study analyses may develop a knowledge base that is compartmentalised and does not readily transfer to real-world business situations, where problems are less structured and require flexible thinking.

Such interference can be particularly problematic in the context of professional education. For example, medical students who rely extensively on GAI for diagnostic reasoning may encounter difficulties in developing the robust clinical reasoning schemas that are essential for addressing complex and ambiguous cases in actual practice. The aforementioned theories posit that such reliance on GAI can impede the development of the comprehensive, interlinked knowledge structures that facilitate effective knowledge transfer and utilisation in novel contexts.

The societal implications of these knowledge transfer limitations extend beyond individual learning outcomes. By systematically bypassing essential cognitive processes in favor of efficiency, educational institutions risk developing generations with superficial knowledge structures who struggle with novel problem-solving in evolving contexts. This could ultimately affect workforce readiness and innovation capacity in fields requiring adaptable expertise and creative problem-solving abilities.

Educators can enhance knowledge transfer by designing authentic application scenarios that strategically limit GAI involvement. For instance, business educators might allow GAI for initial case analysis but require students to independently apply findings to novel, ambiguous scenarios without AI assistance. Medical educators could implement simulated diagnostic exercises where students first develop their own clinical reasoning before comparing their approach with GAI-generated differentials. This staged approach ensures students develop the flexible mental models necessary for knowledge transfer.

### ***Risks of the Integration of GAI in Learning Contexts Across Different Profiles***

The learning risks associated with GAI vary significantly across educational levels, requiring tailored mitigation strategies. According to the scoping review, 50% of users are students across academic levels, but use also extends to professionals and educators. Each group presents distinct challenges in integrating GAI while safeguarding essential learning processes.

At the secondary level, the focus should be on developing foundational cognitive and social competencies. Manual problem-solving and peer interaction are essential. GAI should be introduced gradually, primarily as a verification tool after independent work, to encourage research skills and autonomous thinking.

In high school, the emphasis shifts to analytical and critical thinking. Students can begin comparing their work with GAI outputs to verify ideas rather than rely on the tool

outright. Group discussions before using GAI help strengthen collaboration and independent reasoning, positioning AI as a support, not a crutch. This approach facilitates students' comprehension of AI as a supplementary instrument while sustaining their cognitive growth.

In higher education, the focus shifts towards the attainment of more sophisticated learning objectives. It is recommended that students utilise the GAI tool primarily for the refinement of pre-existing ideas and the verification of understanding through peer discussion. It is recommended that students be encouraged to apply concepts independently before seeking assistance from GAI, thus fostering the development of original thinking. This approach may assist in maintaining the integrity of higher education's objective of fostering the development of independent, critical thinking skills.

At the graduate level, GAI should be regarded as a supplementary tool, with the primary emphasis placed on original research and analysis. It is recommended that students at this level maintain robust peer collaborations and prioritise the development of practical application skills before integrating GAI assistance. This guarantees that advanced academic work remains rigorous and contributes to the development of genuine expertise in the field.

For the users beyond educational settings, such as general and professional users, including business professionals, AI developers, and journalists, who also employ GAI for learning purposes, the risks of uncritical GAI usage similarly manifest but with broader immediate societal implications. Business professionals without understanding the risks of uncritical GAI use may develop decision-making approaches that lack the robust mental models necessary for complex business environments. Journalists relying on GAI without critical engagement risk contributing to information ecosystems characterized by superficial analysis. Most concerning, AI developers who do not recognize these learning risks may inadvertently design systems that perpetuate these same limitations at scale.

These professional contexts illustrate how the theoretical gaps identified in GAI research extend beyond individual learning outcomes to impact organizational effectiveness, information quality, and the design of future technological systems that shape societal knowledge construction. A progressive approach to GAI integration across educational and professional contexts is therefore essential to protect fundamental learning processes while enabling appropriate technology use at each developmental stage. Addressing these theoretical considerations requires a fundamental reorientation toward frameworks grounded in established principles of human learning, necessitating collaboration between learning scientists, educational practitioners, and AI developers to ensure that GAI enhances rather than circumvents the cognitive, social, and motivational processes essential for genuine learning and expertise development.

To mitigate this risk, educational institutions can establish developmentally appropriate guidelines that evolve with learner expertise. For example, secondary schools might adopt an approach where students first complete assignments on their own and then use GAI to review their work and identify areas for improvement. Universities could develop discipline-specific frameworks that progressively increase GAI access as students demonstrate fundamental competencies. Professional learning environments can establish critical evaluation protocols requiring practitioners to document their reasoning before consulting GAI. These tiered approaches ensure that GAI integration aligns with learning

fundamentals across diverse contexts while recognizing the varying needs of different learner profiles.

## Conclusion

The analysis of key learning theories—Cognitive Load Theory (Sweller), constructivist perspectives (Piaget), sociocultural theory (Vygotsky), Activity Theory (Leontiev and Engeström), and Bloom's taxonomy—raises significant concerns about the indiscriminate use of GAI in education. These frameworks emphasize the need for active cognitive engagement, social interaction, and authentic motivation. The study revealed that GAI-related research tends to prioritize operational issues over foundational learning principles and highlighted the risks of uncritical GAI integration.

The practical implications point to the need for structured, developmentally appropriate strategies for GAI use. Educational institutions should prioritize teaching fundamental disciplines—logic, philosophy, linguistics, mathematics, and the arts—to foster deep analytical skills and offset potential adverse effects. The current GAI user population spans a wide range, from individuals—such as children and undergraduates—who may not yet have fully developed cognitive abilities, to those who, although also novice users of GAI, have acquired such skills through education prior to its widespread use. It can be argued that the latter are better equipped to engage critically with GAI due to their established evaluative skills. Evaluating GAI's impact on developing learners therefore requires longitudinal observation. Although it is still too early for definitive conclusions, efforts should begin now to prepare for understanding long-term outcomes. It is also crucial to raise awareness about the risks of uncritical GAI use among novice users, especially across various levels of education. Future research should focus on how GAI can support—rather than bypass—essential learning processes, by developing pedagogical techniques that balance technological integration with traditional learning practices while preserving active learning, social engagement, and motivation.

Several areas of future research are critical. Longitudinal studies should examine how early exposure to GAI affects schema formation, critical thinking, and knowledge transfer. Tracking these learners against historical cohorts could reveal shifts in cognitive flexibility and problem-solving. Additionally, cultural and socioeconomic contexts must be considered, as learning theories manifest differently across societies. Research into how GAI interacts with local knowledge systems, educational traditions, and diverse epistemological frameworks will support culturally responsive implementation. Studies exploring how GAI may either bridge or widen achievement gaps are essential for developing equitable strategies. Comparative policy research could identify which educational systems most effectively balance innovation with the protection of learning fundamentals.

This study's findings carry important policy implications and align with global trends in educational technology. While international initiatives (UNESCO, 2021, 2022; OECD, 2023; European Commission, 2020) acknowledge AI's potential, current frameworks tend to emphasize infrastructure and digital literacy. However, without equal focus on pedagogical foundations, such policies risk undermining essential learning processes. As education systems expand technology integration, policies must also safeguard cognitive development, social learning, and intrinsic motivation. This research contributes a theory-based perspective

to help shape more balanced and effective AI education policies.

Ethical considerations further complicate GAI implementation. The integration of GAI tools raises concerns regarding data privacy, as student interactions generate potentially sensitive information requiring robust protection protocols. Questions of accessibility and equity emerge as critical considerations—differential access to GAI tools across socioeconomic boundaries may exacerbate educational inequalities. For instance, the requirement to use specialized tools—such as tablets with styluses for handwritten submissions—may support cognitive development and aid in verifying authenticity, but it also introduces additional barriers for students with limited access to technological resources. Furthermore, potential biases in GAI systems—reflecting limitations in their training data—present challenges for ensuring fair educational experiences. Addressing these ethical concerns requires collaborative efforts among educators, policymakers, and developers to ensure GAI implementation upholds principles of privacy, equity, and fairness.

This study acknowledges several methodological limitations. The exclusive use of the SCOPUS database, while comprehensive, may have excluded relevant research indexed in other academic repositories. Furthermore, while the scoping review methodology effectively fulfilled the objective of providing a general panorama across diverse learner profiles, it necessarily sacrificed depth for breadth. A more targeted systematic review focusing on specific learner profiles or educational contexts would likely yield more detailed and nuanced results.

## **Declarations**

The authors declare no conflict of interests for this study.

The authors declared no funding sources for this study.

## ***Acknowledgement***

This paper was reviewed and refined with the assistance of OpenAI's GPT-4o and Anthropic's Claude 3.7 Sonnet, complementing the human editorial process.

## References

- Anderson, J. R. (2000). *Learning and Memory: An integrated approach (2nd ed.)*. Wiley.
- Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19-32.  
<https://doi.org/10.1080/1364557032000119616>
- Artemova, I. (2024). Bridging motivation and AI in education: An activity theory perspective. *Digital Education Review*, 45, 59-69. <https://doi.org/10.1344/der.2024.45.59-67>
- Belt, R., Rahimi, K., & Cai, S. (2022). Researching the hard-to-reach: A scoping review protocol of digital health research in hidden, marginal and excluded populations. *BMJ Open*, 12. <https://doi.org/10.1136/bmjopen-2022-061361>
- Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain*. David McKay Company.
- Cacho, R. M. (2024). Integrating generative AI in university teaching and learning: A model for balanced guidelines. *Online Learning*, 28(3), 55-81.  
<https://doi.org/10.24059/olj.v28i3.4508>
- Cardoso Sampaio, R., Chagas, V., Sinimbu Sanchez, C., Gonçalves, J., Borges, T., Brum Alison, M., ... Schwarzer Paz, F. (2024). Uma revisão de escopo assistida por inteligência artificial (IA) sobre usos emergentes de ia na pesquisa qualitativa e suas considerações éticas. *Revista Pesquisa Qualitativa*, 12(30), 01–28.  
<https://doi.org/10.33361/RPQ.2024.v.12.n.30.729>
- Casale, E. G., Golann, D. W., & LeMaster, E. (2021). US school principals and special education legal knowledge: A scoping review. *International Review of Research in Developmental Disabilities*, 60, 213-258. <https://doi.org/10.1016/bs.irrdd.2021.08.007>
- Crawford, K. (2021). *The atlas of AI: Power, politics, and the planetary costs of artificial intelligence*. Yale University Press.
- Cumming, M., Bettini, E., & Chow, J. (2023). High-quality systematic literature reviews in special education: Promoting coherence, contextualization, generativity, and transparency. *Exceptional Children*, 89, 412 - 431.  
<https://doi.org/10.1177/00144029221146576>
- Dogan, M., Dogan, T., & Bozkurt, A. (2023). The use of Artificial Intelligence (AI) in online learning and distance education processes: A systematic review of empirical studies. *Applied Sciences*, 13(5). <https://doi.org/10.3390/app13053056>

- Draganoudi, A., Kaliampou, G., Lavidas, K., & Ravanis, K. (2023). Developing a research instrument to record pre-school teachers' beliefs about teaching practices in natural sciences. *South African Journal of Education*. <https://doi.org/10.15700/saje.v43n1a2031>
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Orienta-Konsultit.
- Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14(1), 133-156. <https://doi.org/10.1080/13639080020028747>
- Engeström, Y., & Sannino, A. (2010). Studies of expansive learning: Foundations, findings and future challenges. *Educational Research Review*, 5(1), 1-24. <http://dx.doi.org/10.1016/j.edurev.2009.12.002>
- European Commission (2020). *Digital Education Action Plan (2021-2027)*. European Commission. <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>
- Ifenthaler, D., & Schumacher, C. (2023). Reciprocal issues of artificial and human intelligence in education. *Journal of Research on Technology in Education*, 55(1), 1 -6. <https://doi.org/10.1080/15391523.2022.2154511>
- Jin, Z. (2023). Analysis of the Technical Principles of ChatGPT and Prospects for Pre-trained Large Models. *2023 IEEE 3rd International Conference on Information Technology, Big Data and Artificial Intelligence (ICIBA)*, 3, 1755-1758. <https://doi.org/10.1109/ICIBA56860.2023.10165540>
- Kirschner, P. A., Sweller, J., & Clark, R. E. (2010). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist*, 41(2), 75-86. [https://doi.org/10.1207/s15326985ep4102\\_1](https://doi.org/10.1207/s15326985ep4102_1)
- Krathwohl, D. R. (2002). A revision of Bloom's Taxonomy: An overview. *Theory Into Practice*, 41(4), 212–218. [https://doi.org/10.1207/s15430421tip4104\\_2](https://doi.org/10.1207/s15430421tip4104_2)
- Leontiev, A. N. (1978). *Activity, consciousness, and personality*. Prentice-Hall.
- Leontiev, A. N. (1981). *Problems of the development of the mind*. Progress Publishers.
- Leontjev, D., & deBoer, M. (2022). Teacher as creator: Orchestrating the learning environment to promote learner development. *Language Teaching Research*. <https://doi.org/10.1177/13621688221117654>
- Li, Z., Wang, C., & Bonk, C. J. (2024). Exploring the utility of ChatGPT for self-directed online language learning. *Online Learning*, 28(3), 157-180. <https://doi.org/10.24059/olj.v28i3.4497>

- Liao, H., Xiao, H., & Hu, B. (2023). Revolutionizing ESL teaching with generative artificial intelligence - Take ChatGPT as an example. *International Journal of New Developments in Education*, 5(20), 39-46, <https://doi.org/10.25236/ijnde.2023.052008>
- Lindsay, E., Johri, A., & Bjerva, J. (2023). A framework for responsible development of automated student feedback with generative AI. *ArXiv*, abs/2308.15334. <https://doi.org/10.48550/arXiv.2308.15334>
- Liu, M., Ren, Y., Nyagoga, L., Stonier, F., Wu, Z., & Yu, L. (2023). Future of education in the era of generative artificial intelligence: Consensus among Chinese scholars on applications of ChatGPT in schools. *Future in Educational Research*. <https://doi.org/10.1002/fer3.10>
- Luckin, R., & Cukurova, M. (2019). Designing educational technologies in the age of AI: A learning sciences-driven approach. *British Journal of Educational Technology*, 50, 2824-2838. <https://doi.org/10.1111/BJET.12861>
- Maani, D., & Shanti, Z. (2023). Technology-enhanced learning in light of Bloom's taxonomy: A student-experience study of the History of Architecture course. *Sustainability*. <https://doi.org/10.3390/su15032624>
- Marzano, R. J., & Kendall, J. S. (2006). *The new taxonomy of educational objectives (2nd ed.)*. Corwin Press.
- McCoy, S., & Lynam, A. (2022). How field experience shapes pre-service primary teachers' technology integration knowledge and practice. *Teacher Development*, 26, 567 - 586. <https://doi.org/10.1080/13664530.2022.2074086>
- Miranda, P., Kaur, J., Abhari, S., & Morita, P. (2023). ChatGPT for systematic and scoping reviews in public health research: An applicable approach. *The European Journal of Public Health*, 33. <https://doi.org/10.1093/eurpub/ckad160.1237>
- OECD. (2023). *OECD Digital Education Outlook 2023. Towards an Effective Digital Education Ecosystem*. OECD Publishing. [https://www.oecd.org/en/publications/oecd-digital-education-outlook-2023\\_c74f03de-en.html](https://www.oecd.org/en/publications/oecd-digital-education-outlook-2023_c74f03de-en.html)
- Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press.
- Piaget, J. (1970). *Structuralism*. Basic Books.
- Piaget, J. (1976). *The grasp of consciousness: Action and concept in the young child*. Harvard University Press.
- Piaget, J. (1980). *Adaptation and intelligence: Organic selection and phenocopy*. University of Chicago Press.
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, 12(2), 257-285. [https://doi.org/10.1207/s15516709cog1202\\_4](https://doi.org/10.1207/s15516709cog1202_4)



- UNESCO. (2021). *AI and education: Guidance for policy-makers*.  
<https://unesdoc.unesco.org/ark:/48223/pf0000376709>
- UNESCO (2022). *Recommendation on the Ethics of Artificial Intelligence*.  
<https://unesdoc.unesco.org/ark:/48223/pf0000381137>
- Van Merriënboer, J. J., & Sweller, J. (2005). Cognitive load theory and complex learning: Recent developments and future directions. *Educational Psychology Review*, 17, 147-177. <https://doi.org/10.1007/s10648-005-3951-0>
- Veresov, N., & Veraksa, N. (2022). Digital games and digital play in early childhood: a cultural-historical approach. *Early Years*, 43, 1089–1101.  
<https://doi.org/10.1080/09575146.2022.2056880>
- von Glasersfeld, E. (1995). *Radical constructivism: A way of knowing and learning*. The Falmer Press.
- Vygotsky, L. S. (1986). *Thought and language*. MIT Press.
- Vygotsky, L. S. (2012). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wadsworth, B. J. (2003). *Piaget's theory of cognitive and affective development: Foundations of constructivism (5th ed.)*. Pearson College Div.
- Wertsch, J. V. (1988). *Vygotsky and the social formation of mind*. Harvard University Press.
- Willingham, D. T. (2021). *Why don't students like school? A cognitive scientist answers questions about how the mind works and what it means for the classroom*. Jossey-Bass
- Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Child Psychology & Psychiatry & Allied Disciplines*, 17(2), 89-100.  
<https://doi.org/10.1111/j.1469-7610.1976.tb00381.x>

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# An Examination of Teaching Presence in an Accelerated Online Bachelor of Business Administration Course

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## **Abstract**

A quantitative content analysis study was conducted to examine teaching presence in an online accelerated Bachelor of Business Administration (BBA) course. Analyzing various course materials, this study identifies patterns of teaching presence across three categories—Instructional Design and Organization, Facilitating Learning, and Direct Instruction. The findings demonstrated that Direct Instruction was the most prominent category of teaching presence, closely followed by Facilitating Learning and Instructional Design and Organization. In addition, the findings revealed that in a contemporary online course, teaching presence extends beyond asynchronous discussions, manifesting in various elements of the online learning experience. This study underscored the critical role of teaching presence in meeting the needs of learners, particularly nontraditional learners, in an accelerated online course format. This content analysis study highlighted the patterns of teaching presence in course design, development, and delivery, offering valuable insights for both novice and experienced instructors focused on online teaching.

*Keywords:* Teaching presence; Accelerated online course; Online teaching; Higher education

Krier, K., Ching, Y.H., Ching, Lowenthal, P. (2025). An examination of teaching presence in an accelerated online bachelor of business administration course. *Online Learning*, 29(4), 418-447. <https://doi.10.24059/olj.v29i4.4740>

## Introduction

Enrollments in online courses and programs in higher education have increased dramatically over the last two decades (Ahmady et al., 2018; Balboni et al., 2018). Business schools, in particular, have seen an increased use of online education (Alsharah & Ghura, 2023). For instance, “between January 2018 and October 2021, U.S.-based online programs in business and management increased from 1,500 to 2,500” (Bisoux, 2022, para. 17). Students enrolled in business programs tend to be nontraditional students who work full-time, juggle family responsibilities while attending courses (Van Doorn & Van Doorn, 2014), and are working professionals that possess “one to ten years of managerial working experiences” (Tseng et al., 2019, p. 181). Engaging these nontraditional students by employing effective design and delivery strategies in online instruction is essential (Ren, 2023), as online education tends to have higher attrition rates than traditional on-campus programs (Ludwig-Hardman & Dunlap, 2003; Ren, 2023).

Universities increasingly offer accelerated online courses to attract nontraditional students (Colclasure et al., 2018). These courses are a shortened version of a typical semester-long course (Kuo, 2014), featuring intensive coursework and compact sessions (Abu-Dawood et al., 2016). For instance, instead of taking 15 weeks to complete a course, a student can complete a course in seven weeks. However, compared to traditional online courses, accelerated online courses may impose greater educational responsibilities on learners, who may already face challenges such as unanticipated work commitments and hectic schedules (Roddy et al., 2017). The condensed time frame necessitates learners to double their weekly study time, potentially causing overload and challenges (Glenn, 2018). Due to the fast pace and demanding workload in accelerated courses, it can be challenging for learners to develop meaningful connections with their peers and instructors (Chicca & Matthias, 2023). Lack of interactions between peers and instructors has been linked to an increased attrition rate among nontraditional online learners (Owens et al., 2009; Park & Choi, 2009; Rovai, 2003).

Studies have explored the role of interaction in accelerated online courses, focusing specifically on aspects such as learner–content interaction, social presence, classroom community, instructional approaches, and peer interactions (Kuo, 2014; Lowenthal, 2016; Lowenthal & Trespalacios, 2022; Soles & Maduli-Williams, 2019; Trekles & Sims, 2013). Among various interactions in online education, instructor interaction is indispensable for online learners to fully engage and succeed in accelerated online courses (Kuo, 2014). Well-structured course design and instructor-student interaction contribute to the success of online courses (Lowenthal & Trespalacios, 2022).

The Community of Inquiry (CoI) framework developed by Garrison et al. (1999) outlines a framework for the research and practice of online learning that can help how course design and interaction contribute to successful online courses. This framework emphasizes three interconnected elements crucial for a meaningful educational experience: social presence, teaching presence, and cognitive presence. Anderson et al. (2001) defined teaching presence “as the design, facilitating, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (p. 5). Teaching presence enhances the online learning community through sharing and understanding,

allowing instructors and learners to collaborate (Wang & Liu, 2019). Teaching presence diminishes the distance between the learner and instructor in online courses (Arbaugh & Hwang, 2006), which mitigates learners from pausing or dropping out of online courses or degree programs (Delaney & Betts, 2022).

However, studies have yet to examine the extent to which teaching presence is manifested in course design, development, and delivery for online accelerated, asynchronous courses in higher education institutions. Particularly, research addressing online accelerated courses in business education, predominantly attended by nontraditional learners, remains notably absent. Given this, we set out to investigate teaching presence in an online accelerated business course. More specifically, we conducted a content analysis to uncover the patterns of teaching presence within instructional design, facilitation, and direct instruction in an accelerated online BBA course. The results of these patterns provide insights enabling instructors to enhance their understanding and implementation of teaching presence in such courses. With this knowledge, instructors can make informed decisions to optimize their teaching approaches, fostering a more engaging and supportive learning environment for nontraditional students.

## **Literature Review**

### ***Teaching Presence***

Teaching presence, as defined within the Community of Inquiry (CoI) framework developed by Garrison et al. (1999), is fundamental to online learning. Initially conceptualized to explain how “teaching” takes place in communities of inquiry, teaching presence focuses on the role design, direct instruction, and discourse play in meaningful educational experiences. This presence is crucial for fostering social and cognitive presences, which are essential for achieving meaningful learning outcomes that address learners’ needs (Garrison, 2017; Garrison et al., 2010; Szeto, 2015; Wang, 2022; Wang & Liu, 2020). Research has shown that teaching presence enhances collaboration, trust, and transparent communication, thereby significantly contributing to student satisfaction, community building, and overall learning outcomes (Delaney & Betts, 2022; Dughi et al., 2023; Li, 2022; Szeto, 2015).

### ***Three Categories of Teaching Presence***

Three categories of teaching presence are conceptualized—instructional design and organization, facilitating discourse, and direct instruction (Anderson et al., 2001). Within the instructional design and organization category, instructors construct and recontextualize curriculum materials and design group or individual activities. Instructors also model or provide guidelines for conducting discussion postings (Anderson et al., 2001). The instructional design and organization category highlights the importance of planning, developing, and establishing the online course’s curriculum, communication and interaction approaches, and evaluation methods (Arbaugh & Hwang, 2006; Shea et al., 2003; Watson et al., 2016). Design and organization aim to devise goals and ways to enhance learning (Stenbom et al., 2016). Effective instructors take control of this process to create online course structure and learning activities (Turk et al., 2021).

Facilitating discourse seeks to create understanding through pedagogical knowledge, disciplinary expertise, interpersonal guidance, and organizational direction (Garrison, 2017). Facilitating discourse allows instructors to provide feedback and comments to students, address their questions, offer directions and resources, and keep discussions engaging (Arbaugh & Hwang, 2006; Garrison, 2017; Watson et al., 2016). Facilitating discourse enables instructors to guide and engage learners in dialogues that are meaningful, purposeful, critical, reflective, and productive with their peers (Turk et al., 2022). This approach fosters effective peer-to-peer interactions (Fiock et al., 2021).

With direct instruction, instructors share expert knowledge and experiences with students (Anderson et al., 2001, p. 8). The direct instruction category involves actively sharing knowledge, resources, and feedback (Watson et al., 2016). These activities help learners gain clarification, guidance, and understanding (Turk et al., 2021). Direct instruction entails the exchange of specific subject matter, which occurs not only between instructors and learners but also among learners themselves (Fiock et al., 2021; Stenbom et al., 2016).

### ***The Role of Teaching Presence***

Several studies have identified a relationship between teaching presence, students' satisfaction, learning, and community development in online education (Akyol & Garrison, 2008; Caskurlu et al., 2020; Garrison, 2017; Khalid & Quick, 2016). Shea, Fredericksen, et al. (2003) assessed students' perceptions of teaching presence and found a positive correlation between student satisfaction and learning and the three categories of teaching presence. Shea, Pickett, et al. (2003) demonstrated a similar positive correlation in a follow-up study. The results revealed that although student classmates contribute to discourse facilitation and direct instruction, the instructor's role remains integral to student satisfaction and learning outcomes. Through a quantitative content analysis, Shea et al. (2010) suggested a positive correlation between learning outcomes and teaching presence. Szeto (2015) echoed that learning outcomes are influenced by teaching presence. Caskurlu et al. (2020) identified teaching presence as "a good predictor of student outcomes" and emphasized its critical role in course design and implementation (p. 11). Moreover, research has highlighted the critical role of teaching presence in community development. For instance, Shea et al. (2005) and Shea et al. (2006) highlighted the connection between students' perceptions of teaching presence and their sense of learning community. Ke (2010) also found that teaching presence contributes to the development process of an online learning community.

Research has consistently highlighted the pivotal role of teaching presence in fostering learning interaction and engagement, and bridging social and cognitive presence. Wang and Liu (2019) found that the categories of instructional design and organization and facilitating discourse impacted students' interaction positively. Notably, Zhang et al. (2016) indicated a positive impact of teaching presence on learner interaction. In addition, Zhang et al. (2023) discovered that teaching presence contributes to the promotion of "learner affective engagement" (p. 6). Garrison et al. (2010) illustrated that the importance of teaching presence in sustaining and facilitating social and cognitive presence is critical, contributing to developing an online community of inquiry. Morrison and Jacobsen's (2023) findings also resonated with the indispensable role of teaching presence within online courses in relation to social and cognitive presence. Prasad (2009) uncovered that teaching presence is interconnected with students'

critical thinking level. Furthermore, Turk et al. (2022) revealed that teaching presence positively affects students' basic psychological need for autonomy and competence, contributing to motivation and engagement (pp. 8–9).

Previous research has suggested that nontraditional students tend to enroll in accelerated online courses, seeking immediate application of learning that could directly integrate into their professional work (Jiang & Koo, 2020; Lowenthal et al., 2016). These students often prioritize practical, relevant learning experiences that can be readily applied to their current professional roles (Jiang & Koo, 2020). In this context, teaching presence is crucial as it entails designing materials and teaching approaches that meet the needs of these students by tailoring content to address the real-world challenges nontraditional students face in their professional lives. This ensures that the learning experience is engaging and directly applicable (Garrison, 2017, p. 70). Teaching presence also plays an essential role in identifying relevant societal knowledge and fostering reflection and discussion, further enhancing the effectiveness of the learning experience for nontraditional students (Garrison, 2017, p. 70).

Teaching presence, previously studied in the context of graduate business management education (Arbaugh & Hwang, 2006), has seen limited examination in the realm of accelerated online courses, especially those pertaining to online BBA programs (Lowenthal, 2016).

## Methodology

This content analysis study aimed to identify the patterns of teaching presence as manifested in instructional design, facilitation, and direct instruction within an accelerated online BBA course. A content analysis study can shed light on the patterns of teaching presence in course design, development, and delivery, and the results will help new and existing instructors identify ways and contexts to demonstrate teaching presence in their online courses.

The study focused on answering the following research questions:

1. What are the teaching presence patterns in an accelerated online BBA course?
  - a. To what extent is teaching presence manifested in the *instructional design and organization* of an accelerated online BBA course?
  - b. To what extent is teaching presence manifested in the *facilitation* of an accelerated online BBA course?
  - c. To what extent is teaching presence manifested in *direct instruction* in an accelerated online BBA course?

## Research Design

This study employed a directed content analysis approach using quantitative analysis methods (Hsieh & Shannon, 2005). Content analysis is a research methodology that “mak[es] replicable and valid inferences from texts to the contexts of their use” (Krippendorff, 2019, p. 24). Content analysis enables researchers to analyze “unstructured data in view of the meanings,

symbolic qualities, and expressive contents they have any of the communicative roles they play in the lives of the data's sources" (Krippendorff, 2019, p. 51). A directed content analysis aims to "validate or extend conceptually a theoretical framework or theory" (Hsieh & Shannon, 2005, p. 1281), which is applicable to this study to explore the emergence of teaching presence in an accelerated online BBA course.

### ***Sample / Context***

This study was conducted in an Association to Advance Collegiate Schools of Business (AACSB)-accredited online BBA program at a metropolitan university in the northwestern United States. The university's Institutional Review Board (IRB) reviewed and approved this study before data collection. It involved secondary data analysis of course content and instructional interactions from a previously completed course. No personally identifiable student information was included in the analysis. This program offers accelerated online courses every seven weeks, targeting working adults with prior college experience aiming to enhance their careers or complete their post-secondary education. Most learners are over the age of 25, nontraditional students who have not attended college for an extended period of time. Many learners attend the program part-time and hold positions in or have a background in business.

Purposeful sampling was utilized to "intentionally sample" a course that would "best inform the researcher about the research problem under examination" (Creswell & Poth, 2018, p. 148). The course selection criteria included whether the course used module overview, announcements, discussion forum instructions, text-based feedback, assignment instructions, instructional videos, and whether the instructor used discussion replies to facilitate discourse. A course emphasizing critical management skills and problem-solving skills related to business and economics met the criteria and was selected for this study. This course was redesigned by an adjunct faculty who is an experienced online instructor with the collaborative effort from the university instructional design team. The collaborative effort involved aligning the course with the quality assurance standards (Quality Matters, 2023), streamlining course and module objectives, and ensuring accessibility for the course design. A new full-time lecturer with proficient online teaching experience taught this course.

### ***Data Sources and Analysis***

#### **Data Sources**

As an entry course for the program, learners share the program's characteristics and are primarily working adults identified as nontraditional learners. One unique characteristic of this course was that the instructor received an academic coach to assist with grading because the enrollment was above 40. Thus, this study evaluated data sources from the instructor and academic coach for this foundational course.

Previous studies that examined teaching presence using content analysis largely focused on asynchronous discussions (Anderson et al., 2001; Nami et al., 2018; Prasad, 2009; Rodriguez, 2014; Rourke & Anderson, 2002). This study intended to broaden the range of data sources to understand better how teaching presence is manifested across course materials and interactions. The study sampled two modules of the course, incorporating a variety of data

sources: two module announcements and overview pages, which the instructor frequently used to convey course material, guidelines, and expectations; two instructional videos, instructions for two discussion forums, named Management in Action, two sets of instructor replies in discussions, two sets of discussion feedback, two project-based assignment instructions, and two sets of assignment feedback. These modules corresponded to weeks two and three in this seven-week accelerated course. Week two focused on routine development, at which point learners became acquainted with the course structure and sequence. Week three highlighted the importance of management, introducing learners to various organizational concepts. All data sources helped understand the categories of teaching presence: instructional design and organization, facilitating discourse, and direct instruction. Table 1 presents a summary of the aforementioned course elements that are collected and analyzed for this study.

**Table 1**

*Summary of Data Sources Collected and Analyzed*

|                |                                                      |
|----------------|------------------------------------------------------|
| Course Element | Module 2 and Module 3 Overview Pages                 |
|                | Module 2 and Module 3 Course Announcements           |
|                | Module 2 and Module 3 Instructional Videos           |
|                | Module 2 and Module 3 Discussion Instructions        |
|                | Module 2 and Module 3 Discussion Instructor Replies  |
|                | Module 2 and Module 3 Discussion Instructor Feedback |
|                | Module 2 and Module 3 Assignment Instructions        |
|                | Module 2 and Module 3 Assignment Feedback            |

Data Analysis

This study used the following revised steps of content analysis based on the research of Hsieh and Shannon (2005), Rourke et al. (2000), and White and Marsh (2006). The researchers first formulated the research questions and selected the data sample to be analyzed. The researcher drew the sample and determined the unit of analysis to be the sentence. Choosing sentence types of analysis allowed the researcher to “focus on the text, including the context in the form of the structural elements provided in the conferencing format” (Fahy et al., 2001, p. 5). Each unit was only coded into one indicator based on the coding scheme. To test out the original coding scheme developed by Wang and Liu (2019), which was adapted from Shea et al.’s (2010) study based on Anderson et al.’s (2001) research, the lead researcher conducted the initial coding on a subset of data from Module 2. The lead researcher and the second coder, another researcher on the team, underwent a coding training session to discuss the codes and revise the coding scheme (Krippendorff, 2019). During the training session, the researcher and the second coder determined that one of the indicators, Utilizing Medium Effectively, should be eliminated because it was not the instructor’s or academic coach’s responsibility to assist students in using LMS features for learning activities and resolving technical problems. The online BBA program has a designated online course technologist who assists in the live courses.

After the training session, the researcher and second coder independently coded a subset of data from Module 3 using the revised coding scheme, yielding a Cohen’s kappa of 0.40, indicating fair inter-rater reliability (Anderson et al., 2001; Landis & Koch, 1977; Rourke et al.,



2001). During this process, coders encountered discrepancies in classifying evolving forms of instructional communication found in accelerated, asynchronous online courses. One notable challenge involved coding the instructor's welcoming language and introductory comments embedded in course announcements or instructional videos. These utterances were initially difficult to align with existing indicators, leading to inconsistencies in coding. Given the frequent presence of these types of communications, and the absence of a suitable existing indicator, the researcher and the second coder, after discussion, created a new indicator, Providing Instructional Greeting, to capture these relational, presence-establishing interactions.

Another recurring point of disagreement was how to code feedback or commentary from instructors that explained student performance or clarified alignment with grading expectations. These did not align well with the Offering Useful Illustrations indicator. Through discussion, the coders agreed to create a new indicator, Explaining Learning Activities, to better capture these forms of instructional engagement. These examples reflect the difficulties of applying earlier frameworks to multi-modal, fast-paced instructional environments designed for nontraditional learners.

Through negotiation and discussion to refine the coding scheme and resolve discrepancies (Garrison et al., 2006), the researcher and the second coder reached a complete agreement. The revised coding scheme, with added codes and modified definitions (see Table 2), aimed to better capture teaching presence as reflected in the course materials and instructional activities, including both text-based communication and videos, in contemporary online courses. The lead researcher then analyzed the entire dataset using this revised coding scheme. In this study, NVivo was used to assist with coding the data.

**Table 2**

*Revised Coding Scheme for Teaching Presence (Applied to the Entire Dataset for Analysis)*

| Indicators of Teaching Presence                         | Added/ Changed /Removed | Description (New, Modified, Remains the Same, or Removed)                                                                                                              |
|---------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instructional Design and Organization (category)</b> |                         |                                                                                                                                                                        |
| Establishing etiquette                                  |                         | Remains the same: Helps students understand the behaviors that are acceptable in online learning, e.g., providing documentation on polite forms of online interaction. |
| Establishing time parameters                            |                         | Remains the same: Communicates important due dates/time frames for learning activities to help students keep pace with the course e.g., accurate course schedule.      |
| Utilizing medium effectively                            | Removed                 | Removed: Assists students to take advantage of the online environment to enhance learning, e.g., using                                                                 |

| Indicators of Teaching Presence                                  | Added/<br>Changed<br>/Removed                                                                        | Description (New, Modified, Remains the Same, or Removed)                                                                                                                                                                                         |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  |                                                                                                      | LMS features for learning activities and resolving technical problems.                                                                                                                                                                            |
| <b>Explaining Learning Activities</b>                            | Added                                                                                                | New: Provides clear instructions on how to participate in course learning activities, e.g., clear explanation of how to complete course assessments successfully, rubrics, and instructor expectations (excluding time parameters and etiquette). |
| Making macrolevel comments                                       |                                                                                                      | Remains the same: Provides rationale for assignment/topic (for example, the purpose of the assignment).                                                                                                                                           |
| Setting curriculum                                               | Changed<br>(from Setting curriculum and communicating assessment methods to be used in the course)   | Modified: Communicates important course objectives, e.g., documentation, goals, topics, and assignment/task titles.                                                                                                                               |
| <b>Facilitating Learning (category)</b>                          | Changed<br>(from Facilitating Discourse)                                                             |                                                                                                                                                                                                                                                   |
| Assess the efficacy of learning performance                      | Changed<br>(from Assess the efficacy of giving a score, e.g., rubric, grading criteria. the process) | Modified: Helps students know more about the overall state of learning and performance including the efficacy of giving a score, e.g., rubric, grading criteria.                                                                                  |
| Drawing in participants and promoting discussion                 |                                                                                                      | Remains the same: Helps students engaged and participate in a productive dialogue                                                                                                                                                                 |
| Encouraging, acknowledging, or reinforcing student contributions |                                                                                                      | Remains the same: Acknowledge student participation in the course, e.g., relied in a positive encouraging manner to student submissions (without referring to any rubric or grading criteria).                                                    |

| Indicators of Teaching Presence                | Added/<br>Changed<br>/Removed | Description (New, Modified, Remains the Same, or Removed)                                                                                                                                                                 |
|------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Identifying areas of agreement or disagreement |                               | Remains the same: Helps identify areas of agreement and disagreement on course topics to enhance student learning.                                                                                                        |
| Providing instructional greeting               | Added                         | New: Provides instructional greeting in course materials.                                                                                                                                                                 |
| Providing instructional reminder               | Added                         | New: Providing reminders regarding learning activities, help-seeking, grading policies, and university rules.                                                                                                             |
| Setting climate for learning                   |                               | Remains the same: Encourages students to explore concepts in the course, e.g., promotes the exploration of new ideas.                                                                                                     |
| <b>Direct Instruction (category)</b>           |                               |                                                                                                                                                                                                                           |
| Conducting informative demonstrations          |                               | Remains the same: Attempts to make course content more comprehensible through the exhibition of processes.                                                                                                                |
| Elaborating relevant concepts                  | Added                         | New: Attempts to elaborate course content with relevant concepts.                                                                                                                                                         |
| Making explicit reference to outside materials |                               | Remains the same: Provides useful information from a variety of sources, e.g., articles, textbooks, personal experiences, or links to external websites.                                                                  |
| Offering useful illustrations                  |                               | Remains the same: Attempts to make course content more comprehensible by providing examples that are substantive and advance understanding.                                                                               |
| Providing instructor perspectives              | Added                         | New: Attempts to provide instructor's perspectives on course concepts or students' assignments.                                                                                                                           |
| Providing valuable analogies                   |                               | Remains the same: Attempts to rephrase/reformulate course material in ways that highlight similarities between content assumed to be understood and new content with the goal of making the material more comprehensible. |
| Reporting teaching activities                  | Added                         | New: Attempts to convey teaching activities through feedback or comments.                                                                                                                                                 |

| Indicators of Teaching Presence  | Added/<br>Changed<br>/Removed | Description (New, Modified, Remains the Same, or Removed)                                                                                                                                          |
|----------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplying clarifying information |                               | Modified: Attempts to reduce confusion or misconceptions about course content by providing additional explanation (including for assignment, and feedback after assessment—steps for improvement). |

## Results

Data from eight sources were analyzed for both Module 2 and Module 3. Table 3 presents a summary of the tally of units analyzed within each source, aiding in a comprehensive understanding of the study's scope.

**Table 3**

*Data Source and Its Unit of Analysis Occurrence (Unit of Analysis = One Sentence)*

| Data Source                   | Module 2 | Module 3 |
|-------------------------------|----------|----------|
| Announcement                  | 26       | 23       |
| Module Overview               | 20       | 17       |
| Instructional Video           | 62       | 68       |
| Discussion Instructions       | 25       | 23       |
| Discussion Instructor Replies | 343      | 208      |
| Discussion Feedback           | 190      | 113      |
| Assignment Instructions       | 27       | 25       |
| Assignment Feedback           | 37       | 17       |

The instructor actively participated in the discussions of Module 2 and Module 3, replying to a total of 43 students across both module discussions. In Module 2, the instructor's responses averaged 7.97 sentences per student. In Module 3, the responses averaged 4.84 sentences per student. The instructor's feedback for Module 2 discussion averaged 4.42 sentences for each student. In Module 3 discussion feedback, the instructor's feedback averaged 2.63 sentences for each student.

Regarding assignment feedback, this responsibility centered on the academic coach. In Module 2, out of 40 students who submitted their assignments, only 20 received feedback. The

feedback averaged 1.85 sentences per student. In Module 3, where 42 students submitted assignments, only 10 students received feedback. This feedback averaged just 1.7 sentences per student.

*Research Question (RQ) 1: What are the teaching presence patterns in an accelerated online BBA course?*

Descriptive statistical analysis was used to examine the distribution of the three categories, Instructional Design and Organization, Facilitating Learning, and Direct Instruction, to better comprehend teaching presence in Module 2 and Module 3.

The analysis from Table 4 revealed that Direct Instruction was the predominant category in both modules, accounting for 45.02% of the teaching presence with 551 occurrences. Facilitating Learning followed closely, constituting 37.17% of the teaching presence with 455 occurrences. Lastly, Instructional Design and Organization was represented to a lesser extent, making up 17.81% of the teaching presence with 218 occurrences.

**Table 4**

*Teaching Presence Patterns (Three Categories: Instructional Design and Organization, Facilitating Learning, and Direct Instruction)*

| Teaching Presence                     | Frequency | Percentage |
|---------------------------------------|-----------|------------|
| Total                                 | 1224      | 100.00%    |
| Instructional Design and Organization | 218       | 17.81%     |
| Facilitating Learning                 | 455       | 37.17%     |
| Direct Instruction                    | 551       | 45.02%     |

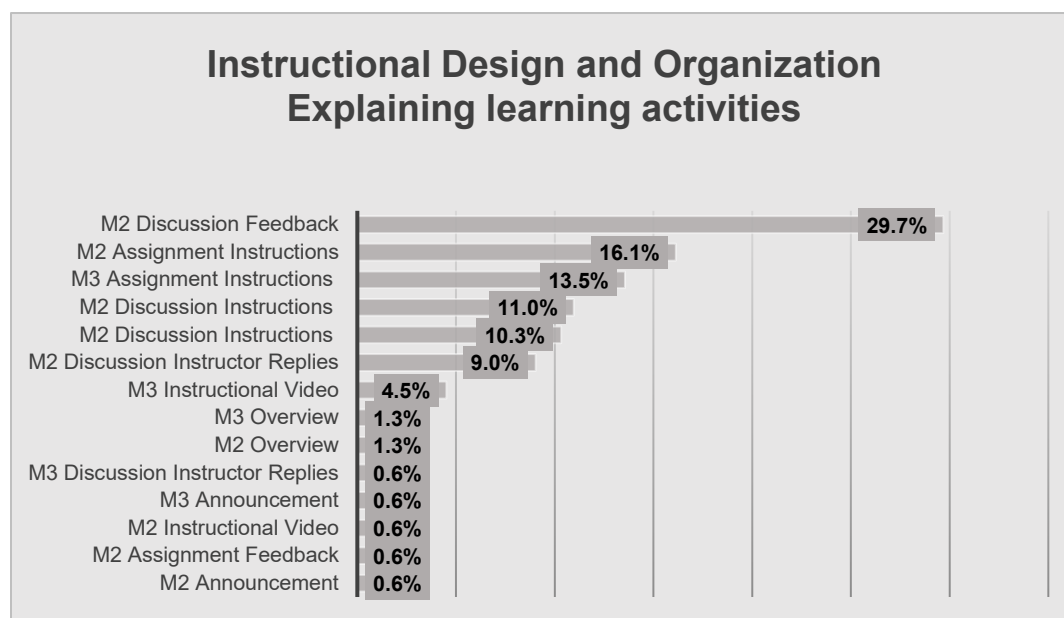
*Research Question (RQ) 1a: To what extent is teaching presence manifested in the instructional design and organization in an accelerated online BBA course?*

The analysis delved into the distribution patterns of Instructional Design and Organization indicators across various data sources, as visually detailed in Table 5. This table displays the proportional percentages of each indicator within the category. Explaining Learning Activities dominated with a 71.1% share, equating to the highest frequency of 155 occurrences. Setting Curriculum was next, making up 19.3% of the category with 42 occurrences. Meanwhile, Making Macrolevel Elements and Establishing Time Parameters were less prevalent, comprising 5.0% and 4.6%, with 11 and 10 occurrences respectively. It is noteworthy that Establishing Etiquette did not feature in the data analyzed.

**Table 5***Instructional Design and Organization Indicator's Percentage*

| Instructional Design and Organization | Frequency | Percentage |
|---------------------------------------|-----------|------------|
| Total                                 | 218       | 100.0%     |
| Explaining learning activities        | 155       | 71.1%      |
| Setting curriculum                    | 42        | 19.3%      |
| Making macrolevel elements            | 11        | 5.0%       |
| Establishing time parameters          | 10        | 4.6%       |
| Establishing etiquette                | 0         | 0.0%       |

Further analysis revealed the overall application levels of the Explaining Learning Activities indicator in the course elements of Modules 2 and 3. Among the observed total instances of the Explaining Learning Activities indicator, 29.7% of the instances were found in the Module 2 Discussion Feedback, making it the predominant course element demonstrating this indicator. This was followed by Module 2 Assignment Instructions, which comprised 16.1% of the observed instances. Figure 1 provides statistical insights into the usage of the Explaining Learning Activities indicator across various data sources in Modules 2 and 3, presenting the data in a proportional perspective through percentages.

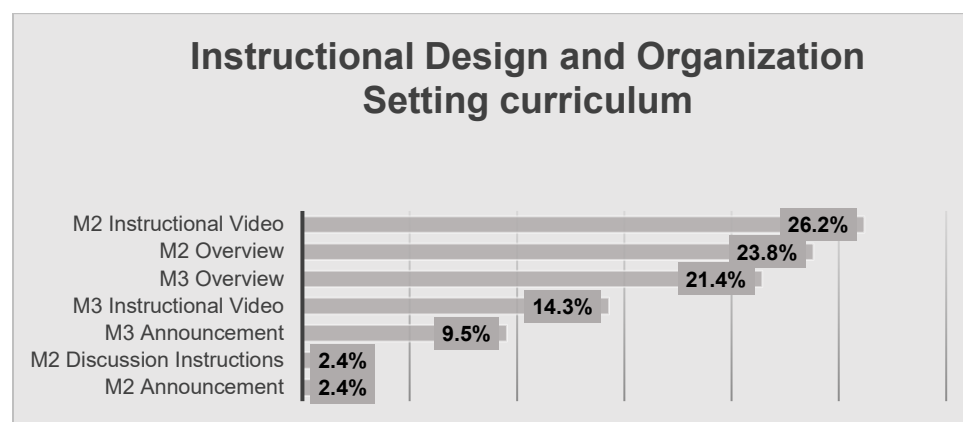
**Figure 1***Explaining Learning Activities Percentage by Each Data Source*

In analyzing the Setting Curriculum indicator among the course elements in Modules 2 and 3, it was discovered that Setting Curriculum was mostly demonstrated in the instructional videos and module overviews. The Module 2 Instructional Video was the primary course

element employing this indicator, with a prevalence of 26.2%. Additionally, the Module 2 Overview also frequently incorporated the Setting Curriculum indicator, accounting for 23.8%. Figure 2 provides a distribution analysis of how the Setting Curriculum indicator is applied across various data sources in Modules 2 and 3.

**Figure 2**

*Setting Curriculum Percentage by Each Data Source*



*Research Question (RQ) 1b: To what extent is teaching presence manifested in the facilitation in an accelerated online BBA course?*

The analysis looked into the percentage of each indicator within the Facilitating Learning category and in each data source to provide an understanding of the patterns of the category. The most prominent indicator, Encouraging, Acknowledging, or Reinforcing Student Contributions, constituted a noticeable 38.2% of the distribution with 174 occurrences. Providing Instructional Reminder ranked second at 24.4% with 111 occurrences. Setting Climate emerged at 13.6% with 62 occurrences and Assess the Efficacy of Learning Performance contributed at 9.0% with 41 occurrences. Drawing in Participants and Promoting Discussion, and Providing Instructional Greeting were found at 6.8% and 6.6%, with 31 and 30 occurrences, respectively. The least represented indicator, Identifying Areas of Agreement or Disagreement, comprised a minimal 1.3% of the total distribution with six occurrences. Table 6 delineates the percentage distribution for each indicator within the facilitating learning category.

**Table 6**

*Facilitating Learning Indicator's Percentage*

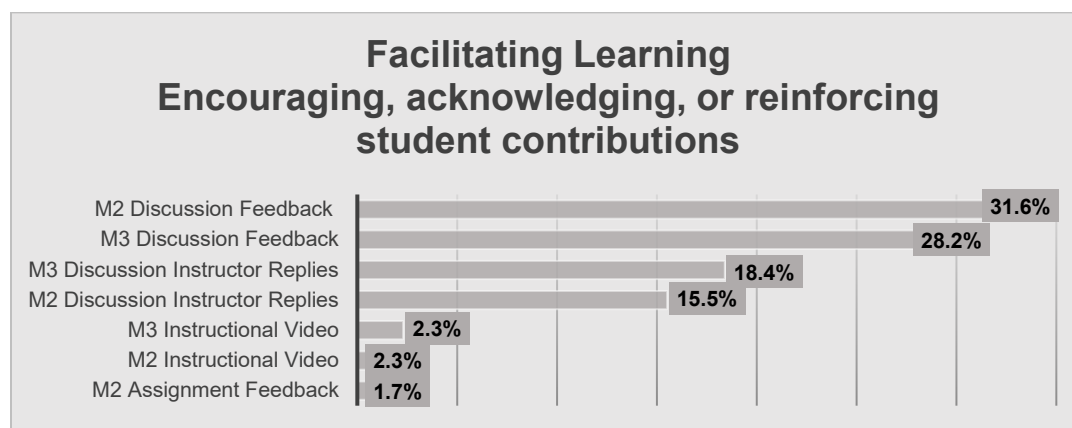
| Facilitating Learning                                            | Frequency | Percentage |
|------------------------------------------------------------------|-----------|------------|
| Total                                                            | 455       | 100.0%     |
| Encouraging, acknowledging, or reinforcing student contributions | 174       | 38.2%      |
| Provide instructional reminder                                   | 111       | 24.4%      |
| Setting climate for learning                                     | 62        | 13.6%      |

|                                                  |    |      |
|--------------------------------------------------|----|------|
| Assess the efficacy of learning performance      | 41 | 9.0% |
| Drawing in participants and promoting discussion | 31 | 6.8% |
| Providing instructional greeting                 | 30 | 6.6% |
| Identifying areas of agreement or disagreement   | 6  | 1.3% |

Further analysis examined the overall application levels of the Encouraging, Acknowledging, or Reinforcing Student Contributions indicator within Module 2 and Module 3 course elements. Among the observed total instances of this indicator, 31.6 % of the instances were found in the Module 2 Discussion Feedback, making it the predominant course element demonstrating this indicator, closely followed by Module 3 Discussion Feedback at 28.2%. Figure 3 depicts the distribution of the indicator across various data sources.

**Figure 3**

*Encouraging, Acknowledging, or Reinforcing Student Contributions Percentage by Each Data Source*

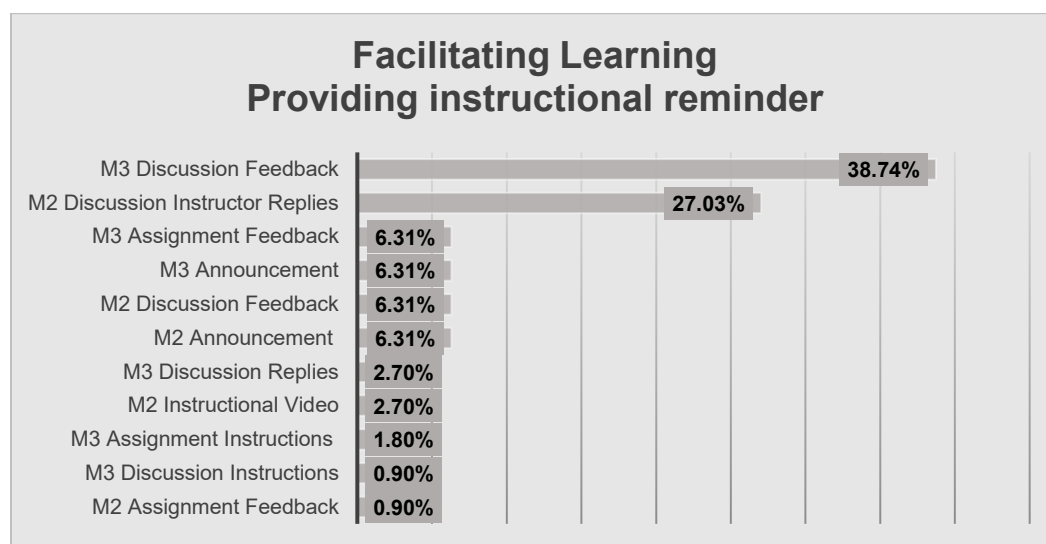


An examination of the Providing Instructional Reminder indicator across Modules 2 and 3 revealed a utilization pattern within the observed course elements. Specifically, the Module 3 Discussion Feedback emerged as the leading context for applying this indicator, accounting for 38.74% of its usage. This was followed by Module 2 Discussion Instructor Replies, which held the second-highest application rate at 27.03%. Figure 4 represents the distribution of the Providing Instructional Reminder indicator across various data sources within Modules 2 and 3.



**Figure 4**

*Providing Instructional Reminder Percentage by Each Data Source*



*Research Question (RQ) 1c: To what extent is teaching presence manifested in the direct instruction in an accelerated online BBA course?*

Analyzing the Direct Instruction category, the leading indicator, Providing Instructor Perspectives, dominated this category with a substantial 47.9% contribution at 264 occurrences, followed by Supplying Clarifying Information, which accounted for 22.0% with 121 occurrences. Notably, Making Explicit Reference to Outside Materials ranked third, constituting 16.9% of the distribution with 93 occurrences. In the lower spectrum, Offering Useful Illustrations, Elaborating Relevant Concepts, and Reporting Teaching Activities were represented with respective percentages of 7.6%, 2.9%, and 2.7%, with 42, 16, and 15 occurrences. Conducting Informative Demonstrations and Providing Valuable Analogies were absent in the observed data sources. Table 7 showcases the percentage distribution of each indicator in the category of direct instruction.

**Table 7**

*Direct Instruction Indicators' Percentage*

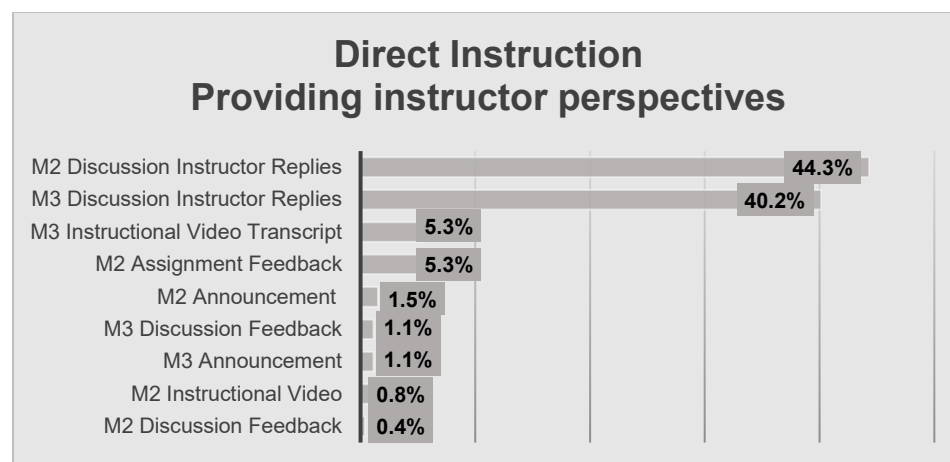
| Direct Instruction                             | Frequency | Percentage |
|------------------------------------------------|-----------|------------|
| Total                                          | 551       | 100.0%     |
| Providing instructor perspectives              | 264       | 47.9%      |
| Supplying clarifying information               | 121       | 22.0%      |
| Making explicit reference to outside materials | 93        | 16.9%      |
| Offering useful illustrations                  | 42        | 7.6%       |
| Elaborating relevant concepts                  | 16        | 2.9%       |

|                                       |    |      |
|---------------------------------------|----|------|
| Reporting teaching activities         | 15 | 2.7% |
| Conducting informative demonstrations | 0  | 0.0% |
| Providing valuable analogies          | 0  | 0.0% |

The examination of the Providing Instructor Perspectives indicator in Module 2 and Module 3 course elements uncovered that it was mostly demonstrated in the Module Discussion Instructor Replies. The most instances were found in Module 2 Discussion Instructor Replies, which accounted for 44.3% of its usage. This was closely followed by Module 3 Discussion Instructor Replies at 40.2%. Figure 5 illustrates the Providing Instructor Perspectives percentage of occurrences through various data sources in Modules 2 and 3.

**Figure 5**

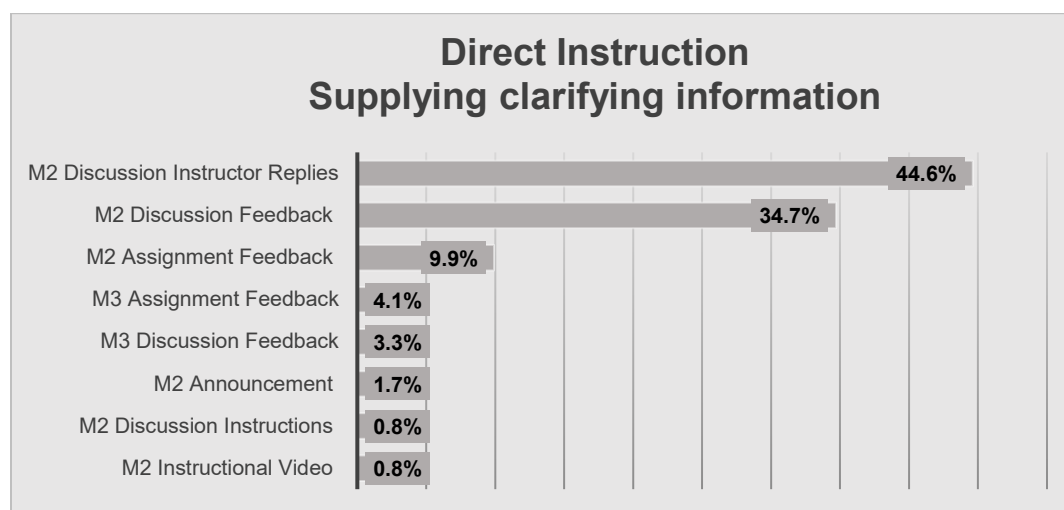
*Providing Instructional Perspectives Percentage by Each Data Source*



An examination of the Supplying Clarifying Information indicator revealed a noticeable pattern in its application across the observed course elements within Modules 2 and 3. The primary context for its utilization was found to be the Module 2 Discussion Instructor Replies, constituting 44.6% of the indicator's application. Following this, Module 2 Discussion Feedback accounted for 34.7% of its usage. Figure 6 displays the distribution of the Supplying Clarifying Information indicator across various data sources in Modules 2 and 3.

**Figure 6**

*Supplying Clarifying Information Percentage by Each Data Source*



## Discussion

### *Revised Coding Scheme to Capture Teaching Presence in Various Data Sources*

This study explored teaching presence in an online accelerated BBA course, focusing on three categories: instructional design and organization, facilitating discourse, and direct instruction (Anderson et al., 2001). Prior studies on teaching presence using content analysis have primarily focused on asynchronous discussions (Anderson et al., 2001; Nami et al., 2018; Prasad, 2009; Rodriguez, 2014; Rourke & Anderson, 2002). In contrast, this study explored multiple data sources that capture teaching presence beyond discussion board activities (Fiock et al., 2021; Shea et al., 2010), offering a more comprehensive view of how teaching presence can be demonstrated through various course elements, including module overview pages, course announcements, instructional videos, discussion instruction, replies, feedback, and assignment instruction and feedback. This broader perspective is valuable for instructors and instructional designers, as it highlights that teaching presence is not confined to just one aspect of the course but is distributed across multiple forms of communication and interaction.

Previous research has indicated that the applicability of the teaching presence coding scheme may differ across various academic disciplines (Arbaugh, 2010; Annand, 2019, as cited in Baker et al., 2022). This study employed a revised teaching presence coding scheme developed through an iterative process involving coding training, independent coding, and discussions to resolve discrepancies. After data analysis, one teaching presence category was redefined, six new indicators were introduced, and two existing ones were modified. The revised coding scheme was intended to contribute to a more comprehensive understanding of teaching presence as represented in today's online courses' course materials and instructional activities, encompassing both text-based communication and video content.

### ***The Identified Teaching Presence Patterns in an Accelerated Online BBA Course***

The content analysis of the two modules in the accelerated online BBA course revealed that Direct Instruction was the predominant category of teaching presence, with Facilitating Learning and Instructional Design and Organization following closely. This finding is consistent with Anderson et al.'s (2001) research, where Direct Instruction was identified as the primary category, succeeded by Facilitating Discourse and Instructional Design and Organization. However, this pattern differs significantly from the results of Wang and Liu's (2019) study, which highlighted Instructional Design and Organization as the leading category, followed by Facilitating Discourse and Direct Instruction. Such revelation indicated the role of using different data sources for the analysis, which could influence the patterns of teaching presence. For instance, in Anderson et al.'s (2001) study, computer conference transcripts were the data sources; Wang and Liu (2019) utilized transcripts of the course syllabus, discussion postings, learning reports, and final modules of the three courses as the data sources. Furthermore, as mentioned earlier, research has shown that the relevance of the teaching presence coding scheme can vary across different academic fields (Arbaugh, 2010; Annand, 2019, as cited in Baker et al., 2022). Consequently, the observed patterns of teaching presence may differ in each analysis depending on the discipline and the teaching practice of the specific instructor.

### ***Patterns in the Instructional Design and Organization Category***

Examining the patterns of teaching presence in the Instructional Design and Organization category, Explaining Learning Activities and Setting Curriculum were the most frequent indicators, primarily employed in Module 2 Discussion Feedback, Module 2 Assignment Instructions, Module 2 Instructional Video, and Module 2 Overview. These patterns highlight the vital role of instructors in crafting the course structure and content, underscoring the importance of developing course materials, designing course activities, producing video mini-lectures, and providing guidelines for effective online learning (Arbaugh & Hwang, 2006; Caskurlu et al., 2020; Turk et al., 2022). The Explaining Learning Activities indicator suggests the instructor provides clear instructions to students on how to participate in course learning activities, e.g., a clear explanation of how to complete course assessments successfully, rubrics, and instructor expectations (excluding time parameters and etiquette). The Setting Curriculum indicator signifies the instructor communicates important course objectives, e.g., documentation, goals, topics, and assignment/task titles. Both indicators underscore the necessity of clear communication in setting course goals and the clarity of assignments, which are instrumental for student success (Sheridan et al., 2013). This clarity is particularly crucial in this online accelerated course format, where most students are nontraditional and may not have prior online learning experiences. Clear guidelines serve as a scaffold, helping students orient themselves with course expectations and establish routines that contribute to their success in subsequent modules. Moreover, Modules 2 and 3 serve as the beginning stage of the course, making it essential to provide such clear communication and guidelines early on. Both indicators are vital to online teaching and learning, motivating students toward task completion, and cultivating students' learning (Johnson et al., 2017; Wang et al., 2021).

### ***Patterns in the Facilitating Learning Category***

Examining the patterns of teaching presence within the category of Facilitating Learning, Encouraging, Acknowledging, or Reinforcing Student Contributions and Providing Instructional Reminders are ranked as the top indicators, mainly utilized in Module 2 and 3 Discussion Feedback and Module 2 Discussion Instructor Replies. These findings demonstrate the critical role of instructor feedback in teaching presence. Prior studies found that instructor feedback directly impacted student motivation, satisfaction, and engagement (Cole et al., 2017; Dolan et al., 2017; Khalid & Quick, 2016). Facilitating learning focused on individualized feedback between instructors and learners (Arbaugh & Hwang, 2006). Under the Encouraging, Acknowledging, or Reinforcing Student Contributions indicator, the instructor recognized student involvement, fostering engagement, motivation, and interest in the course material (Dughi et al., 2023). The Providing Instructional Reminder indicator shows the instructor's practices of reminding students about learning activities, seeking assistance, grading policies, and university rules. This strategy provides a roadmap for success in the course and refocuses student attention, positioning the instructor as a collaborative partner rather than a mere director of learning (Waston et al., 2016). Given that this is the first graded course in the online BBA program, catering to a majority of nontraditional students, the role of facilitating learning is imperative in this accelerated online environment. Instructor feedback is essential in motivating and engaging students (Morrison & Jacobsen, 2023) and providing the support they need to succeed in this fast-paced online learning environment.

### ***Patterns in the Direct Instruction Category***

A deeper analysis of the Direct Instruction category revealed that the most widely utilized indicators are Providing Instructor Perspectives and Supplying Clarifying Information, primarily found in Module 2 and Module 3 Discussion Instructor Replies and Module 2 Discussion Feedback. Such findings highlight the role of direct instruction by “providing subject matter expertise to support students’ learning” (Caskurlu et al., 2020, p. 3) when instructors interact with students through online discussions and feedback activities. Through providing instructor perspectives, the instructor showcases points of view on course concepts and students’ assignments (Dughi et al., 2023). Supplying clarifying information improves understanding of the course content and provides feedback that reduces confusion and leads to clear comprehension (Arbaugh & Hwang, 2006). Direct instruction serves as a quintessential instructional component that offers detailed feedback to learners and clarifies or shares resources (Watson et al., 2016). In understanding the patterns of teaching presence within the category of direct instruction, the Module 2 and Module 3 Discussion Instructor Replies and Module 2 Discussion Feedback are notable contexts for this category, indicating the instructors utilized discussions to guide learning. The inclusion of instructor interaction in these discussion replies is instrumental in “promot[ing] deep learning and provid[ing] clarification” for student inquiries (Garrison, 2017; Hoey, 2017, p. 268). Such findings echo that instructors’ active participation in discussions helps cultivate a positive online learning environment (Mandernach et al., 2006).

### ***Instructional Feedback from the Instructor and Academic Coach***

Due to the large enrollment of this course, an academic coach assisted the course instructor in teaching this accelerated online course. One of the responsibilities of the academic coach was to provide assignment feedback. The findings of this study demonstrated a distinct contrast in the instructor's engagement with students in discussions compared to the academic coach's involvement in assignment feedback across both modules, revealing inconsistencies between the instructional practice of the instructor and the academic coach. The expectation may need to be clearly communicated to the academic coach, or training needs to be provided so that the practice is consistent with the instructor's instructional approach. However, not everyone does what this specific instructor does. As an experienced instructor, the amount of interaction the instructor provided in these two modules examined was exemplary. The academic coach may not perceive the need and immediacy to provide so many interactions as the instructor has already done. Previous studies have established the importance of "timely, relevant, and adequate feedback" (York & Richardson, 2012, p. 88), particularly in situations where immediate feedback is lacking in online courses, as this can lead to increased dissatisfaction among learners (Khalid & Quick, 2016). Therefore, consistent feedback is essential for effective online learning (Morrison & Jacobsen, 2023). Academic coaches need to receive instructional training to improve the practice of providing timely and individualized feedback.

Overall, exploring this online accelerated BBA course offers a unique lens for unveiling the patterns of teaching presence through the instructional approach of an experienced instructor with a proficient online teaching background. Upon examination, as the first non-pass/fail course in the online BBA program, the retention rate for this course is 90.9%, with 40 out of 44 students succeeding in moving on to the next course within the online BBA program; four students did not successfully complete the course. Although this study did not explore the relationship between teaching presence and student retention, the patterns of teaching presence in this study showcased the practices of an experienced instructor who provided an exemplary level of interaction. This study revealed that teaching presence can be demonstrated in various course materials and interactions, such as module overview pages, course announcements, instructional videos, discussion instructions, discussion instructor replies, discussion instructor feedback, assignment instructions, and assignment feedback. For instance, module overview pages and course announcements provide a clear roadmap and expectations for students in their learning process; instructional videos and instructions for discussions and assignments offer guidance and clarity on course content and engagement. Discussion instructor feedback and assignment feedback are instrumental in facilitating learning and providing personalized support and direction to students (Hosler & Arend, 2012). By analyzing these diverse data sources, the study revealed that teaching presence is not confined to asynchronous discussions but is manifested throughout various aspects of the online course.

## **Conclusion**

This study used content analysis to examine teaching presence in various materials and activities of an accelerated online BBA course. However, it did not analyze all course elements, so some aspects of teaching presence were not considered. The focus was on a single foundational course, which may not represent all courses in the program. Data were sourced

from the instructor and academic coach, potentially showing varied levels of teaching presence. Garrison et al. (1999) intentionally labeled it teaching rather than teacher presence because they believed any member of an online course (i.e., both the instructor and students) could provide teaching presence (Akyol et al., 2009; Watson et al., 2016). This study, however, only highlighted the teaching presence of the instructor and academic coach, excluding the perspectives of other members of the course.

Future research should include complete data from all course modules to gain a comprehensive understanding of how teaching presence is demonstrated across modules and how it impacts student learning and engagement in online courses. Future studies could also collect instructor and learner perspectives to complement the content analysis for a comprehensive understanding of the role of teaching presence.

Given the close link between teaching presence and key factors such as student learning outcomes, satisfaction, community development, learning interaction and engagement, and retention, it is imperative for instructors and instructional designers to recognize its importance. Teaching presence can be demonstrated through instructional design and organization, facilitating learning, and direct instruction. This study, through content analysis, uncovers patterns of teaching presence in various instructional materials, showcasing how an experienced online instructor demonstrated teaching presence across diverse course materials, especially in an accelerated course format serving mostly nontraditional students.

Although this study focused on an accelerated online BBA course, its findings have broader relevance for programs that utilize accelerated formats to meet the needs of today's diverse learners. As Mowreader (2024) notes, shortened and condensed courses are increasingly adopted in higher education to enhance flexibility, support timely degree completion, improve retention, and optimize institutional resources. Despite the growing prevalence of these accelerated online courses, few studies have examined their specific instructional dynamics. This research addresses that gap by identifying and analyzing how teaching presence is conveyed through course materials and activities in an intensive, asynchronous format. The findings offer practical insights that can inform course design and instructional strategies across disciplines and help online instructors enhance their presence and better support student learning in fast-paced learning environments.

Few studies have explored the unique dynamics of accelerated online BBA courses. Therefore, this research offers valuable insights for online instructors, enhancing their understanding of how to demonstrate teaching presence in online course materials and activities. This enhanced understanding equips educators to better support and facilitate teaching and learning in this context.

## **Declarations**

The authors declare no conflicts of interest related to the research, authorship, or publication of this study.

Ethical approval was obtained from the Boise State University Institutional Review Board (IRB), Protocol Number: IRB23-445. The authors have no competing interests to declare.



## References

- Abu-Dawood, S., Barbee, S., Niu, J., West, J., West, T., Cox, L. C., Warren, S. J., & Norris, C. (2016). Evaluating the effectiveness of message design in accelerated online programs using a think aloud protocol. *iConference 2016 Proceedings*.  
<https://doi.org/10.9776/16587>
- Ahmady, S., Kohan, N., Bagherzadeh, R., Rakshhani, T., & Shahabi, M. (2018). Validity testing of classroom community scale in virtual environment learning: A cross sectional study. *Annals of Medicine and Surgery*, 36, 256–260.  
<https://doi.org/10.1016/j.amsu.2018.08.021>
- Akyol, Z., & Garrison, D. R. (2008). The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks*, 12, 3–22.
- Akyol, Z., Garrison, D. R., & Ozden, M. Y. (2009). Development of a community of inquiry in online and blended learning contexts. *Procedia - Social and Behavioral Sciences*, 1(1), 1834–1838. <https://doi.org/10.1016/j.sbspro.2009.01.324>
- Alsharah, H., & Ghura, H. (2023). Online learning in business education: Key lessons from COVID-19 pandemic. *Development and Learning in Organizations: An International Journal*, 37(3), 4–6. <https://doi.org/10.1108/DLO-08-2022-0171>
- Anderson, T., Liam, R., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1–17.
- Arbaugh, J. B., & Hwang, A. (2006). Does “teaching presence” exist in online MBA courses? *The Internet and Higher Education*, 9(1), 9–21.  
<https://doi.org/10.1016/j.iheduc.2005.12.001>
- Baker, M., Richardson, S., & Rubio, F. (2022). Patterns of teaching presence during one semester of a large online graduate nursing course. *International Journal of E-Learning & Distance Education*, 37(1), 1–33. <https://doi.org/10.55667/ijede.2022.v37.i1.1228>
- Balboni, G., Perrucci, V., Cacciamani, S., & Zumbo, B. D. (2018). Development of a scale of sense of community in university online courses. *Distance Education*, 39(3), 317–333.  
<https://doi.org/10.1080/01587919.2018.1476843>
- Bisoux, T. (2022, January 26). *Are attitudes changing toward online learning?* AACSB.  
<https://www.aacsb.edu/insights/articles/2022/01/are-attitudes-changing-toward-online-learning>
- Caskurlu, S., Maeda, Y., Richardson, J. C., & Lv, J. (2020). A meta-analysis addressing the relationship between teaching presence and students’ satisfaction and learning. *Computers & Education*, 157, 1–16. <https://doi.org/10.1016/j.compedu.2020.103966>

- Chicca, J., & Matthias, A. (2023). Strengthening accelerated online nursing programs: Approaches for educators. *Teaching and Learning in Nursing, 18*(4), 552-554. <https://doi.org/10.1016/j.teln.2023.05.006>
- Colclasure, B. C., LaRose, S. E., Warner, A. J., Ruth, T. K., Bunch, J. C., Thoron, A. C., & Roberts, T. G. (2018). Student perceptions of accelerated course delivery format for teacher preparation coursework. *Journal of Agricultural Education, 59*(3), 58-74. <http://dx.doi.org/10.5032/jae.2018.03058>
- Cole, A. W., Anderson, C., Bunton, T., Cherney, M. R., Cronin Fisher, V., Draeger, Jr., R., Featherston, M., Motel, L., Nicolini, K. M., Peck, B., & Allen, M. (2017). Student predisposition to instructor feedback and perceptions of teaching presence predict motivation toward online courses. *Online Learning, 21*(4), 245-262. <https://doi.org/10.24059/olj.v21i4.966>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). SAGE.
- Delaney, B., & Betts, K. (2022). Addressing transactional distance through teaching presence strategies in online journalism and mass communication courses. *Journalism & Mass Communication Educator, 77*(1), 5-23. <https://doi.org/10.1177/10776958211001214>
- Dolan, J., Kain, K., Reilly, J., & Bansal, G. (2017). How do you build community and foster engagement in online courses? *New Directions for Teaching and Learning, 2017*(151), 45-60. <https://doi.org/10.1002/tl.20248>
- Dughi, T., Rad, D., Runcan, R., Chis, R., Vancu, G., Maier, R., Costin, A., Rad, G., Chis, S., Uleanya, C., & Mihaela, M. (2023). A network analysis-driven sequential mediation analysis of students' perceived classroom comfort and perceived faculty support on the relationship between teachers' cognitive presence and students' grit—A holistic learning approach. *Behavioral Sciences, 13*(2), 1-19. <https://doi.org/10.3390/bs13020147>
- Fahy, P. J., Crawford, G., & Ally, M. (2001). Patterns of interaction in a computer conference transcript. *International Review of Research in Open and Distributed Learning, 2*(1), 1-24. <https://doi.org/10.19173/irrodl.v2i1.36>
- Fiock, H., Maeda, Y., & Richardson, J. C. (2021). Instructor impact on differences in teaching presence scores in online courses. *The International Review of Research in Open and Distributed Learning, 22*(3), 55-76. <https://doi.org/10.19173/irrodl.v22i3.5456>
- Garrison, D. R. (2017). *E-learning in the 21st century: A framework for research and practice* (3rd ed.). Routledge.
- Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2-3), 87-105. [https://doi.org/10.1016/S1096-7516\(00\)00016-6](https://doi.org/10.1016/S1096-7516(00)00016-6)

- Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education*, 13(1–2), 31–36. <https://doi.org/10.1016/j.iheduc.2009.10.002>
- Glenn, C. W. (2018). Adding the human touch to asynchronous online learning. *Journal of College Student Retention: Research, Theory & Practice*, 19(4), 381–393. <https://doi.org/10.1177/1521025116634104>
- Hoey, R. (2017). Examining the characteristics and content of instructor discussion interaction upon student outcomes in an online course. *Online Learning*, 21(4), 263–281. <https://doi.org/10.24059/olj.v21i4.1075>
- Hosler, K. A., & Arend, B. D. (2012). The importance of course design, feedback, and facilitation: Student perceptions of the relationship between teaching presence and cognitive presence. *Educational Media International*, 49(3), 217–229. <https://doi.org/10.1080/09523987.2012.738014>
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288. <https://doi.org/10.1177/1049732305276687>
- Johnson, C., Hill, L., Lock, J., Altowairiki, N., Ostrowski, C., Da Rosa Dos Santos, L., & Liu, Y. (2017). Using design-based research to develop meaningful online discussions in undergraduate field experience courses. *The International Review of Research in Open and Distributed Learning*, 18(6), 36–53. <https://doi.org/10.19173/irrodl.v18i6.2901>
- Jiang, M., & Koo, K. (2020). Emotional presence in building an online learning community among nontraditional graduate students. *Online Learning*, 24(4), 93–111. <https://doi.org/10.24059/olj.v24i4.2307>
- Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*, 55(2), 808–820. <https://doi.org/10.1016/j.compedu.2010.03.013>
- Khalid, M. N., & Quick, D. (2016). Teaching presence influencing online students' course satisfaction at an institution of higher education. *International Education Studies*, 9(3), 62–70. <https://doi.org/10.5539/ies.v9n3p62>
- Krippendorff, K. (2019). *Content analysis: An introduction to its methodology* (4th ed.). SAGE.
- Kuo, Y. C. (2014). Accelerated online learning: Perceptions of interaction and learning outcomes among African American students. *American Journal of Distance Education*, 28(4), 241–252. <https://doi.org/10.1080/08923647.2014.959334>
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159–174. <https://doi.org/10.2307/2529310>

- Li, F. (2022). “Are you there?”: Teaching presence and interaction in large online literature classes. *Asian-Pacific Journal of Second and Foreign Language Education*, 7(1), 1–15. <https://doi.org/10.1186/s40862-022-00180-3>
- Lowenthal, P. R. (2016). A mixed methods examination of instructor social presence in accelerated online courses. In L. Kyei-Blankson, J. Blankson, E. Ntuli, & C. Agyeman (Eds.), *Handbook of research on strategic management of interaction, presence, and participation in online courses* (pp. 147–159). IGI Global. <https://doi.org/10.4018/978-1-4666-9582-5.ch006>
- Lowenthal, P. R., & Trespalacios, J. (2022). Classroom community and time: Comparing students’ perceptions of classroom community in traditional vs. accelerated online courses. *Online Learning*, 26(4), 59–77. <https://doi.org/10.24059/olj.v26i4.3498>
- Ludwig-Hardman, S., & Dunlap, J. C. (2003). Learner support services for online students: Scaffolding for success. *International Review of Research in Open and Distributed Learning*, 4(1), 1–15. <https://doi.org/10.19173/irrodl.v4i1.131>
- Mandernach, B. J., Gonzales, R. M., & Garrett, A. L. (2006). An examination of online instructor presence via threaded discussion participation. *Journal of Online Learning and Teaching*, 2(4), 248–260
- Morrison, L., & Jacobsen, M. (2023). The role of feedback in building teaching presence and student self-regulation in online learning. *Social Sciences & Humanities Open*, 7(1), 1–8. <https://doi.org/10.1016/j.ssaho.2023.100503>
- Mowreader, A. (2024, December 10). *College leaders share perspectives on shortened terms*. Inside Higher Ed. <https://www.insidehighered.com/news/student-success/academic-life/2024/12/10/five-student-success-strategies-accelerated-courses>
- Nami, F., Marandi, S. S., & Sotoudehnama, E. (2018). Interaction in a discussion list: An exploration of cognitive, social, and teaching presence in teachers’ online collaborations. *ReCALL*, 30(3), 375–398. <https://doi.org/10.1017/S0958344017000349>
- Owens, J., Hardcastle, L. A., & Richardson, B. (2009). Learning from a distance: The experience of remote students. *International Journal of E-Learning & Distance Education*, 23(3), 53–74. <https://www.ijede.ca/index.php/jde/article/view/596>
- Park, J. H., & Choi, H. J. (2009). Factors influencing adult learners' decision to drop out or persist in online learning. *Journal of Educational Technology & Society*, 12(4), 207–217. <https://www.jstor.org/stable/jeductechsoci.12.4.207>
- Prasad, D. (2009). Empirical study of teaching presence and critical thinking in asynchronous discussion forums. *International Journal of Instructional Technology and Distance Learning*, 6(11), 3–26.
- Quality Matters. (2023). *Course design rubric standards*. <https://www.qualitymatters.org/qa-resources/rubric-standards/higher-ed-rubric>

- Ren, X. (2023). Investigating the experiences of online instructors while engaging and empowering nontraditional learners in eCampus. *Education and Information Technologies*, 28(1), 237–253. <https://doi.org/10.1007/s10639-022-11153-x>
- Roddy, C., Amiet, D. L., Chung, J., Holt, C., Shaw, L., McKenzie, S., Garivaldis, F., Lodge, J. M., & Mundy, M. E. (2017). Applying best practice online learning, teaching, and support to intensive online environments: An integrative Review. *Frontiers in Education*. 2, 1–10. <https://doi.org/10.3389/feduc.2017.00059>
- Rodriguez, M. A. (2014). Content analysis as a method to assess online discussions for learning. *SAGE Open*, 4(4), 1–13. <https://doi.org/10.1177/2158244014559019>
- Rourke, L., & Anderson, T. (2002). Using peer teams to lead online discussions. *Journal of Interactive Media in Education*, 1, 1–21.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. *The Journal of Distance*, 14(2), 50–71.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Methodological issues in the content analysis of computer conference transcripts. *International Journal of Artificial Intelligence in Education*, 12, 8–22.
- Rovai, A. P. (2003). In search of higher persistence rates in distance education online programs. *The Internet and Higher Education*, 6(1), 1–16. [https://doi.org/10.1016/S1096-7516\(02\)00158-6](https://doi.org/10.1016/S1096-7516(02)00158-6)
- Shea, P. J., Fredericksen, E. E., Pickett, A. M., & Pelz, W. E. (2003). A preliminary investigation of “teaching presence” in the SUNY learning network. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice direction*, Vol. 4 (pp. 279–312). Sloan Center for Online Education.
- Shea, P., Hayes, S., & Vickers, J. (2010). Online instructional effort measured through the lens of teaching presence in the community of inquiry framework: A re-examination of measures and approach. *International Review of Research in Open and Distributed Learning*, 11(3), 127–154. <https://doi.org/10.19173/irrodl.v11i3.915>
- Shea, P., Li, C. S., Swan, K., & Pickett, A. (2005). Developing learning community in online asynchronous college courses: The role of teaching presence. *Journal of Asynchronous Learning Networks*, 9(4), 59–82. <https://doi.org/10.24059/olj.v9i4.1779>
- Shea, P., Pickett, A. M., & Pelz, W. E. (2003). A follow-up investigation of “teaching presence” in the SUNY learning network. *Online Learning*, 7(2), 61–80. <https://doi.org/10.24059/olj.v7i2.1856>
- Shea, P., Sau Li, C., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *The Internet and Higher Education*, 9(3), 175–190. <https://doi.org/10.1016/j.iheduc.2006.06.005>

- Sheridan, K., Kelly, M. A., Bentz, D. T. (2013). A follow-up study of the indicators of teaching presence critical to students in online courses. In Z. Akyol & D. R. Garrison (Eds.), *Educational communities of inquiry: Theoretical framework, research and practice* (pp. 67–83). IGI Global. <https://doi.org/10.4018/978-1-4666-2110-7.ch005>
- Soles, B., & Maduli-Williams, D. (2019). Student perceptions of an accelerated online master's in education administration program through the lens of social presence. *Educational Leadership and Administration: Teaching and Program Development*, 30, 56–82.
- Stenbom, S., Jansson, M., & Hulkko, A. (2016). Revising the community of inquiry framework for the analysis of one-to-one online learning relationships. *The International Review of Research in Open and Distributed Learning*, 17(3). <https://doi.org/10.19173/irrodl.v17i3.2068>
- Szeto, E. (2015). Community of inquiry as an instructional approach: What effects of teaching, social and cognitive presences are there in blended synchronous learning and teaching? *Computers & Education*, 81, 191–201. <https://doi.org/10.1016/j.compedu.2014.10.015>
- Trekles, A. M., & Sims, R. (2013). Designing instruction for speed: Qualitative insights into instructional design for accelerated online graduate coursework. *Online Journal of Distance Learning Administration*, 16(3), 1–15.
- Tseng, H., Yi, X., & Yeh, H. T. (2019). Learning-related soft skills among online business students in higher education: Grade level and managerial role differences in self-regulation, motivation, and social skill. *Computers in Human Behavior*, 95, 179–186. <https://doi.org/10.1016/j.chb.2018.11.035>
- Turk, M., Heddy, B. C., & Danielson, R. W. (2022). Teaching and social presences supporting basic needs satisfaction in online learning environments: How can presences and basic needs happily meet online? *Computers & Education*, 180, 1–15. <https://doi.org/10.1016/j.compedu.2022.104432>
- Van Doorn, J. R., & Van Doorn, J. D. (2014). The quest for knowledge transfer efficacy: Blended teaching, online and in-class, with consideration of learning typologies for nontraditional and traditional students. *Frontiers in Psychology*, 5, 1–14. <https://doi.org/10.3389/fpsyg.2014.00324>
- Wang, Y. (2022). Effects of teaching presence on learning engagement in online courses. *Distance Education*, 43(1), 139–156. <https://doi.org/10.1080/01587919.2022.2029350>
- Wang, Y., & Liu, Q. (2019). Effects of online teaching presence on students' interactions and collaborative knowledge construction. *Journal of Computer Assisted Learning*, 36(3), 370–382. <https://doi.org/10.1111/jcal.12408>
- Wang, Y., Stein, D., & Shen, S. (2021). Students' and teachers' perceived teaching presence in online courses. *Distance Education*, 42(3), 373–390. <https://doi.org/10.1080/01587919.2021.1956304>



- Watson, S. L., Watson, W. R., Richardson, J., & Loizzo, J. (2016). Instructor's use of social Presence, teaching presence, and attitudinal dissonance: A case study of an attitudinal change MOOC. *The International Review of Research in Open and Distributed Learning*, 17(3), 54–74. <https://doi.org/10.19173/irrodl.v17i3.2379>
- White, M. D., & Marsh, E. E. (2006). Content analysis: A flexible methodology. *Library Trends*, 55(1), 22–45. <https://doi.org/10.1353/lib.2006.0053>
- York, C. S., & Richardson, J. C. (2012). Interpersonal interaction in online learning: Experienced online instructors' perceptions of influencing factors. *Journal of Asynchronous Learning Network*, 16(4), 83–98.
- Zhang, Y., Tian, Y., Yao, L., Duan, C., Sun, X., & Niu, G. (2023). Teaching presence promotes learner affective engagement: The roles of cognitive load and need for cognition. *Teaching and Teacher Education*, 129, 1–11. <https://doi.org/10.1016/j.tate.2023.104167>

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# Do Interactive Technologies Enhance Online Students' Engagement? Insights from a Post-Graduate Guidance and Counselling Course

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## Abstract

Students who study university courses online have a higher level of attrition compared with their on-campus counterparts, so online student engagement has become a contemporary concern for teaching faculty. The issue of student engagement is particularly acute in fields such as Guidance and Counselling in Education, which have not traditionally been taught online. Online student engagement suggests that learning success can be enhanced if students are given opportunities to engage cognitively, behaviourally, and affectively. This study took a pragmatic research approach using design-based research to explore whether interactive technologies, which are learner-centred and promote active and participatory learning, can enhance online student engagement. Data were gathered at a mid-sized regional Australian university in a post-graduate Guidance and Counselling course and analysed in response to Redmond et al.'s (2018) online engagement framework for higher education. The results provide specific insights into how three interactive technologies—Padlet, Google Docs and video-embedded quizzes—engaged online students. They show that students valued learning with technology and that all three technologies promoted engagement across the various dimensions. As online counselling courses become more widely accepted, further knowledge is needed about how best to engage the range of students who are studying for people-centred professions such as counselling.

**Keywords:** Online student engagement; Higher education; Interactive technologies; Guidance and Counselling education

Tualaulelei, E., Getenet, S., Pillay, Y., & Singh, N. (2025). Do interactive technologies enhance online students' engagement? Insights from a post-graduate Guidance and Counselling course, *Online Learning*, 29(4), 448-466. <https://doi.10.24059/olj.v29i4.4531>



## Introduction

Over the last two decades, universities have moved increasingly to online modes of delivery. Online education offers flexibility and accessibility to higher education for students who are otherwise unable to undertake traditional on-campus study because of family and work commitments or geographical constraints (Snow & Coker, 2020). Online education has been growing steadily (Morris et al., 2020), but its uptake significantly increased when the COVID-19 pandemic closed down educational institutions across the world, triggering a rapid pivot from face-to-face or blended modes of teaching and learning to fully online (Bedi, 2023). According to UNESCO, 194 countries and regions temporarily closed their educational institutions due to the pandemic, affecting more than 1.5 billion students worldwide (Torun, 2019). Challenges were certainly felt at scale as universities had to “invest in new technologies and update their existing IT [information technology] infrastructure” and “students and academic staff were forced to learn new technologies and to adjust quickly to the new approaches to learning and teaching” (O’Dea & Stern, 2022, p. 437). As part of this adjustment, the issue of online student engagement came to the fore due to its links with positive learning outcomes, student retention, and student completion rates (Bedi, 2023; Tualaulelei et al., 2022).

The issue of student engagement is particularly acute in fields such as Guidance and Counselling in Education, which have not traditionally been taught online. Counsellor educators conventionally use face-to-face teaching to train educational counsellors within a humanistic and experiential framework (Pipoly, 2013). The profession has a “high touch” nature and it values face-to-face interactions, the evaluation of verbal and nonverbal communication skills, and rapport-building (Watson, 2012). These present differently in an online environment. For example, verbal interactions may be shorter, nonverbal communication more difficult to read or people may feel a level of disconnect through lack of direct eye contact. The current generation of counselling students is also different, with at least one study (Koltz et al., 2017) arguing for variations in the way counselling is taught to millennial students, who may be more tech-savvy, socially and environmentally conscious, and self-focused, compared with other generations. As online counselling courses become more widely accepted, further knowledge is needed about how best to engage the range of students who are studying for professions such as counselling that are heavily people-centred.

To explore these issues, this article presents a study that used design-based research to understand online student engagement. Specifically, it explores whether “interactive” technologies—defined as those that are learner-centred and promote active and participatory learning (Anderson, 2008; Garrison, 2017; Pifarre, 2019)—enhance students’ engagement with online learning. The literature review provides an overview of three key areas: research in online learning and student engagement, interactive technologies and online student engagement, and online counselling education. Next, the theoretical framework, context, and methods of the current study are described, followed by results. The subsequent discussion argues that interactive technologies promote student engagement and active learning across several dimensions. This is especially important for fields like Guidance and Counselling that are predicated on human interaction and communication. Our study’s contribution is in teasing out how interactive technologies enhance specific dimensions of online student engagement. These insights can assist university educators to use these technologies more intentionally.

## Literature Review

### *Online Learning and Student Engagement*

Online learning, also known as e-learning, is a subset of distance learning and it is commonly accepted to mean learning through the internet, or “online” (Anderson, 2008; Garrison, 2017). Online learning involves various modalities and combinations of technologies integrated into learning management systems such as Moodle, Blackboard, or Canvas. Some institutions offer courses fully online while others provide blended learning (face-to-face and online classes). The online environment offers learners opportunities and benefits that may be absent from face-to-face experiences. For example, Arasaratnam-Smith and Northcote (2017) highlight four online advantages: “social egalitarianism” where students enter online environments as equals; time for students to provide reasoned and reflective responses; social agency, where students are free to interact with the individuals and groups they want to, and an emphasis on interactions through verbal and written means. Technologies can further increase students’ digital skills, deepen their discipline knowledge, and give diverse learners the flexibility to study through their preferred modes of engagement (Farrell & Brunton, 2020; Rajabalee et al., 2020). Online educators may create a sense of community through mini-lectures, group discussions, and the use of designated social media (Arasaratnam-Smith & Northcote, 2017). Post Covid-19, however, students reported that the decreased interaction with peers and educators and the lack of social connection negatively affected their online learning experiences (Hollister et al., 2022; Redmond et al., 2023). Interactive technologies therefore play a key role in students’ participation and success with online learning.

The term used to describe student interest or interaction with learning is “online student engagement” which is commonly viewed as a multi-faceted construct. Hollister et al. (2022) suggested that researchers largely agreed on three dimensions of student engagement: behavioural, cognitive, and affective. Their definition drew from Coates’ (2007) typological model, among others, which described online and campus-based students’ styles of engagement as being a mix of dependent/collaborative styles and intense/passive styles. A slightly different definition was put forth by Kahu and Nelson (2018) who proposed three dimensions: emotional, which indicates a student’s interest and enthusiasm; cognitive, which focuses on deep learning and self-regulation; and behavioural, which includes the student’s participation, time, effort, and interaction. Some studies equate engagement with interaction and connection to other learners, the instructor, and course content (Dixson, 2015; Martin & Bolliger, 2018), while others embed engagement within models such as Garrison’s Community of Inquiry, which emphasises students’ social presence, cognitive presence, and instructors’ teaching presence (Rioch & Tharp, 2022). While researchers have not yet reached a consensus on a definition, it is clear that online student engagement differs from face-to-face engagement. It is also evident that student engagement involves a balance between what the student needs or desires through study, whether that be cognitive, social, or emotional, and what educators and institutions think students need (i.e., certain levels of cognitive advancement, specific behaviours that reflect time and effort put into study, or collaboration with peers to enhance graduate outcomes etc.).

Perhaps the most holistic framework has been proposed by Redmond et al. (2018). Through a review of relevant research and consultation with international experts in the field,

Redmond et al. (2018) created an online engagement framework for higher education with five dimensions which are summarised in Table 1: social, cognitive, behavioural, collaborative and emotional. Although the authors did not include a developed instrument for measuring each of these dimensions, they identified indicators that could be used to develop measurement methods. The authors recommended the framework as an “audit tool or point of reference” (p. 196).

**Table 1**

*Online Learning Engagement Framework (Redmond et al., 2018, p. 190)*

| Dimension of Engagement | Indicators                                                                                                                                                                                      |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Social                  | Building community, creating a sense of belonging, developing relationships, and establishing trust                                                                                             |
| Cognitive               | Thinking critically, activating metacognition, integrating ideas, justifying decisions, developing deep discipline understandings, and distributing expertise                                   |
| Behavioural             | Developing academic skills, identifying opportunities and challenges, developing multidisciplinary skills, developing agency, upholding online learning norms, supporting and encouraging peers |
| Collaborative           | Learning with peers, relating to faculty members, connecting to institutional opportunities, and developing professional networks                                                               |
| Emotional               | Managing expectations, articulating assumptions, recognising motivations, and committing to learning                                                                                            |

As shown in Table 1, social engagement is when online students create purposeful and trusting relationships with others. Cognitive engagement is “the active process of learning” (p. 191), while behavioural engagement involves students “demonstrating positive learning behaviours and attitudes” (p. 193). Collaborative engagement includes “the development of different relationships and networks that support learning, including collaboration with peers, instructors, industry, and the educational institution” (p. 194). Emotional engagement is “related to feelings or attitudes towards learning” (p. 195). This framework informs the current study for two reasons: Each dimension is comprehensive and research-based, and the framework is specific to online higher education.

## ***Interactive Technologies and Online Student Engagement***

“Interactive technologies” are online and virtual tools that enable students to communicate and learn synchronously or asynchronously (Getenet & Tualaulelei, 2023; Pifarre, 2019). Unlike static media such as documents and videos, interactive technologies require students to actively engage, respond, or manipulate them. There are also a number of emerging technologies that are interactive such as virtual worlds like *Second Life*, social media, augmented/virtual reality, artificial intelligence, and educational (or “serious”) games. But many of these tools have not been widely adopted in higher education. University educators generally adopt tools that are free or low-cost, readily accessible to both students and staff, and those that conform with university policies on student privacy and technology use. For example, Dianati et al. (2020) investigated Padlet, Kahoot! and Cirrus technologies, and Licorish et al. (2018) similarly studied Kahoot! quizzes. Both studies found that student learning and engagement improved with the use of technology-enhanced educational activities. Some studies have focussed on a technology’s influence on specific dimensions of student engagement. Padlet, for instance, has been found to promote cognitive engagement (Gill-Simmen, 2021) and collaborative learning (Mehta et al., 2021). Few studies, however, have focussed on technology’s impact on holistic student engagement beyond one or two dimensions.

While there are a great number of interactive technologies being used in universities across the world, there are emerging bodies of research around three common ones, namely, Padlet, Google Docs, and video-embedded quizzes. Padlet is a web 2.0 tool which creates virtual walls where files, documents, images, and videos can be posted (Wallwisher, 2022). When embedded within learning management systems, students can see real-time updates of the Padlet. Google Docs is a suite of office applications (spreadsheet, word processing, presentation slides) that allows collaboration and sharing. When used in synchronous online tutorials, Google Docs allows live editing of documents that can later be shared with students asynchronously for their contributions. Both technologies have been found to increase students’ motivation and interest and deepen their critical thinking and reflection skills (Gill-Simmen, 2021; Heggart & Yoo, 2018; Mehta et al., 2021; Tran & Lamar, 2020). Another technology is video-embedded quizzes, where brief quizzes are placed within video resources. A number of studies have highlighted their effectiveness for engaging students with course content, although some studies have returned mixed results around their effects on student learning (Deng & Gao, 2023; Haagsman et al., 2020; Rice et al., 2019; Singh et al., 2023). As these technologies become more widely used, research is needed to understand which aspects of student engagement they can be used to enhance.

## ***Online Counselling Education***

Counselling education is increasingly being delivered online whether students aim to offer traditional or online counselling. Along with the pandemic-fuelled move to online learning, there has also been an increase of individuals in the community seeking online counselling such as web counselling, virtual counselling, and e-counselling (Hennigan & Goss, 2016; Paterson et al., 2019; Pipoly, 2013). Research has explored the effectiveness of different course delivery methods (e.g., face-to-face, online, or hybrid) by examining students’ beliefs about their ability to gain effective counselling skills (Hennigan & Goss, 2016; Watson, 2012). Traditional counselling has established that students who feel confident using their clinical

skills in face-to-face settings provide a higher quality of counselling services to clients, but Watson (2012) found that online students reported higher levels of self-efficacy, personal motivation, and self-confidence compared with face-to-face students. In addition, in a study exploring the equivalence of online compared with on-campus counselling education, Holmes and Reid (2017) found that not only were learning outcomes equivalent, but student evaluations of their learning were also similar. As online counselling education is on the rise and it promises equivalence with face-to-face training, a sharper focus is needed on the affordances of various technologies for promoting the skills and dispositions required of counselling professionals.

Some core threshold concepts in counselling education relate to interpersonal skills, relationship-building, and ethics, which have been reframed through online education. For instance, a longstanding goal of most counsellor education programs is to foster students' confidence in their abilities to work effectively with clients (Watson, 2012). A key concern of critics has been that online education does not provide sufficient opportunities for the social engagement needed "for a professional role emphasising the importance of quality of relationships" (Scholl et al., 2017, p. 197). Counsellor educators have, therefore, had to find innovative ways to observe students' non-verbal behaviours, empathy development, and counselling and communication skills throughout their training. Magill et al. (2022) scoped the technologies reported in the literature and they found three main types for training and monitoring counselling skills: avatar-interfaces, video-interfaces, and performance monitoring programmes. The authors identified the advantages of these technologies (scalability, resource efficiency, standardisation, and immediacy of feedback). However, they also suggested that future research focus on "understanding factors, whether individual or institutional, that maximise user's sustained engagement and adherence" (p. 334). Outside the scope of their review was the user experiences of these technologies. Partially addressing this aspect, Roth et al. (2019) studied how counsellors-in-training perceived their online education, and they found that students were satisfied with their course if they could gain advanced knowledge, if the course was convenient, if they could build strong connections with their peers, and if the course enhanced their self-efficacy. The evidence points to a fundamental role of technology in helping students deepen their engagement with the social and emotional aspects of counselling education.

As technology evolves, so too will the nature of counselling. Issues around ethics and legalities have emerged as key concerns for some researchers (e.g., Coker et al., 2021; Sheperis et al., 2020), while others have explored how technology can facilitate and enhance counsellor education to ensure that graduates are professionally prepared (Cicco, 2013; Cook, 2016; Snow et al., 2018). According to Pipoly (2013, p. 49), "Online counselling . . . challenges the foundation upon which the counselling field was built," so technology should enhance and promote the values and skills of the profession rather than undermine them. In a review of online counsellor education, Coker et al. (2021, p. 41) recommended research into "program development that utilizes various technologies" due to the affordances and possibilities presented by emerging and disruptive technologies such as virtual reality. To our knowledge, there is also scant research about the role artificial intelligence will play in this area.

Given the increasingly widespread use of technology within counselling and counselling education, and the urgent need for a more robust evidence base that helps guide online counsellor education, the present study explored three interactive technologies: Padlet, video-

embedded quizzes, and Google Docs, and their effectiveness in enhancing university students' engagement in a foundational post-graduate counselling course. The research question guiding the present study was:

How do interactive technologies enhance specific dimensions of online student engagement for students studying Guidance and Counselling?

## Methodology

### *Research Approach and Design*

The current study is grounded in the philosophical tradition of pragmatism, which emphasises practical outcomes in research. Pragmatist methods allow for flexible, real-world inquiry and they encourage the investigation of problems in context (Dewey, 1916; Peirce, 1905). Pragmatism values what works best in real-world settings over strict adherence to traditional research methodologies, and it encourages the blending of qualitative and quantitative methods to find effective, actionable solutions (Biesta, 2010). From this perspective, a design-based research approach was considered appropriate for the current study. Design-based research is appropriate for technological interventions (Zheng, 2015) and it can be used for short-term projects (Pool & Laubscher, 2016). It encourages the collection of various types of data (McKenney & Reeves, 2013) and it is typically implemented in phases.

The first phase of this three-phase study was reported in Getenet and Tualaulelei (2023). That phase gathered background information through the implementation of the interactive technologies across two undergraduate courses, and it resulted in initial professional learning strategies and a prototype of a professional learning guide. The second phase involved the current study where the professional learning ideas from the first phase were utilised, refined, and revised. For example, we learned from the first phase that quizzes placed at the end of lecture videos tended to be ignored and that no matter how intuitive we thought technologies were, they always needed explanation to ensure all students could participate. We were also able to refine our data collection tools from phase one for use in this phase.

### *Context and Participants*

The study was conducted at a mid-sized regional Australian university in an online post-graduate Guidance and Counselling course in a Master of Education programme. Over 75% of students at this university study online, and students in this particular course were all teacher-qualified and mature-aged (over 25 years old). Most students studied whilst working as schoolteachers or counsellors. The course was designed to provide students with theoretical content, counselling frameworks, as well as counselling skills-based interventions. Students had the opportunity to role-play their skills by video and be evaluated by teachers. The course also emphasised ethical conduct. The course duration was 13 weeks or one semester.

The technologies chosen for investigation in this study were Padlet (Wallwisher, 2022), video-embedded quizzes, and Google Docs. These tools were selected due to their availability to students and staff, their compliance with university use policies and the convenience of

integrating them within the Moodle learning management system alongside other technologies already used in the course. Padlet activities in this course were embedded within each of the six course modules and were structured as reflective exercises based on key module content of counselling skills, communication, problem-solving skills, ethical behaviour, leadership skills, and multicultural competency. Video-embedded quizzes were embedded in the recorded lecture videos. Google Docs was used for pairs to collaborate on case studies. These technologies are interactive in the sense that users manipulate and interact with the technology and the technology is responsive to user input (Pifarre, 2019). Access for all technologies was via a standard web browser, making the tool relatively easy for students and staff to access.

### **Data Collection**

After ethical approval from the relevant university committee (Approval No. H20REA133), data were collected through a pre- and post-survey attached in the Appendix. To ensure the validity of the survey, the items were developed based on Redmond et al.'s (2018) online engagement for higher education framework. In addition, we drew upon our experiences of researching online student engagement in the design process of the survey to ensure its content validity (Getenet & Tualaulelei, 2023; Getenet et al., 2022; Tualaulelei et al., 2022). The surveys were also piloted in the first phase of the project to assess the clarity, relevance and appropriateness of the items which further helped to strength the validity of the survey. All 158 students in the course were invited via email from our research assistant to participate in the anonymous surveys which asked students about their confidence in using and teaching with technology, as well as their views about each of the technologies. The survey was administered online through Google Forms with 5-point Likert scale questions ranging from *strongly disagree* (1) to *strongly agree* (5). The pre-survey received 39 responses (response rate 24.7%) and the post-survey received 23 responses (response rate 14.6%). Table 1 summarises the demographics of the survey participants for the pre- and post- surveys. It shows that most of the participants were female, most were aged between 35 and 49 years of age, most studied part-time, and almost all students studied off-campus.

**Table 2**

#### *Summary of Pre- and Post-Survey Participants*

| Features   |             | Pre | Post |
|------------|-------------|-----|------|
| Gender     | Female      | 36  | 21   |
|            | Male        | 3   | 2    |
| Age        | 25-34 years | 7   | 3    |
|            | 35-49 years | 26  | 13   |
|            | 50+ years   | 6   | 7    |
| Study load | Full time   | 6   | 5    |
|            | Part-time   | 33  | 18   |

|            |                 |    |     |
|------------|-----------------|----|-----|
| Study mode | >75% off campus | 0  | 1   |
|            | 100% off campus | 39 | 21* |

\* 1 student did not respond to this question in the post-survey

### ***Data Analysis***

Data analysis was guided by Redmond et al.'s (2018) framework to gauge students' engagement on the cognitive, behavioural, emotional, collaborative, and social dimensions. SPSS (Version 29.0.1.0) was used to derive results and descriptive statistics were used to summarise these. We used content analysis for the small amount of qualitative data gathered from the survey's open-ended questions.

## **Results**

The survey results show no significant differences between the pre- and post- mean ratings. Table 3 shows that generally, students were neutral or agreed that they were confident using technology for learning (Pre M=3.95, Post M=4.00). As teachers, most of the students were neutral or agreed that they were confident teaching with technology (Pre M=3.64, Post M=3.87), but they agreed that learning with technology was important (Pre M=4.08, Post M=4.30). They further agreed that learning with technology would influence how they taught with technology in the future (Pre M=4.10, Post M=4.17). Students were neutral or agreed that university courses offered good opportunities for learning with relevant technologies (Pre M=3.92, Post M=4.04). These figures indicate that for students, technology was an accepted tool for learning and teaching both currently and for the future, confirming the importance of learner-interface interactions for online learning (Anderson, 2008).

**Table 3**

### *Students' General Perspectives of Technology Use*

| Items                                                                                   | Pre  |       | Post |       |
|-----------------------------------------------------------------------------------------|------|-------|------|-------|
|                                                                                         | Mean | SD    | Mean | SD    |
| I am confident using technology for learning at the University                          | 3.95 | 0.916 | 4.00 | 0.798 |
| I am confident teaching with technology                                                 | 3.64 | 0.932 | 3.87 | 0.968 |
| Learning with technology is important to me                                             | 4.08 | 0.739 | 4.30 | 0.703 |
| Learning with technology will influence how I teach with technology in the future       | 4.10 | 0.718 | 4.17 | 0.717 |
| The university courses offer good opportunities for learning with relevant technologies | 3.92 | 0.703 | 4.04 | 0.706 |



Strongly agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly disagree = 1

Table 4 summarises student responses to the pre- and post-surveys and it is worthwhile examining the results for each technology for comparison and contrast.

**Table 4**

*Student Responses to Pre- and Post-Surveys Mean and SD*

| Engagement<br>Dimension and<br>Indicators  | Padlet |      |      |      | Video-embedded quizzes |      |      |      | Google Docs |      |      |      |
|--------------------------------------------|--------|------|------|------|------------------------|------|------|------|-------------|------|------|------|
|                                            | Pre    |      | Post |      | Pre                    |      | Post |      | Pre         |      | Post |      |
|                                            | Mean   | SD   | Mean | SD   | Mean                   | SD   | Mean | SD   | Mean        | SD   | Mean | SD   |
| <b>Cognitive</b>                           |        |      |      |      |                        |      |      |      |             |      |      |      |
| Think critically                           | 3.6    | 0.59 | 3.26 | 1.29 | 3.46                   | 0.62 | 3.43 | 1.20 | 3.15        | 0.71 | 3.35 | 1.15 |
| Develop deep discipline understandings     | 3.6    | 0.59 | 3.17 | 1.23 | 3.46                   | 0.62 | 3.39 | 1.20 | 3.15        | 0.71 | 3.3  | 1.11 |
| Use expertise gained from other courses    | 3.5    | 0.70 | 3.22 | 1.20 | 3.31                   | 0.55 | 3.3  | 1.02 | 3.36        | 0.70 | 3.39 | 1.16 |
| <b>Behavioural</b>                         |        |      |      |      |                        |      |      |      |             |      |      |      |
| Develop academic skills                    | 3.4    | 0.64 | 3.13 | 1.18 | 3.38                   | 0.62 | 3.22 | 1.04 | 3.39        | 0.79 | 3.35 | 1.11 |
| Develop agency                             | 3.57   | 0.65 | 3.17 | 1.19 | 3.27                   | 0.47 | 3.26 | 1.01 | 3.52        | 0.76 | 3.35 | 1.15 |
| Understand online learning norms           | 3.5    | 0.65 | 3.22 | 1.24 | 3.31                   | 0.60 | 3.26 | 1.01 | 3.39        | 0.79 | 3.43 | 1.16 |
| <b>Collaborative</b>                       |        |      |      |      |                        |      |      |      |             |      |      |      |
| Engage with lecturers or tutors            | 3.78   | 0.69 | 3.3  | 1.30 | 3.31                   | 0.60 | 3.17 | 0.98 | 3.36        | 0.78 | 3.35 | 1.15 |
| Connect to opportunities at the university | 3.37   | 0.64 | 2.96 | 1.07 | 3.19                   | 0.50 | 3.04 | 0.88 | 3.18        | 0.68 | 3.09 | 1.08 |
| Develop professional networks              | 3.43   | 0.65 | 2.91 | 1.13 | 3.19                   | 0.50 | 3    | 0.91 | 3.24        | 0.87 | 3.04 | 1.06 |
| <b>Social</b>                              |        |      |      |      |                        |      |      |      |             |      |      |      |
| Create sense of belonging                  | 3.43   | 0.78 | 3.17 | 1.20 | 3.23                   | 0.58 | 3    | 0.91 | 3.24        | 0.94 | 3.09 | 1.04 |
| Develop relationship with others           | 3.5    | 0.70 | 3    | 1.09 | 3.19                   | 0.50 | 3    | 0.91 | 3.36        | 0.86 | 3.32 | 1.09 |
| Develop sense of community among others    | 3.5    | 0.70 | 3.22 | 1.20 | 3.23                   | 0.52 | 3    | 0.91 | 3.45        | 0.79 | 3.09 | 1.04 |
| <b>Emotional</b>                           |        |      |      |      |                        |      |      |      |             |      |      |      |
| Become interested in the course            | 3.5    | 0.63 | 3.26 | 1.21 | 3.38                   | 0.75 | 3.48 | 1.08 | 3.3         | 0.77 | 3.22 | 1.04 |
| Reduce my anxiety about learning           | 3.43   | 0.57 | 3.17 | 1.23 | 3.31                   | 0.68 | 3.26 | 1.14 | 3.21        | 0.65 | 3.26 | 1.10 |

|                    |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Commit to learning | 3.53 | 0.63 | 3.26 | 1.25 | 3.38 | 0.70 | 3.39 | 1.12 | 3.36 | 0.65 | 3.17 | 1.03 |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|

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Strongly agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly disagree = 1

### ***Padlet***

Post-survey figures about Padlet were generally lower than the pre-survey figures across all five dimensions of engagement. Students were neutral about Padlet's contribution to their cognitive, behavioural, social, and emotional engagement. One student described how Padlet facilitated a student's social engagement through a sense of community with their peers, stating that "Padlet was used early in this course and I enjoyed reading and learning from other students' responses." The data supports the idea that online learners require opportunities to reflect on what they are learning. This helps them to contextualise and internalise learning (Garrison, 2017). Interestingly, students tended to disagree that Padlet helped with their collaborative engagement. The lower mean score for collaborative engagement (made up of engaging with lecturers or tutors Post M=3.35, connecting to university opportunities Post M=3.09, and developing professional networks Post M=3.04) was partially explained by how Padlet was used in this course. It was specifically aimed at enhancing students' cognitive engagement by asking them to reflect on their understandings, and behavioural engagement through having students post their ideas for the cohort. In other words, Padlet was not specifically aimed at enhancing collaborative engagement (i.e., for students to connect to opportunities at the university or to develop professional networks).

### ***Video-Embedded Quizzes***

Similar to the Padlet results, the post-survey mean rating about the video-embedded quizzes were generally lower than the pre-survey mean ratings across all five dimensions of engagement except for very slight differences in the emotional dimension. In the post-survey results, after students had engaged with the quizzes, they agreed slightly more that the quizzes were helpful for cognitive engagement compared with Padlet. This was also the case with behavioural engagement, where students rated quizzes more useful than Padlet for developing academic skills, developing agency, and understanding online norms. Students appreciated the seamless integration of the quizzes, commenting that "the Panopto quizzes were embedded well in lectures." When asked whether the quizzes helped students become interested in the course and commit to learning (which are elements of emotional engagement), the mean rating from the post-survey was slightly higher than the pre-survey results. Quizzes may therefore play a role in helping students feel emotionally engaged with online learning. This is consistent with students' higher mean rating of quizzes over Padlet on the collaborative elements of connecting to opportunities at university and developing professional networks.

One student pointed out the importance of aligning quizzes closely to course content, writing that:

Panopto quiz would have been good for a pre and post assessment of understanding, but the questions often did not relate to the content in the corresponding lecture. I think this would be a great tool, but do not feel that it was used very effectively in this course.

This comment highlights the need for relevant and strategically placed quizzes so that students can maximise their learning opportunities.

### ***Google Docs***

Like the Padlet and video-embedded quiz results, the post-survey figures for Google Docs were mostly neutral. However, the post-survey mean rating for the cognitive dimension was slightly higher for the post-survey compared with the pre-survey. This tentatively suggests that Google Docs engaged students cognitively slightly more than the other two technologies. Google Docs also appeared to engage students emotionally, particularly in reducing their anxiety about learning, an element that had a mean rating slightly higher in the post-survey compared with the pre-survey. Our results suggest that cognitive and emotional engagement may be the result of learners being actively involved in learning activities.

Overall, students were neutral towards the interactive technologies that were trialled, although qualitative responses to the post-survey provided further insights. Several students were concerned that the technologies created extra work, as exemplified by this comment:

Google Docs, Padlet or Panopto are just tools . . . the more platforms are introduced, the more time wasting distracts from learning as students navigate the variety of platforms - a good course should be able to allow one clear access point with everything embedded and no requirements for downloads and navigating. Already too many spots to access to get all information. Just gets distracting rather than enhancing learning.

Course design should therefore consider which technologies are easy to use, access, and understand for students, and take care to integrate technologies as seamlessly as possible. Educators will need to guide students more with technologies such as Google Docs which may initially involve more instruction and guidance to use.

## **Discussion**

The research question guiding the present study was: *How do interactive technologies enhance specific dimensions of online student engagement for students studying Guidance and Counselling?* Redmond et al.'s. (2018) online engagement framework was used as a guide for this design-based research project. The students in this study agreed that technology was important for both learning at university and for their future professional roles as counsellors. This was reflected in the high mean scores across Table 3, for example, they indicated strong agreement that learning with technology is important to them (Pre M=4.08, Post M=4.30), and that it will influence how they use technology in the future (Pre M=4.10, Post M=4.17). These results indicate that students value the role of technology in their current study but also anticipate its relevance in their future professional practice as counsellors. Results also showed that Padlet promoted cognitive, behavioural, social and emotional engagement but not necessarily collaborative engagement. We surmised that this was due to Padlet not being

specifically used to promote collaboration. Students considered video-embedded quizzes more engaging across all five dimensions, including collaborative engagement. The results also show some potential for quizzes to promote students' emotional engagement through increasing their interest in and commitment to learning online. Google Docs was reported by students to enhance their cognitive and emotional engagement. The survey showed that students were generally neutral towards all three technologies, but they preferred them to be used purposefully and with "one clear access point." Student neutrality was likely due to the survey responses being self-reported, as well as students possibly feeling overloaded by multiple technologies and platforms for learning.

These results are important because they tease out the aspects of online student engagement that can be enhanced by interactive technologies. Advantages highlighted by Arasaratnam-Smith and Northcote (2017) were particularly evident. Padlet promoted social egalitarianism between students as contributions could be made anonymously. All three technologies allowed for asynchronous use, meaning that students had time to consider and craft their responses. Padlet also promoted social agency where students could post and respond to peers. Padlet and Google Docs further helped students hone their communicative skills as they discussed issues or solved problems and recorded their notes. We found that the interactive technologies helped students become more interested in what they were learning and commit to their studies, in alignment with the findings of Bedi (2023) and Redmond et al. (2023). Importantly, online students are not passive recipients of knowledge that is merely accessed online; they interact with course content and with peers and educators to negotiate and create knowledge.

The three technologies in this study further promoted students' self-efficacy with key tenets of counselling education. Contemporary counselling students view online counselling as "a natural part of their counselling skills portfolio" (Paterson et al., 2019, p. 296), so it is important that online education uphold and promote the profession's foundational skills and dispositions. In the current study, all three technologies built up students' sense of self-efficacy with counselling practices. The technologies encouraged students to use clear verbal and written communication, develop rapport with each other, and to gain increased confidence with the profession's language, ways of working, and interacting (see Table 4). This supports Roth et al.'s (2019) idea that online students want peer connections as well as advanced knowledge and skills. It also extends upon findings from Watson (2012) and Holmes and Reid (2017) who suggested that online counselling education may be as effective as traditional face-to-face modes of learning. Online counselling education might offer a better mode of training for online counselling provision and delivery. Our results further respond to the critique highlighted by Scholl et al. (2017) regarding whether online counselling education can provide sufficient opportunities for social engagement. In this study, students were neutral about the three technologies promoting social engagement, so future research can explore other technologies that can be used.

As the demand for online counselling services increases (Hennigan & Goss, 2016; Pipoly, 2013), the ability of counsellors to develop relationships and rapport-building through technology will also gain importance. Access to Padlet in the current study allowed students thinking and response time. They could present reasoned and timely responses at their leisure without the social pressures and time-restrictions prevalent in face-to-face communication. It

helped that the Padlets were accessible for the entire semester. This echoes findings from Torun (2019) and Roth et al. (2019) that students value convenience with online platforms. The implementation of interactive technologies allows diverse learners to learn at a flexible pace. Additionally, it gives counselling students a sense of the benefits and challenges of using technology with future clients who may prefer to post thoughts anonymously in group settings, or who may need the extra time to collect their thoughts. Understanding these nuances of online interaction is important because contemporary counselling clientele have become more comfortable with seeking online or distance counselling. It may not be long before counselling is provided through avatars combined with artificial intelligence (Coker et al., 2021; Magill et al., 2022), further influencing the nature of online counselling education and online counselling itself. We recommend that counselling educators utilise technologies that are accessible, engaging, and seamlessly integrated into the overall learning experience. Our study may provide insights about available technologies and student preferences for counselling education.

## Conclusion

As online counselling education is here to stay (Coker et al., 2021), the technologies used in online education warrant more attention in terms of their value for engaging online learners and upholding the values of the counselling profession. The current study investigated how three interactive technologies enhanced student engagement in a post-graduate educational counselling course. The study's participants agreed that technology was important for online study and for the counselling profession. Results from a pre- and post-surveys revealed that: Padlet promoted cognitive, behavioural, social, and emotional engagement but not necessarily collaborative engagement; video-embedded quizzes promoted engagement across all five dimensions; and Google Docs enhanced cognitive and emotional engagement. Overall, however, students were neutral about all three technologies, expressing neither agreement nor disagreement that one technology was more engaging over the others. What they valued instead was accessibility and clarity with whichever technological tools were used. The study's results may have limited generalisability due to its focus on one course in one mid-sized university and the limited data set. This can be remedied with future research of samples that are much wider in scope exploring, for instance, a broader selection of university courses and technologies.

Counsellor educators are encouraged to be strategic with how they integrate technology into their online counselling courses. Students studying guidance counselling for education especially need to be prepared to become "available in digital places that young people 'inhabit'" (Paterson et al., 2019, p. 301). To this end, more studies are needed to help unpack specific technologies and their impacts on online student engagement, as well as studies that explore online client engagement so that the technologies used in counsellor education are as relevant and responsive as possible.

## Declarations

The authors declare they have no competing interests.

This study was funded by a University of Southern Queensland Learning and Teaching grant.

## References

- Anderson, T. (2008). Towards a theory of online learning. In T. Anderson (Ed.), *The theory and practice of online learning* (2nd ed., pp. 15-44). AU Press.  
<https://doi.org/10.15215/aupress/9781897425084.004>
- Arasaratnam-Smith, L., & Northcote, M. (2017). Community in online higher education: Challenges and opportunities. *The Electronic Journal of e-Learning*, 15(2), 188-198.  
<https://academic-publishing.org/index.php/ejel/article/view/1831>
- Bedi, A. (2023). Keep learning: Student engagement in an online environment. *Online Learning*, 27(2), 119-136. <https://doi.org/10.24059/olj.v27i2.3287>
- Biesta, G. (2010). Pragmatism and the philosophical foundations of mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *SAGE Handbook of Mixed Methods in Social & Behavioral Research* (2nd ed., pp. 95-118). SAGE.  
<https://doi.org/10.4135/9781506335193.n4>
- Cicco, N. (2013). Online course effectiveness: A model for innovative research in counselor education. *i-manager's Journal on School Educational Technology*, 9(1), 10-16.  
<https://doi.org/10.26634/jsch.9.1.2399>
- Coates, H. (2007). A model of online and general campus-based student engagement. *Assessment & Evaluation in Higher Education*, 32(2), 121-141.  
<https://doi.org/10.1080/02602930600801878>
- Coker, K., Snow, W., & Hinkle, S. (2021). The past, present and future of online counselor education. *Journal of Technology in Counselor Education and Supervision*, 1(1), 6.  
<https://doi.org/10.22371/tces/0006>
- Cook, R. (2016). Using the magic of a live online classroom to enhance distance counsellor education. In N. Wright (Ed.), *There and back: Charting flexible pathways in open, mobile and distance education* (pp. 140-142). The University of Waikato.  
<https://flanz.org.nz/flanzorg/wp-content/uploads/2016/06/DEANZ16-Conference-proceedings11-April.pdf>
- Deng, R., & Gao, Y. (2023). Effects of embedded questions in pre-class videos on learner perceptions, video engagement, and learning performance in flipped classrooms. *Active Learning in Higher Education*, 25(3), 473-487.  
<https://doi.org/10.1177/14697874231167098>
- Dewey, J. (1916). *Democracy and education*. The Free Press.
- Dianati, S., Nguyen, M., Dao, P., Iwashita, N., & Vasquez, C. (2020). Student perceptions of technological tools for flipped instruction: The case of Padlet, Kahoot! and Cirrus. *Journal of University Teaching and Learning Practice*, 17(5), 4.  
<https://doi.org/10.53761/1.17.5.4>
- Dixson, M. D. (2015). Measuring student engagement in the online course: The Online Student Engagement scale (OSE). *Online Learning*, 19(4), 1-15.  
<https://doi.org/10.24059/olj.v19i4.561>

- Farrell, O., & Brunton, J. (2020). A balancing act: A window into online student engagement experiences. *International Journal of Educational Technology in Higher Education*, 17(1). <https://doi.org/10.1186/s41239-020-00199-x>
- Garrison, D. R. (2017). *E-learning in the 21st century: A framework for research and practice* (3rd ed.). Routledge.
- Getenet, S., & Tualaulelei, E. (2023). Using interactive technologies to enhance student engagement in higher education online learning. *Journal of Digital Learning in Teacher Education*, 39(4), 220-234. <https://doi.org/10.1080/21532974.2023.2244597>
- Getenet, S., Worsley, S., Tualaulelei, E., & Pillay, Y. (2022). The role of technologies to enhance pre-service teachers' engagement in an online mathematics education course. In N. Fitzallen, C. Murphy, V. Hatisaru, & N. Maher (Eds.), *Mathematical confluences and journeys (Proceedings of the 44th Annual Conference of the Mathematics Education Research Group of Australasia)* (pp. 241–249). MERGA. <https://merga.net.au/common/Uploaded%20files/Annual%20Conference%20Proceedings/2022%20Annual%20Conference%20Proceedings/MERGA44%20Proceedings%20July%203-7%202022.pdf>
- Gill-Simmen, L. (2021). Using Padlet in instructional design to promote cognitive engagement: A case study of undergraduate marketing students. *Journal of Learning Development in Higher Education*(20). <https://doi.org/10.47408/jldhe.vi20.575>
- Haagsman, M. E., Scager, K., Boonstra, J., & Koster, M. C. (2020). Pop-up questions within educational videos: Effects on students' learning. *Journal of Science Education and Technology*, 29(6), 713-724. <https://doi.org/10.1007/s10956-020-09847-3>
- Heggart, K., & Yoo, J. (2018). Getting the most from Google Classroom: A pedagogical framework for tertiary educators. *Australian Journal of Teacher Education*, 43(3), 140-153. <https://doi.org/10.14221/ajte.2018v43n3.9>
- Hennigan, J., & Goss, S. P. (2016). UK secondary school therapists' online communication with their clients and future intentions. *Counselling and Psychotherapy Research*, 16(3), 149-160. <https://doi.org/10.1002/capr.12082>
- Hollister, B., Nair, P., Hill-Lindsay, S., & Chukoskie, L. (2022). Engagement in online learning: Student attitudes and behavior during COVID-19. *Frontiers in Education*, 7(1), 851019. <https://doi.org/10.3389/educ.2022.851019>
- Holmes, C. M., & Reid, C. (2017). A comparison study of on-campus and online learning outcomes for a research methods course. *Journal of Counselor Preparation and Supervision*, 9(2), 15. <https://doi.org/10.7729/92.1182>
- Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: Understanding the mechanisms of student success. *Higher Education Research & Development*, 37(1), 58-71. <https://doi.org/10.1080/07294360.2017.1344197>
- Koltz, R. L., Smith, A., Tarabochia, D. S., & Wathen, C. C. (2017). A pedagogical framework for counselor educators working with millennial students. *Journal of Counselor Preparation and Supervision*, 9(1), 6. <https://doi.org/10.7729/91.1150>

- Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, 13(1), 1-23. <https://doi.org/10.1186/s41039-018-0078-8>
- Magill, M., Mastroleo, N. R., & Martino, S. (2022). Technology-based methods for training counseling skills in behavioral health: A scoping review. *Journal of Technology in Behavioral Science*, 7(3), 325-336. <https://doi.org/10.1007/s41347-022-00252-8>
- Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, 22(1), 205-222. <https://doi.org/10.24059/olj.v22i1.1092>
- McKenney, S., & Reeves, T. C. (2013). Systematic review of design-based research progress: Is a little knowledge a dangerous thing? *Educational Researcher*, 42(2), 97-100. <https://doi.org/10.3102/0013189X12463781>
- Mehta, K. J., Miletich, I., & Detyna, M. (2021). Content-specific differences in Padlet perception for collaborative learning amongst undergraduate students. *Research in Learning Technology*, 29, 1-19. <https://doi.org/10.25304/rlt.v29.2551>
- Morris, N. P., Ivancheva, M., Coop, T., Mogliacci, R., & Swinnerton, B. (2020). Negotiating growth of online education in higher education. *International Journal of Educational Technology in Higher Education*, 17(1), 48. <https://doi.org/10.1186/s41239-020-00227-w>
- O'Dea, X., & Stern, J. (2022). Virtually the same? Online higher education in the post- COVID-19 era. *British Journal of Educational Technology*, 53(3), 437-442. <https://doi.org/https://doi.org/10.1111/bjet.13211>
- Paterson, S. M., T., L., & and Lehtelä, P. L. (2019). Counsellor students' conceptions of online counselling in Scotland and Finland. *British Journal of Guidance & Counselling*, 47(3), 292-303. <https://doi.org/10.1080/03069885.2017.1383357>
- Peirce, C. S. (1905). What pragmatism is. *The Monist*, 15(2), 161-181. <https://doi.org/10.5840/monist190515230>
- Pifarre, M. (2019). Using interactive technologies to promote a dialogic space for creating collaboratively: A study in secondary education. *Thinking Skills and Creativity*, 32, 1-16. <https://doi.org/10.1016/j.tsc.2019.01.004>
- Pipoly, L. (2013). Counselor education curriculum and online counseling. *Journal of Instructional Research*, 2, 48-57. <https://doi.org/10.9743/jir.2013.2.16>
- Pool, J., & Laubscher, D. (2016). Design-based research: Is this a suitable methodology for short-term projects? *Educational Media International*, 53(1), 42-52. <https://doi.org/10.1080/09523987.2016.1189246>
- Rajabalee, B. Y., Santally, M. I., & Rennie, F. (2020). A study of the relationship between students' engagement and their academic performances in an eLearning environment. *E-Learning and Digital Media*, 17(1), 1-20. <https://doi.org/10.1177/2042753019882567>



- Redmond, P., Alexsen, M., Maloney, S., Turner, J., Brown, A., Basson, M., Galligan, L., Lawrence, J., & Henderson, R. (2023). Student perceptions of online engagement. *Online Learning*, 27(1). <https://doi.org/10.24059/olj.v27i1.3320>
- Redmond, P., Heffernan, A., Abawi, L., Brown, A., & Henderson, R. (2018). An online engagement framework for higher education. *Online Learning*, 22(1), 183-204. <https://doi.org/10.24059/olj.v22i1.1175>
- Rice, P., Beeson, P., & Blackmore-Wright, J. (2019). Evaluating the impact of a quiz question within an educational video. *TechTrends*, 63(5), 522-532. <https://doi.org/10.1007/s11528-019-00374-6>
- Rioch, K. E., & Tharp, J. L. (2022). Relationships between online student engagement practices and GPA among RN-to-BSN students. *Online Learning*, 26(1), 198-217. <https://doi.org/10.24059/olj.v26i2.2680>
- Roth, G., Jacob, C. J., Jackson, C., Stoler, J. R., & Oloidi, W. (2019). Learning to be a counselor at a distance: A qualitative investigation of the distance education experience for counselors-in-training. *Journal of Counselor Preparation and Supervision*, 12(3). <https://research.library.kutztown.edu/jcps/vol12/iss3/2>
- Scholl, M. B., Hayden, S. C. W., & Clarke, P. B. (2017). Promoting optimal student engagement in online counseling courses. *The Journal of Humanistic Counseling*, 56(3), 197-210. <https://doi.org/https://doi.org/10.1002/johc.12053>
- Sheperis, D. S., Coker, J. K., Haag, E., & Salem-Pease, F. (2020). Online counselor education: A student-faculty collaboration. *Professional Counselor*, 10(1), 133-143. <https://doi.org/10.15241/dss.10.1.133>
- Singh, N., Getenet, S., & Tualaulelei, E. (2023). Examining students' behavioural engagement in lecture videos with and without embedded quizzes in an online course. In T. T. Cochrane, V. Narayan, C. Brown, K. MacCallum, E. Bone, C. Deneen, R. Vanderburg, & B. Hurren (Eds.), *People, partnerships and pedagogies: Proceedings ASCILITE 2023* (pp. 224 - 233). Australasian Society for Computers in Learning in Tertiary Education. <https://doi.org/10.14742/apubs.2023.571>
- Snow, W. H., & Coker, J. K. (2020). Distance counselor education: Past, present, future. *The Professional Counselor*, 10(1), 40-56. <https://doi.org/10.15241/whs.10.1.40>
- Snow, W. H., Lamar, M. R., Hinkle, J. S., & Speciale, M. (2018). Current practices in online counselor education. *Professional Counselor*, 8(2), 131-145. <https://doi.org/10.15241/whs.8.2.131>
- Torun, E. D. (2019). Online distance learning in higher education: E-learning readiness as a predictor of academic achievement. *Open Praxis*, 12(2). <https://doi.org/10.5944/openpraxis.12.2.1092>
- Tran, C. J. K., & Lamar, M. F. (2020). Fostering small group discussion in an online instrumental analysis course using Google Docs. *The Journal of Forensic Science Education*, 2(2). <https://jfse-ojs-tamu.tdl.org/jfse/article/view/34>

- Tualaulelei, E., Burke, K., Fanshawe, M., & Cameron, C. (2022). Mapping pedagogical touchpoints: Exploring online student engagement and course design. *Active Learning in Higher Education*, 23(3), 189-203. <https://doi.org/10.1177/1469787421990847>
- Wallwisher. (2022). Padlet. <https://padlet.com/>
- Watson, J. C. (2012). Online learning and the development of counseling self-efficacy beliefs. *The Professional Counselor*, 2(2), 143-151. <https://doi.org/10.15241/jcw.2.2.143>
- Zheng, L. (2015). A systematic literature review of design-based research from 2004 to 2013. *Journal of Computers in Education*, 2(4), 399-420. <https://doi.org/10.1007/s40692-015-0036-z>

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# The Role of Social Relationships with Peers and Teachers for Undergraduate Students' Subjective Wellbeing in the Context of University Synchronous Online Learning

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## Abstract

Social interactions with peers and teachers significantly impact students' subjective wellbeing (SWB) by influencing their achievements, mental health, and motivation. Students who study online often lack these interactions, leading to lower SWB. However, studies show that the experience of social relationships varies by context. Therefore, examining the specific context of an online programme integrated within the university with partially regulated social interactions and active students and teachers' engagement in the learning process provides a more comprehensive understanding of the online students' social experiences, distinct from other online learning formats. The aim of the present study was to find out what such students find important in social interactions for their SWB and whether they are satisfied with the quality of these interactions. To gather insights from the experiences of participants, data were collected from eight semi-structured interviews with second year undergraduate students of a synchronous online programme. Thematic analysis revealed the importance of communication for SWB in the university setting, noting the significance of relationships among teachers and peers. While participants recognised the lack of personal social interactions with online peers, they found that academic communication with them may decrease feelings of detachment. Teacher relationships played a pivotal role in students' SWB and positive learning experience, suggesting that strong teacher support can offset a potential decrease in student SWB in online programs with limited peer interactions.

*Keywords:* Subjective wellbeing in university; Higher education; Academic wellbeing; Online learning; Distance learning

Andronova, E. (2024). The role of social relationships with peers and teachers for undergraduate students' subjective wellbeing in the context of university synchronous online learning. *Online Learning*, (29)4, 467-488.  
<https://doi.org/10.24059/olj.v29i4.4389>

## Introduction

Studies of online education reveal that remote learners experience significant challenges, including decreased motivation, engagement, and a sense of belonging (Foley & Marr, 2019). These difficulties contribute to a decline in subjective wellbeing (SWB) within the educational context (Tian et al., 2017). This is especially true socially, since online learning environments often hinder the development of deep connections with peers and teachers, leading to withdrawal from online programmes (Berry, 2019) and a further decline in subjective wellbeing (Foley & Marr, 2019).

Studies show that perceptions of the quality of relationships within education are highly context dependent (Hagenauer & Volet, 2014) and may vary significantly due to cultural, institutional, and personal factors. Building on this, we assume that not only the online format itself but also the type of online format may transform social relationships in a university context. Studies on various formats of social interactions in online education have shown that context impacts students' perceptions of the quality of these interactions. For instance, research on students' satisfaction with social relationships among university students who study asynchronously highlighted aspects of the institutional role of the university in such interactions (O'Shea et al., 2015). On the other hand, research on university students who studied synchronously during COVID-19 showed that the main reasons for students' dissatisfaction with social relationships lay in their involuntary inclusion in such study formats and their teachers' attitudes (Hopwood, 2022). Thus, we may observe the diversity of factors that impact online students' perceptions of social interactions based on the context of their studies.

This study investigated students in an online programme that is an integral part of the university, where general requirements and rules for teachers, students, and the organisation of educational processes apply. That may bring new insights about how the university environment and policies about online programmes can influence students' perceptions of their social interactions with teachers and peers compared to previous research. Therefore, we assume that by investigating a new context, we can broaden the body of existing research on relationships with teachers and peers in online university programmes and the role of these relationships in students' perceptions of SWB.

## Literature Review

### *Social Relationships and Subjective Wellbeing Within the Educational Context*

Subjective wellbeing (SWB) in the educational context, sometimes also referred to as academic wellbeing (Korhonen et al., 2014; Tuominen-Soini et al., 2012; Widlund et al., 2018), reflects “how students subjectively evaluate and emotionally experience their school lives” (Tian et al., 2017; p. 2). SWB in the educational context shows connections with such important aspects of the learning process as academic achievement (Bücker et al., 2018; Chattu et al., 2020), academic engagement (Datu & King, 2018), adaptability (Putwain et al., 2020), lower social-emotional loneliness (Özdoğan, 2021), and lower dropout rates (Korhonen et al., 2014). One approach to describing SWB in the educational context is presented in the model of Tian (2015), based on the widely used model of general SWB by Deiner (1994). Diener's model of

SWB includes a cognitive component presented as satisfaction with life and a component presented as positive and negative affect. A high level of subjective wellbeing denotes elevated life satisfaction and a harmonious balance of positive and negative affect in response to life events (Diener, 1994). Tian's model follows this structure and describes SWB in school through concepts of school satisfaction and affect towards school. School satisfaction refers to the cognitive evaluation of one's school experience, e.g., the learning process, and relationships with classmates. Affect towards school is the volume of experiencing positive or negative emotions directly during the school day. Tian's model became the foundation for the development of the tool for measuring SWB in school (Tian et al., 2015). The model is designed to capture the level of school satisfaction, including satisfaction with relationships with teachers and peers, satisfaction with the school environment, and satisfaction with one's own achievement. Besides that, the tool measures the level of positive and negative affect towards school. Moreover, Tian's model was used in search of connection of SWB in school with goal orientations (Tian et al., 2017), school belonging (Tian et al., 2016), and prosocial behaviour (Chen et al., 2020).

The primary strength of Tian's model lies in its explicit focus on the educational context. Both the model and its measurement instrument are designed to assess students' attitudes toward their school experience. This school-specific approach differs from studies on students' SWB that rely on general wellbeing scales (Bücker et al., 2018; Chattu et al., 2020; Datu & King, 2018; Putwain et al., 2020; Özdoğan, 2021). By concentrating on environmental factors within the school setting, it allows researchers to capture aspects of SWB that are directly related to the educational process. However, Tian's model presents limitations as a key model in our research. In particular, it focuses on relationships with teachers and students with only two questions on overall relationship satisfaction, which is clearly insufficient to understand the deeper patterns and reasons that affect the experience of relationships in an educational context and wellbeing.

Another approach, suggested by Konu and Rimpela (2002), is based on the Allardt (1993) concept of "welfare" and describes SWB in school through the categories of "loving," "having," and "being." These categories represent aspects of school experience that are included in SWB. "Loving" refers to social relationships, "having" to school conditions, and "being" to means of self-fulfilment. One can see that both approaches recognise social relationships as a part of SWB in the educational context. However, these models do not investigate in depth the relationships with teachers and peers, giving only a little information about the content of social relationships and their possible impact on SWB in the educational context.

As noted, social relationships in the educational context are highly context dependent (Hagenauer & Volet, 2014). The change in the learning environment after the transition from school to university may impact the nature of social relationships. As stated by sociocultural theory, the shift from school to university leads from an orientation on personal relationships to an orientation on professional relationships (El'Konin, 1999; Vygotsky, 2017). We assume that the content of social relationships in the university context regarding SWB can include not only the emotional component of these relationships, as presented in the existing models (Konu & Rimpelä, 2002; Tian et al., 2015), but also aspects connected to professional and academic growth.

These suggestions are partially supported by research on social relationships within universities. For instance, summarising research findings on teacher-student relationships in higher education, Hagenauer and Volet (2014) identified two dimensions of these relationships: the support dimension and the affective dimension. The affective dimension, represented by personal relationships, specifically between teachers and students, is widely acknowledged as crucial to students' positive perceptions of the learning environment, evaluation of teaching quality, and overall subjective wellbeing (Bağriacık Yılmaz, 2022; Hagenauer & Volet, 2014; Tackie, 2022; Tormey, 2021). However, studies of social relationships in higher education also underlined the importance of relationships between students and teachers that focused on the learning process specifically (support dimension). Proper preparation of study materials, high-quality feedback, and expectations towards students' academic success may impact their learning experience (Bağriacık Yılmaz, 2022; Hattie & Timperley, 2007). It is shown that, when perceived as satisfactory from the perspective of support, relationships with teachers impact students' academic achievement (Kiltz et al., 2020; Murray-Harvey, 2010) and students' satisfaction with courses and studies (Tormey, 2021).

On the other hand, studies on relationships among peers in higher education and school have shown quite similar results about connections between peer relationships and learning outcomes. Thus, relationships with peers contribute to university adjustment, a sense of belonging (Maunder, 2018), academic motivation, and satisfaction with their education (McCabe, 2022). However, though similar types of connections are seen between social relationships with peers in school and university contexts, the nature of these relationships may differ substantially. As with relationships with teachers, peer relationships at university are significant, not only in forming friendships but also take on a greater orientation towards networking for future careers and co-curricular activities (El'konin 1999).

The existing literature gives us an understanding of the role of social relationships in university students' learning experiences and outcomes, their mental health, and their general wellbeing. However, the studies do not delve into the direct educational context and its components (e.g., learning environment, curriculum, or learning achievements) that may be important in terms of SWB in university. On the other hand, as noted, the available SWB models do not adequately explore the issue of relationships within the educational context. In addition, since the models are built to study well-being in a school context, they do not include issues related to the professional focus of relationships that may be important for university students. Thus, there is some gap in understanding the contribution of direct relationships with teachers and peers to subjective well-being at university.

In order to describe the role of social relationships with faculty and peers in the context of online learning at the university, it is important, in addition to a general picture of the role of social relationships, to understand what research says about the dynamics of these relationships in the online environment in general.

### ***Relationships with Peers and Teachers in Online Education***

Research on social interactions in online university learning commonly examines how instructional design, technological tools, and specific teacher characteristics contribute to the quality of online education (Bağriacık Yılmaz, 2022; Wallace, 2003). In addition, studies

investigate how students and teachers perceive these interactions and how such perceptions relate to their subjective wellbeing (Hopwood, 2022; O'Shea et al., 2015; Tackie, 2022; Tichavsky et al., 2015).

Research emphasises the key role of the teacher in shaping a positive online learning experience. For example, studies have shown that a lack of established online communication aligned with the teacher, a lack of a learning environment organised specifically for the online format, and perceived unfriendly attitudes of teachers played an important role in dissatisfaction with the online learning process and engagement in the process (Hopwood, 2022; O'Shea et al., 2015). It has been noted that the teacher's mastery of online tools and technology for lessons also plays an important role (Bağrıacık Yılmaz, 2022; Wallace, 2003). The teacher is the central figure who facilitates and engages students in the learning process, including communication (O'Shea et al., 2015; Wallace, 2003).

Overall, although the cited studies have shown that students in online learning often experience difficulties in building relationships with peers (Berry, 2019; Foley & Marr, 2019; Hopwood, 2022) and teachers (Hopwood, 2022; O'Shea et al., 2015; Tichavsky et al., 2015), it is important to consider that the findings of these studies can be significantly context-dependent (Hagenauer & Volet, 2014).

In addition to general cultural and age factors, these contexts of social relationships include the format of online learning and its place within the integral structure of the university itself. For instance, research on asynchronous university online programmes (O'Shea et al., 2015) showed that students felt excluded from the student community due to a lack of organisation of their studies by the university and faculty members. That contributed to their dissatisfaction with social interactions because of the disorganised process of communication with teachers and peers through e-mails and unmoderated forums. On the other hand, research on students who studied online synchronously during the pandemic revealed that relationships with teachers and peers were perceived as low-quality due to unorganised interactions during the classes, the unfriendly attitude of teachers, and the necessity, rather than choice, of studying in an online format (Hopwood, 2022). We can see that different formats (synchronous and asynchronous) bring different challenges to students' interactions with teachers and peers. Thus, the asynchronous format, on the one hand, can affect the sense of community and connection with teachers (O'Shea et al., 2015). And in synchronous learning, instructor involvement in the process and students' own motivation to learn in this format played a major role in relationship satisfaction (Hopwood, 2022).

Thus, we see that social relationships play a role in the experience of satisfaction with the learning process, but the data on how this satisfaction depends on the online learning format do not give a clear picture. The literature review revealed that the context in which these relationships are realised is especially important (Hagenauer & Volet, 2014; O'Shea et al., 2015; Hopwood, 2022). Therefore, to see how these relationships unfold and what role they play in the experience of well-being in students who are both fully distance learners and regular undergraduate students, we need to delve into the direct experience of these students.

## Methods

To answer research questions and study personal students' experiences and their perceptions of social aspects of SWB in university, a qualitative methodology was chosen. Qualitative methodology was essential for gaining deeper insights into our research topic, given the limited existing research on SWB in university among students in online programs and the lack of suitable quantitative tools for measuring SWB in a specific university environment.

### *Current Study*

#### The Aim and Research Questions

This study aimed to understand the role of social interactions for the SWB in university of undergraduate students in a synchronous online programme. Specifically, what aspects of social interactions these students value and whether they are satisfied with the quality of social interaction they experience within the learning environment.

As noted, the lack of a comprehensive model of SWB renders the content and place of social relationships in SWB unclear. Thus, before exploring the attitude of students towards the quality of social relationships while studying online, we investigated their experience of SWB in university and what aspects of social relationships are considered integral to it. Our first research question was: "What aspects of interactions with peers and teachers are considered a part of SWB by university students enrolled in synchronous online programmes?"

The second research question was specifically connected to the experience of online learning and its perceived impact on participants' SWB. The second research question was: "How do students perceive the impact of online format on their satisfaction with social relationships with teachers and peers?"

To better understand the context of our study, the following section provides a description of the specific educational context of study participants.

#### The Context

This study was conducted in 2022 at a highly selective Russian university, the nation's only institution offering a fully remote undergraduate programme when the study was conducted. This programme, equivalent to the structure and requirements of the university's on-campus programmes, adheres to national standards for undergraduate degrees, encompassing credit requirements, disciplines, contact hours, and learning objectives. Students enrolled in this programme study for four years and engage in synchronous online lectures and seminars according to the schedule established by the faculty. Students' assessments follow the same university-wide guidelines as other on-campus programmes. The key difference between this programme and traditional on-campus programmes lies in its fully remote format. While both formats use various online tools (such as online classrooms, forums, and boards), the remote programme exclusively relies on these tools for all classes and interactions. Students in traditional programmes, on the other hand, are physically present on campus, engaging in face-to-face interactions with faculty and staff. While the use of online tools is increasingly common



in traditional programmes, the reliance on these tools for all aspects of learning is unique to this fully remote programme. Upon graduation, students receive the same undergraduate degree and university diploma as their on-campus counterparts.

The context of our participants' study, a fully synchronous online programme with mandatory attendance requirements, may provide an additional perspective on the role of social relationships in SWB of students learning online. This format, which emphasises real-time engagement, may help reduce some challenges that were previously linked to passive lecturing (O'Shea et al., 2015) because teachers need to participate actively in classes synchronously. Moreover, participants' choice of this online format could influence their perceptions of social relationships. They may have entered the programme with particular expectations regarding interaction, potentially facilitating their adaptation to the specific constraints of online communication.

Therefore, this study provides an opportunity to examine the role of social relationships on the SWB of students within a fully synchronous online learning environment, considering the specific factors of mandatory attendance and the participants' choice of this format.

### ***Participants***

Participants were selected based on convenience sampling procedures and comprised eight second year undergraduate students (male = 5, female = 3, age range 18 - 29), enrolled in a synchronous online computer science programme. We decided to use eight respondents because at the 8th participant, themes became redundant and no new insights were found. In other words, data saturation began to be observed, which, in general, allows us to stop collecting data and start analysing (Bekele & Ago, 2022; Sargeant, 2012).

To cover the topic more broadly, we recruited participants with various educational backgrounds and experience with online education. Thus, there were three students who enrolled in the online programme straight out of high school and five participants who had already experienced campus learning at the university. We suggested that participants who had prior experience with traditional, on-campus university education might offer valuable insights into their perceptions of the differences between online and face-to-face communication with both teachers and peers.

During the interview, we asked participants for information about their previous online learning experiences to explore possible original expectations and prejudgments towards online learning that could influence their current perception of social aspects of SWB during the present online programme study. Seven participants had experience with asynchronous online courses and remote learning during COVID-19. A more detailed description of the sample is presented in Table 1.

**Table 1***Characteristics of Participants*

| N   | Age (gender) | Educational background<br>(before enrolling the<br>programme) | Experience of online-learning                   |
|-----|--------------|---------------------------------------------------------------|-------------------------------------------------|
| P1* | 20 (female)  | 1 year of UD**                                                | online courses, remote learning during COVID-19 |
| P2  | 19 (male)    | High School                                                   | online courses, remote learning during COVID-19 |
| P3  | 22 (female)  | 3 years of UD                                                 | remote learning during COVID-19                 |
| P4  | 18 (male)    | High School                                                   | online courses, remote learning during COVID-19 |
| P5  | 18 (male)    | High School                                                   | online courses, remote learning during COVID-19 |
| P6  | 20 (male)    | 1 year of UD                                                  | online courses, remote learning during COVID-19 |
| P7  | 29 (male)    | 4 years of UD (not finished)                                  | online courses                                  |
| P8  | 23 (female)  | 2 years of UD                                                 | remote learning during COVID-19                 |

\*P - participant

\*\*UD - undergraduate degree

***Data Collection Procedure***

Data for this study were collected at the beginning of students' second year of study through individual semi-structured interviews focused on participants' learning experiences in an online programme. The interview guide consisted of four sections, including informed consent and consent to record the interview, questions about participants' educational background and experience with online learning, core questions about SWB in university, and a final section for participant feedback and additional questions.

The core questions of the interview included topics about (1) overall participant experience of SWB in university, (2) perception of the value of the social aspect of subjective wellbeing in university and its content, and (3) perception and satisfaction with the quality of the social relationships in relation to their experience on an online programme. The examples of questions for each topic are presented in Table 2.

**Table 2***Examples of the Interview Questions*

| Topic                                                                            | Example                                                                                                                                    |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Overall participant experience of SWB in university                              | What, in your opinion, should be present in the university environment to make your studying process psychologically comfortable?          |
| The value of the social aspect of SWB in university and its content              | Is there something in communication with others (teachers or students) that is important for your wellbeing in the university environment? |
| Satisfaction with the quality of the social relationships during online learning | Do you feel that the online format of your study affects the quality of your relationships with teachers and other students?               |

For future analysis, the interviews were transcribed into text format, with all personal information about the participants removed for anonymity and confidentiality purposes.

***Data Analysis***

The obtained data were analysed using the thematic analysis method according to the guidelines provided by Braun and Clarke (2006). Our research aimed to uncover and analyse general trends in how participants perceive social relationships rather than conducting detailed examinations of specific phenomena or language usage. Therefore, thematic analysis was chosen over phenomenological or discourse analysis as the most optimal method, allowing us to uncover overarching themes within the data (Braun & Clarke, 2006).

The thematic analysis method included the following phases: (1) familiarisation with the data; (2) coding the main elements in the texts; (3) synthesising the codes into themes; (4) review of the themes; (5) identifying and naming themes; and (6) describing the findings.

To establish the main ideas and recurring keywords, interviews were read twice. First, the author read each interview to acquire an overall understanding of the text. Second, each interview was analysed more closely, with the main ideas and key repeated words highlighted. This initial coding process was conducted manually and assisted by Atlas.ti© software, which generated additional codes.

Next, codes produced by the author and the software were compared and assessed to acquire a broader perspective on the text's content. These codes were then renamed to be more comprehensive and clearer.

Subsequently, codes were combined into sub-themes and themes within each interview. The themes from all interviews were then examined and refined based on their relevance to the research questions and aim of the study.

In the final step, all themes and sub-themes were merged into a single table, providing a comprehensive overview of the findings across all interviews.

## Results

Our results have shown that social relationships appeared as the primary topic in regard to students' SWB from the start of the interviews when participants were asked about the crucial components of their SWB. Two main themes emerged in the topic of relationships with teachers, and two main themes in relationships with peers. Table 3 summarises the themes and sub-themes derived from our analysis. The themes connected specifically with online learning were firmly intertwined with topics of social relationships in the participants' narratives. Therefore, we decided not to divide these themes into separate results of analysis but to describe them within the general context of social relationships.

**Table 3**

### *Results of Thematic Analysis*

| Theme                       | Subtheme                                                     | Codes                                                                                                                                |
|-----------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Relationships with teachers | Support dimension                                            | additional study activities                                                                                                          |
|                             |                                                              | feedback                                                                                                                             |
|                             |                                                              | availability outside class                                                                                                           |
|                             | Affective dimension (respectful and understanding treatment) | absence of dismissive or aggressive attitude<br>personalised approach to students<br>consideration of students' subjective wellbeing |
| Relationships with peers    | academic communication                                       | collaborative academic activities outside class<br>discussion of study materials outside class                                       |
|                             |                                                              | personal relationships                                                                                                               |
|                             | extracurricular communication                                | university events                                                                                                                    |

### *Relationships with Teachers*

Six out of the eight participants highlighted the importance of their relationships with teachers in relation to their SWB in university. They expressed that a lack of substantial interaction with teachers, both within and outside of the curriculum, would significantly increase their stress levels and decrease their motivation to engage with specific courses.

Their responses revealed two main themes, which we decided to name in alignment with the Hagenauer and Volet (2014) model, emphasising the affective dimension and the support dimension, based on the content of the respondents' answers. The support dimension encapsulates the practices adopted by teachers to aid students in achieving academic success, such as the quality of feedback and the preparation of study materials. The affective dimension concerns the quality of the interpersonal relationship between teachers and students, encompassing emotional aspects. In our study, participants referred to it as "respectful and understanding treatment."

In our study, the support dimension was represented by teachers' additional activities outside of the classroom, the quality of teachers' feedback, and the availability of teachers outside of class.

Feedback was considered by all eight participants as a central part of their perception of the quality of relationships with teachers. Meaningful, personalised, and prompt feedback gave participants a sense of reassurance and reduced anxiety associated with the course collection. Students acknowledged that regular feedback showed them the teacher's readiness to assist them if they encountered any difficulties with the course material, giving them a sense of security. For instance, P1 noticed that untimely feedback makes a teacher look "unapproachable, and in the end, [she felt] like there is no sense in asking him/her something."

Additionally, participants highlighted other themes related to extracurricular activities (e.g., additional "Q&A" sessions) and the willingness of educators to engage with students beyond the classroom setting. These themes resonate with the concept of approachability, as described by Hagenauer and Volet (2014). When discussing the approachability of teachers, participants emphasised the importance of being able to connect with educators to seek clarification on the subject, discuss assignments, or address organisational queries. Participants acknowledged that "it is nice to know that he/she is ready to answer your questions and help you if you have any struggles before it's too late" (P1) and "when the professor tells you that you can reach him/her for extra study sessions [...] inspires me" (P2).

When discussing educators' willingness to engage outside of regular class hours, some participants highlighted the potential for networking "not only with other students but with professors as well, because a lot of them are working in actual companies" (P7). Also, it was suggested that it is important to "talk not only about our courses but also about other professional topics I'm interested in" (P6).

The support dimension, represented by teachers' approachability and engagement, had an impact on students' SWB by providing a sense of support and security about study. Each described component was perceived by students as a teacher's investment of time and effort,

indicating that students felt valued and recognised as active participants in their educational process. For instance, P2 recognised that he felt “really steady knowing that they [teachers] care and are interested in giving you knowledge.”

The affective dimension in our results was specifically represented by positive and respectful behaviour, a personalised approach and attention to students’ personal problems, and care for students’ SWB. When discussing key elements contributing to their SWB, respondents highlighted the emotional component of their interactions with instructors. Specifically, participants were speaking about communication with teachers without “fear of being ridiculed” (P6) and “extra formalism” (P8). Participants who had prior university experience recalled unfavourable incidents such as public reprimands and humiliation, underscoring the significant impact of negative experiences on their subjective wellbeing and stress levels. “It’s really psychologically hard when you realise that at any moment a teacher can raise their voice at you and somehow humiliate you in front of everyone for making a mistake or being late for a class” (P8).

In addition to highlighting the importance of a safe environment, three students emphasised the value of instructors recognising the potential for difficult personal circumstances in students’ daily lives. The opportunity to complete additional assignments, which allowed students to catch up on the material, strengthened their motivation to continue studying and reduced their anxiety. This reflected their sense that the instructor was supportive and committed to providing the knowledge needed for their success.

Based on the existing research (Hopwood, 2022; O’Shea et al., 2015; Tichavsky et al., 2015), it was expected that students in an online programme would experience a lack of relationships with teachers or indicate its low quality. However, most students did not identify these deficiencies, attributing the quality of communication and available support to being superior in the online format, especially regarding prompt and detailed feedback and instructor availability outside class. Six participants highlighted that distance learning not only provided more options for engagement but also facilitated efficient and immediate communication with instructors, contributing to their overall satisfaction.

It can be inferred that the initial organisation of distance learning facilitated the selection of instructors capable of providing satisfactory support by leveraging digital literacy. Moreover, the online communication format, which is not reliant on physical presence, incentivises instructors to engage promptly and efficiently with students.

In terms of the affective dimension, respondents indicated that they felt comfortable and were satisfied in their current place of study, but they did not attribute this to the format of teaching but more to the specifics of the university and teachers’ personal traits.

### ***Relationships with Peers***

When considering the social aspect of their SWB, students emphasised not only their relationships with teachers but also the importance of socialising with other students. Their responses centred on two primary themes: academic communication, which included mutual

assistance in studying outside of class and the discussion of academic material, and personal communication beyond the classroom.

In discussing peer relationships, participants focused more on the transformations of these connections in distance learning, unlike their discussions about relationships with instructors, where participants were referring to their SWB. While students found relationships with instructors to be a pivotal aspect of their SWB, irrespective of the learning format, they expressed concerns about deficits in their peer relationships in the context of distance learning.

Respondents explicitly identified in-person interactions with peers outside of school hours as the most significant contributors to their subjective wellbeing. This observation was pronounced among respondents with prior university experience, who noted a contrast in their sense of belonging within specific study groups and the broader student community when compared to their previous university life.

Six respondents expressed a sense of loneliness and isolation because of limited face-to-face communication, which in turn diminished their overall sense of SWB. Participants highlighted the challenge of lacking a unifying physical environment that hindered spontaneous communication and necessitated an initiative-taking approach.

P2: It's easier to say something or to join a conversation when you are offline. For instance, when two people are talking, someone else can spontaneously join them. When two people are talking online, they use direct messages, where no one can join them.

Moreover, remote learning has diminished their feeling of “any university atmosphere” (P4) as it restricts their ability to participate in student events organised by the university or department. Consequently, students experience a sense of detachment from the student community. “There was no sense of connection in such [online] format. There was no sense of friendship, no feeling of another human. And sometimes there was nothing to say to someone just because I didn't feel a connection” (P4).

However, despite experiencing a lack of social interaction with their peers, most respondents (six out of eight) did not express overall dissatisfaction with the current programme. While describing their experience, participants mentioned that communication about academic topics is a way of coping with a sense of loneliness and detachment from peers in an online format. They indicated that engaging in online discussions about academic subjects contributed to their sense of lively interaction and served as a source of motivation for their studies.

P8: For instance, I remember how someone dropped a Discord link and wrote: “Hey, we are going to do our homework together tonight.” It was cool, to be honest. Because even if you planned to do your homework later or didn't plan to do it at all, this kind of thing could motivate you to join the team and get the work done.

Additionally, organising extracurricular learning activities diminished their apprehension about their academic progress, especially when they were unable to actively engage in real-time discussions during class.

P3: Sometimes I just sit and look at some course materials and think, “Probably I’m too dumb and can’t understand anything. Probably I should just quit.” But then I write in the course chat and see that a lot of people don’t understand something. And I start to feel better, realising that maybe it’s about the course difficulty and not about my intelligence.

Moreover, respondents who had already had experience with university learning indicated that the absence of extracurricular student activities did not significantly impact their current SWB. First, they particularly expressed that their motivation for choosing the programme related to getting a high-quality education at one of the leading universities in the country. Second, they “don’t need any active campus life [since they] had it enough already” (P3).

Thus, for some participants, a lack of peer-to-peer communication was compensated by their positive relationships with teachers as well as their perception of the quality of education they were receiving. While participants articulated their desire for closer peer relationships, they also noted that they were able to offset this by interacting with individuals outside the university. Additionally, they emphasised that, despite the absence of a shared sense of unity, they were still able to establish closer personal connections. Furthermore, they found solace in academic communication, which served as a common foundation for all interactions among students in the programme.

## Discussion

This study investigated the role of social relationships within subjective wellbeing (SWB) among undergraduate students enrolled in a synchronous online programme. Drawing on Tian’s (2017) definition, SWB was defined as the subjective evaluation of satisfaction and emotional experiences within the university context. The study aimed to explore aspects of social relationships perceived as influencing SWB and examine the impact of the online learning context on these perceptions. We argued that investigating specific online formats may broaden our understanding of the role and content of social relationships in both online learning and the structure of SWB in the university setting. The results of the study have shown that social relationships play a crucial role for students regarding their SWB.

Teachers’ feedback was acknowledged as the central part of participants’ satisfaction with their relationships with teachers. In line with existing literature, high-quality feedback was described by respondents as prompt and detailed (Hattie & Timperley, 2007; Nelson & Schunn, 2009; Thurlings et al., 2013). Consistent with prior research emphasising the significance of feedback in fostering student motivation, a positive mindset, and an overall positive learning environment (Thurlings et al., 2013; Nelson & Schunn, 2007). Our findings have further demonstrated that high-quality teacher feedback also reduced participants’ anxiety regarding course completion and fosters a perception of teacher approachability. The perception of students regarding the quality of feedback they receive plays a crucial role in their overall



satisfaction with the relationship they share with their teachers, which contributes to the cognitive component of their subjective wellbeing (Tian et al., 2015). Additionally, effective feedback that addresses students' anxieties fosters a sense of support and care from the instructors and minimises negative experiences while promoting positive ones can be linked to the affective component of subjective wellbeing (Tian et al., 2015).

Accessibility outside of class and additional academic activities can be considered part of the concept of teachers' approachability. Approachability was also frequently described as essential for facilitating positive teacher-student relationships (TSR) (Hagenauer & Volet, 2014). Our results supported these studies, showing that students consider teachers' approachability as part of their TSR regarding SWB in university. The possibility of reaching out to teachers outside the class and discussing their study difficulties gave the participants a feeling of support and reassurance.

Studies showed that the emotional component plays an essential role in such concepts of teacher-student relationships as "care" and "closeness." According to studies, experience of care and closeness helps students perceive relationships with teachers as positive and see a teacher as "good" (Tormey, 2021; Tackie, 2022; Hagenauer & Volet, 2014). Participants also noted that acknowledgement of their personal circumstances and care for their subjective wellbeing by teachers increased their sense of security, trust, and motivation for further study and course completion.

In online learning studies, relationships between students and teachers mostly showed dissatisfaction among students with the quality of such relationships. Such interactions were perceived as more distant (Tichavsky et al., 2015; Bağrıacık Yılmaz, 2022), awkward, and unorganised (Hopwood, 2022). Additionally, students experienced feelings of isolation and discomfort from interacting with instructors in a distance format (Vagos & Carvalhais, 2022). Our findings revealed that participants were satisfied with their relationships with teachers. They noticed that online formats provide some features for communication that were not available for those who studied on campus before, such as using messengers for prompt communication.

The divergence of results can be explained through the context dependency of social relationships. As previously noted, the online programme our participants are enrolled in is considered a full-time programme of the university that meets all official requirements of the university. Teachers on the programme are obliged to be skilled in online teaching to work with these students. As studies showed, teachers' variety of skills in using technology both in teaching and communication are considered a part of students' satisfaction with their teachers' relationships online (Bağrıacık Yılmaz, 2022; O'Shea et al., 2015). Thus, it may be possible that the university requires teachers of the investigated online programme to have a certain level of skill in using technology, which reduces the possibility of the emergence of dissatisfaction with relationships with teachers due to their lack of digital literacy.

Moreover, investigating student engagement in online learning at the university, O'Shea et al. (2015) demonstrated that students also start to feel detached from the learning process when lecturers become non-responsive or "disappear," leaving students alone in their study

process. In our research, teachers are required by the university to attend classes that occur in synchronous format, which creates an environment for student-teacher interaction and decreases the possibility of teachers “disappearing.” In addition, teachers who are proficient with technology may organise study groups and chats that facilitate closer interaction between students and teachers during course completion, which involves more students in discussion and increases the feeling of approachability of a teacher (Kasperski & Blau, 2023). Therefore, the way in which student-teacher communication is externally organised, along with specific technological competency requirements for teachers, may partially explain why participants in our study reported feeling satisfied, contrary to the findings of other studies. Thus, our hypothesis about the possible shift of accents due to format and context and satisfaction with the student-teacher relationship may have a basis for future investigation.

The second main part of the social aspect of SWB—relationships with peers—was mostly described by participants as deficient in online study. After analysing their answers, we identified two main subtopics: academic and extracurricular communication. Academic interactions were mainly about communication about learning materials and collaborative study activities outside the class. Extracurricular communication included establishing personal relationships with peers and attending university events.

Regarding peer-to-peer interactions within the online environment, our results mostly correspond to the existing body of research. Studies indicate that students studying online usually report feelings of loneliness and isolation (Foley & Marr, 2019), awkwardness, and detachment from groupmates (Hopwood, 2022). Our participants also noted that they experienced a lack of social interactions with their peers, which they viewed as a disadvantage. The lack of peer interaction in the course, as reported by respondents, contributed to feelings of isolation and loneliness. This can impact overall SWB, as studies have shown a correlation between loneliness, negative affect, and decreased life satisfaction (Özdoğan, 2021). One of the main reasons students named was the lack of possibility for spontaneous communication due to the absence of a common environment that made such communication possible while studying on campus (Berry, 2019).

However, communication regarding participants’ studies and learning experiences served as a common ground for interactions and facilitated their motivation for organising collaborative activities. Consequently, such activities decreased the feeling of detachment and gave a sense of closer, more lively communication. Examining the findings, we propose that future research on subjective well-being in the university context might explore alternative ways to design the online environment, with a particular emphasis on creating opportunities for students to engage in a broader range of activities beyond their academic pursuits. This could involve designing strategies to facilitate and promote not only academic activities, but also extracurricular engagements, which have been shown to contribute to students’ subjective wellbeing.

Although participants recognised the limited social interactions with peers and expressed a desire for a closer sense of community, most reported overall satisfaction with the programme. Many emphasised that their primary goal was to obtain a high-quality education at a leading university, and therefore they had anticipated potential drawbacks related to social interaction

when choosing an online format. A similar result was found by O'Shea et al. (2015), where adult students did not perceive the lack of interactions with peers because of their main goal of getting a degree.

Thus, in answering our first research question about the content of social relationships in SWB, several topics were emphasised. The aspects of relationships with teachers were described as important: teachers' feedback, accessibility outside of class, additional academic activities organised by teachers, positive attitude, personalised approach to students, and consideration of students' subjective wellbeing. Important aspects of SWB in relationships with peers were collaborative academic activities outside class, discussion of study materials outside class, establishing close personal relationships, and participation in university events.

Regarding our second research question about students' online programme satisfaction with the quality of their social relationships, our results have shown that in the specific context of online studying, our participants were not dissatisfied with relationships with teachers. However, they acknowledged the notable lack of interactions with peers. This lack caused dissatisfaction with the relationships but did not affect their overall perception of the study process as positive.

Our results may contribute to the existing body of research about teacher-student and peer-peer relationships in online programmes at universities, raising questions about the impact of context on the reception of social interactions online in higher education. The possible findings of future larger-scale studies may become the basis for the development of recommendations for teachers and the administration of such programmes and faculties to increase student's levels of satisfaction with social relationships.

Moreover, research can be useful for future investigations of SWB beyond online education. In the existing models of SWB in the education context, relationships with teachers and peers are included in the aspect of satisfaction with school (Tian, 2015) but have not been investigated in depth. In another model of SWB in school, presented by Kanonire et al. (2019), relationships with classmates were separated into distinct parts of the model, based on the importance of peer-to-peer relationships for elementary school children. Existing models of SWB in the educational context describe schoolchildren's experiences and do not reflect the specifics of social relationships among university students.

Specifically, the role of academic communication and its importance to SWB are not explored in the existing models. First, our result showed that social relationships are perceived as a crucial part of students' SWB and relate to both cognitive (satisfaction) and affective (positive and negative emotions) components of SWB in an educational context and can be considered a separate part of the SWB model. Second, academic communication may also be included in the social relationship part of SWB as an important aspect of communication with teachers and peers. Based on these results, we propose that future research on subjective wellbeing in university settings should consider examining the role of teacher feedback, the quality of extracurricular academic communication, and the influence of the university environment on social relationships. These factors could be included as variables in models of subjective wellbeing and potentially integrated into future measurement tools, allowing for a

more comprehensive understanding of the complex factors that influence students' subjective wellbeing.

## **Conclusion and Limitations**

Summarising our results, we can see that both relationships with teachers and peers are perceived by students of online programmes as part of their SWB. Supportive, attentive, and emotionally positive relationships with teachers give students a sense of confidence and security and increase their motivation to further course completion. The online format of learning was not identified as a factor that could decrease the level of satisfaction with these relationships. On the contrary, relationships with peers, acknowledged as an important part of SWB as well, are seen as insufficient in the online format. Although our participants expressed dissatisfaction with the quality of peer-to-peer contact in the distance format, this aspect of the learning experience did not appear to impact their overall sense of satisfaction with distance learning.

Despite the limitations of our small sample size and the focus on students with prior university experience, our exploratory study provides a valuable starting point for further research into the factors that contribute to SWB in online university environments. By understanding the nuances of social relationships within these programs, we can work towards creating more supportive and fulfilling learning experiences for all students.

## **Declarations**

The article was prepared within the framework of the HSE University Basic Research Program.

## References

- Allardt, E. (1993). Having, loving, being: An alternative to the Swedish model of welfare research. In M. Nussbaum & A. Sen (Eds.), *The quality of life* (pp. 88–94). Oxford University Press. <https://doi.org/10.1093/0198287976.003.0008>
- Bağriacık Yılmaz, A. (2022). Teacher-student interaction within the context of online teaching and learning: In A. S. Zimmerman (Ed.), *advances in educational technologies and instructional design* (pp. 1–20). IGI Global. <https://doi.org/10.4018/978-1-6684-8407-4.ch001>
- Bekele, W. B., & Ago, F. Y. (2022). Sample size for interview in qualitative research in social sciences: a guide to novice researchers. *Research in Educational Policy and Management*, 4(1), Article 1. <https://doi.org/10.46303/repam.2022.3>
- Berry, S. (2019). The offline nature of online community. *The International Review of Research in Open and Distributed Learning*, 20(2). <https://doi.org/10.19173/irrodl.v20i2.3896>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bücker, S., Nuraydin, S., Simonsmeier, B. A., Schneider, M., & Luhmann, M. (2018). Subjective well-being and academic achievement: A meta-analysis. *Journal of Research in Personality*, 74, 83–94. <https://doi.org/10.1016/j.jrp.2018.02.007>
- Chattu, V. K., Sahu, P. K., Seedial, N., Seecharan, G., Seepersad, A., Seunarine, M., Sieunarine, S., Seymour, K., Simboo, S., & Singh, A. (2020). Subjective well-being and its relation to academic performance among students in medicine, dentistry, and other health professions. *Education Sciences*, 10(9), 224. <https://doi.org/10.3390/educsci10090224>
- Chen, X., Tian, L., & Huebner, E. S. (2020). Bidirectional relations between subjective well-being in school and prosocial behavior among elementary school-aged children: A longitudinal study. *Child & Youth Care Forum*, 49(1), 77–95. <https://doi.org/10.1007/s10566-019-09518-4>
- Datu, J. A. D., & King, R. B. (2018). Subjective well-being is reciprocally associated with academic engagement: A two-wave longitudinal study. *Journal of School Psychology*, 69, 100–110. <https://doi.org/10.1016/j.jsp.2018.05.007>
- Diener, E. (1994). Assessing subjective well-being: Progress and opportunities. *Social Indicators Research*, 31(2), 103–157. <https://doi.org/10.1007/BF01207052>
- el'konin, d. b. (1999). Toward the problem of stages in the mental development of Children. *Journal of Russian & East European Psychology*, 37(6), 11–30. <https://doi.org/10.2753/RPO1061-0405370611>
- Foley, K., & Marr, L. (2019). Scaffolding extracurricular online events to support distance

- learning university students. *Journal of Interactive Media in Education*, 2019(1), Article 1. <https://oro.open.ac.uk/66936/>
- Hagenauer, G., & Volet, S. E. (2014). Teacher–student relationship at university: An important yet under-researched field. *Oxford Review of Education*, 40(3), 370–388. <https://doi.org/10.1080/03054985.2014.921613>
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112. <https://doi.org/10.3102/003465430298487>
- Hopwood, I. (2022). Peerless? How students’ experience of synchronous online teaching can disrupt the development of relationships to peers, teachers, subject and self. *Research and Practice in Technology Enhanced Learning*, 18, 007. <https://doi.org/10.58459/rptel.2023.18007>
- Kanonire, T. (2019). Subjective well-being of primary school students with different achievement levels. *Psychology. Journal of Higher School of Economics*, 16(2), 378–390. <https://doi.org/10.17323/1813-8918-2019-2-378-390>
- Kanonire, T., Federiakin, D. A., & Uglanova, I. L. (2020). Multicomponent framework for students’ subjective well-being in elementary school. *School Psychology*, 35(5), 321–331. <https://doi.org/10.1037/spq0000397>
- Kasperski, R., & Blau, I. (2023). Social capital in high-schools: Teacher-student relationships within an online social network and their association with in-class interactions and learning. *Interactive Learning Environments*, 31(2), 955–971. <https://doi.org/10.1080/10494820.2020.1815220>
- Kiltz, L., Rinas, R., Daumiller, M., Fokkens-Bruinsma, M., & Jansen, E. P. W. A. (2020). “When they struggle, I cannot sleep well either”: Perceptions and interactions surrounding university student and teacher well-being. *Frontiers in Psychology*, 11, 578378. <https://doi.org/10.3389/fpsyg.2020.578378>
- Konu, A., & Rimpelä, M. (2002). Well-being in schools: A conceptual model. *Health Promotion International*, 17(1), 79–87. <https://doi.org/10.1093/heapro/17.1.79>
- Korhonen, J., Linnanmäki, K., & Aunio, P. (2014). Learning difficulties, academic well-being and educational dropout: A person-centred approach. *Learning and Individual Differences*, 31, 1–10. <https://doi.org/10.1016/j.lindif.2013.12.011>
- Maunder, R. E. (2018). Students’ peer relationships and their contribution to university adjustment: The need to belong in the university community. *Journal of Further and Higher Education*, 42(6), 756–768. <https://doi.org/10.1080/0309877X.2017.1311996>
- McCabe, J. (2022). Peer relations and friendship among postsecondary students. In J. E. Côté & S. Pickard, *Routledge Handbook of the Sociology of Higher Education* (2nd ed., pp. 132–144). Routledge. <https://doi.org/10.4324/9781003262497-13>

- Murray-Harvey, R. (2010). Relationship influences on students' academic achievement, psychological health and well-being at school. *Educational and Child Psychology*, 27(1), 104–115.
- Nelson, M. M., & Schunn, C. D. (2009). The nature of feedback: How different types of peer feedback affect writing performance. *Instructional Science*, 37(4), 375–401. <https://doi.org/10.1007/s11251-008-9053-x>
- O' Shea, S., Stone, C., & Delahunty, J. (2015). "I 'feel' like I am at university even though I am online." Exploring how students narrate their engagement with higher education institutions in an online learning environment. *Distance Education*, 36(1), 41–58. <https://doi.org/10.1080/01587919.2015.1019970>
- Özdoğan, A. Ç. (2021). Subjective well-being and social-emotional loneliness of university students: The mediating effect of the meaning of life. *Journal of Pedagogical Research*, 5(1), 18–30. <https://doi.org/10.33902/JPR.2021066865>
- Putwain, D. W., Loderer, K., Gallard, D., & Beaumont, J. (2020). School-related subjective well-being promotes subsequent adaptability, achievement, and positive behavioural conduct. *British Journal of Educational Psychology*, 90(1), 92–108. <https://doi.org/10.1111/bjep.12266>
- Sargeant, J. (2012). Qualitative research part II: Participants, analysis, and quality assurance. *Journal of Graduate Medical Education*, 4(1), 1–3. <https://doi.org/10.4300/JGME-D-11-00307.1>
- Tackie, H. N. (2022). (Dis)Connected: Establishing social presence and intimacy in teacher–student relationships during emergency remote learning. *AERA Open*, 8, 233285842110695. <https://doi.org/10.1177/23328584211069525>
- Thurlings, M., Vermeulen, M., Bastiaens, T., & Stijnen, S. (2013). Understanding feedback: A learning theory perspective. *Educational Research Review*, 9, 1–15. <https://doi.org/10.1016/j.edurev.2012.11.004>
- Tian, L., Wang, D., & Huebner, E. S. (2015). Development and validation of the Brief Adolescents' Subjective Well-Being in School Scale (BASWBSS). *Social Indicators Research*, 120(2), 615–634. <https://doi.org/10.1007/s11205-014-0603-0>
- Tian, L., Yu, T., & Huebner, E. S. (2017). Achievement goal orientations and adolescents' subjective well-being in school: The mediating roles of academic social comparison directions. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.00037>
- Tian, L., Zhang, L., Huebner, E. S., Zheng, X., & Liu, W. (2016). The longitudinal relationship between school belonging and subjective well-being in school among elementary school students. *Applied Research in Quality of Life*, 11(4), 1269–1285. <https://doi.org/10.1007/s11482-015-9436-5>
- Tichavsky, L. P., Hunt, A., Driscoll, A., & Jicha, K. (2015). "It's just nice having a real

- teacher”: Student perceptions of online versus face-to-face instruction. *International Journal for the Scholarship of Teaching and Learning*, 9(2).  
<https://doi.org/10.20429/ijstl.2015.090202>
- Tormey, R. (2021). Rethinking student-teacher relationships in higher education: A multidimensional approach. *Higher Education*, 82(5), 993–1011.  
<https://doi.org/10.1007/s10734-021-00711-w>
- Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2012). Achievement goal orientations and academic well-being across the transition to upper secondary education. *Learning and individual differences*, 22(3), 290-305. <https://doi.org/10.1016/j.lindif.2012.01.002>
- Vagos, P., & Carvalhais, L. (2022). Online versus classroom teaching: Impact on teacher and student relationship quality and quality of life. *Frontiers in Psychology*, 13, 828774.  
<https://doi.org/10.3389/fpsyg.2022.828774>
- Vygotsky, L. S. (2017). The problem of teaching and mental development at school age [ *Problema obuchenija i umstvennogo razvitija v shkol'nom vozraste* ]. *Changing English*, 24(4), 359–371. <https://doi.org/10.1080/1358684X.2017.1395165>
- Wallace, R. M. (2003). Online learning in higher education: A review of research on interactions among teachers and students. *Education, Communication & Information*, 3(2), 241–280. <https://doi.org/10.1080/14636310303143>
- Widlund, A., Tuominen, H., & Korhonen, J. (2018). Academic well-being, mathematics performance, and educational aspirations in lower secondary education: Changes within a school year. *Frontiers in Psychology*, 9, 297. <https://doi.org/10.3389/fpsyg.2018.00297>

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# “Like Throwing Darts at a Dartboard”: A Literature Synthesis of Higher Education Instructors’ Interactions in the Transition to Online Teaching

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## Abstract

In this literature synthesis, we reviewed qualitative research studies that captured rich descriptions of instructors’ experiences in higher education (HE) as they transitioned from traditional in-person classrooms to online learning environments. We identified articles for review by conducting an ERIC database search that targeted qualitative research since 2010, using terms related to online education, higher education, teacher experience, qualitative research, and change. A careful screening with exclusion/inclusion criteria resulted in 31 articles. The sample represents the lived experiences of more than 200 instructors across various articles representing HE disciplines and contexts. The articles were analyzed for emerging themes in their reported challenges and successes, especially with respect to teachers’ interactions with learners and content. The instructor-participants in the research literature experienced varying levels of satisfaction in designing and facilitating online classes and navigating available technology, with most finding the transition process time consuming and effort intensive. They likewise experienced a range of success in their interactions with their online classes and individual students. Some instructors found opportunities for rich connections in online discussions and one-to-one communication while others struggled to feel a sense of community or perceive students’ needs. These faculty experiences, though collected from many bounded qualitative studies, suggest that teachers new to online classrooms share many challenges in their interactions with students and content. This synthesis offers recommendations for research and practice in higher education, emphasizing how potential online instructors and their institutions can deepen their understanding of the faculty transition to online teaching and collaborate to provide meaningful support.

*Keywords:* Online courses; Higher education; Teaching experience; Modality transition; Online teaching

Sorensen, S. D., & West, R. E. (2025). “Like throwing darts at a dartboard”: A literature synthesis of higher education instructors’ interactions in the transition to online teaching, *Online Learning* 29(4), 489-516. <https://doi.10.24059/olj.v29i4.4274>

## Introduction

Colleges offer more blended and online courses to meet increased student demand, expand enrollment capacity, and reduce the physical limitations of on-campus space (Goodman et al., 2019; Guppy et al., 2022; Moloney & Oakley, 2010; Singh et al., 2022). Currently, 71% of undergraduate students report enrollment in distance education courses (National Center for Education Statistics, 2022). Although experts in the field of educational technology know that online learning can be effective with intentional digital pedagogy and design (Bas & Kivilcim, 2021; Gonzales, 2014; Luna & Winters, 2017), many instructors remain skeptical of online learning and hesitate to adopt teaching in a new modality (Lederman, 2020; Shreaves et al., 2020). It seems essential to ask why this is true. What do instructors typically experience in their transition to online environments? We need a better understanding of their shared challenges so that (a) instructors can anticipate and prepare for needed adjustments as they transition to online teaching and (b) institutions can provide adequate training and support.

Despite the need to understand teachers' transitions, the literature is spotty, with much more literature devoted to students' online learning experiences and challenges. This calls for research to better understand faculty experiences and needs in this context. Qualitative research is considered the best approach to capture the rich depth of individuals' experiences, but most available qualitative research about instructor perspectives is limited to a specific context, method, or intervention. Researchers of bounded qualitative studies do not typically purport the generalizability of their conclusions and findings. However, synthesizing multiple qualitative studies may reveal common themes and shared experiences across a quantity of research and contexts, thereby increasing the potential transferability to larger HE populations.

Several previous literature reviews synthesized studies about online teaching, but these papers considered now-dated evidence from before 2010. These scholars reviewed a combination of quantitative, qualitative, and mixed-methods research (Baran et al., 2011; Maguire, 2005; Mayes et al., 2011; Tallent-Runnels et al., 2006). Mayes et al. (2011) particularly focused on graduate students in math teacher education and Tallent-Runnels et al. (2006) found more articles about students' needs, outcomes, and characteristics than instructors' experiences. Both reviews considered student and instructor data.

Wingo et al. (2017) more recently reviewed quantitative, qualitative, and mixed-methods research, looking specifically at studies related to the Technology Acceptance Model (Davis, 1989). The model does address transitions toward increased technology use in teaching, however, the lack of demographics about participants' teaching experience makes it difficult to isolate the experience of novice online instructors covered in this review. Kebritchi et al. (2017), meanwhile, also synthesized quantitative, qualitative, and mixed-methods studies that addressed online issues, learner issues, instructor issues, and course design. Though they did not focus their review on instructor experience, they did identify the following online instructor issues: Changing faculty roles, transitioning from face-to-face to online, time management, and teaching styles. Both reviews address some of the challenges faced in online teaching, but they include quantitative research design rather than focusing on qualitative descriptions of teacher experience, and they do not specifically address modality transitions.

The current review expands upon these previous findings by including more recent literature and highlighting qualitative data, allowing us to better understand the nuances of teacher transitions. While studies about student online transition are more common, it is particularly essential to understand teacher transitions and provide support, professional development, and institutional guidance to the teachers who navigate the decisions that arise during their transition to online learning. By better understanding these teacher needs, we can better develop future online learning environments and support the main change agents—teachers.

For this reason, and to better understand how teachers themselves perceive and understand their transition experiences, we analyzed qualitative reports about instructors' experiences across various HE disciplines and contexts as they transitioned from traditional in-person classrooms to online learning environments. We identified common themes in their varied experiences. By studying these qualitative reports, we were better able to hear teachers' voices and empathize with their perspectives, needs, and challenges. In discussing their experiences, we focused particularly on teachers' perceptions of the changes in their interactions with content and students in various mediums. We look at content interactions because new learning environments demand adjustments in media and course delivery methods (Graham, 2021). In addition, we considered student-teacher interactions because this "emotional labor" (p. 811) is often enjoyable for teachers and the reason for their career choice (Hargreaves, 2020).

After diving deeply into the qualitative descriptions of these teachers' transition experiences and focusing on how their interactions with students and content were affected by these transitions, we conclude with recommendations for the support they need in these new modalities. Specifically, we asked the following questions:

As higher education instructors transition from traditional classrooms to online learning environments,

1. What do instructors experience in their interactions with students and content?
2. What changes in those interactions do they find challenging or satisfying?

## **Method**

This literature synthesis seeks to better understand the teacher experience in modality transitions "through integration of multiple, interrelated qualitative studies" (Maeda et al., 2022, p. 1). The synthesis included an ERIC (EBSCO) database search for relevant terms and a subsequent analysis of the resulting sample. The researchers employed line-by-line analysis of the sample and created descriptive codes of the resulting themes (Thomas & Harden, 2008). Details related to the search for articles and the analysis of their qualitative data are provided below.

### ***Literature Search***

The lead reviewer began the literature search in the ERIC (EBSCO) database using combinations of more than 70 search terms in five categories: Online, higher education, teacher

experience, qualitative research, and change/transition. Filters were applied to exclude irrelevant contexts such as quantitative design or emergency response teaching during the Covid-19 pandemic. We used the following combined thesaurus terms listed in Table 1 to conduct our initial search.

**Table 1**

*ERIC Database Search Terms and Results*

| Category/<br>Theme | ERIC Thesaurus terms                                                                                                                                                                                                                                                                                                                                                                         | AND additional individual search<br>terms                                                                                                                                                       | Results        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Online             | DE "Online Courses" OR DE "Asynchronous Communication" OR DE "Blended Learning" OR DE "Electronic Learning" OR DE "Virtual Classrooms" OR DE "Virtual Schools" OR DE "Virtual Universities" OR DE "Web Based Instruction"                                                                                                                                                                    | TI blended teaching, hybrid, digital, distance learning, online teaching, distance education                                                                                                    | <b>53,273</b>  |
| Higher Education   | DE "College Curriculum" OR DE "College Instruction" OR DE "College Programs" OR DE "Doctoral Programs" OR DE "Graduate Students" OR DE "Undergraduate Students" OR DE "Universities" OR DE "Colleges" OR DE "Open Universities" OR DE "Research Universities" OR DE "State Universities" OR DE "College Faculty" OR DE "Graduate Study" OR DE "Higher Education" OR DE "Undergraduate Study" | n/a                                                                                                                                                                                             | <b>527,384</b> |
| Teacher Experience | DE "Teaching Experience" OR DE "Experience" OR DE "Experienced Teachers" OR DE "Expertise" OR DE "Knowledge Base for Teaching" OR DE "Reflective Teaching" OR DE "Teacher Background" OR DE "Teacher Qualifications"                                                                                                                                                                         | TI ("teacher" or "instructor" or "faculty" or "professor") AND ("experience" or "lived experience" or "perception*" or "interact*" or "attitude*" or "practice" or "participat*" or "reflect*") | <b>50,466</b>  |

The three searches above (**S3**) were combined to produce **1,358** results. Those results were then combined separately with the following search categories to yield more specific results.

|                      |                                                                                                                 |                                                                                                                                                                                                                                                                                                    |                                    |
|----------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Qualitative Research | n/a (Librarian recommended against this thesaurus term because not all qualitative studies are labeled as such) | TI/AB/TX "Case Stud*" OR "Ethnograph*" OR "Evaluation Method*" OR "Field Stud*" OR "Focus Group" OR "Grounded Theory" OR "Interview*" OR "Mixed Method*" OR "Naturalistic Observation" OR "Observe" OR "Participant Observation" OR "Transcript*" OR "journal*" OR "self reflect*" OR "phenomeno*" | TI 81<br><b>AB 507</b><br>TX 1,206 |
|----------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|

|                       |     |                                                                                                                                             |                                  |
|-----------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Change/<br>Transition | n/a | TI/AB/TX "Adjust*" OR<br>"transition*" OR "adopt*" OR<br>"adapt*" OR "move*" OR<br>"change*" OR "switch*" or<br>"redesign*" OR "reevaluate" | TI 65<br><b>AB 414</b><br>TX 471 |
|-----------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|

- S3 + AB (Qualitative Research search terms) + AB (Change search terms) = 174
- 174 results + NOT ("Covid" OR "pandemic" OR "ERT" OR "emergency" OR "Covid-19") = **129**

The database search, using the combination of terms described in Table 1, returned 129 articles. We then screened titles to remove studies outside our scope—such as non-journal articles, K-12 context, or learner-focused studies—that had not been excluded by the search, likely due to incomplete indexing or database limitations. This initial sorting resulted in 59 titles that aligned with the focus of our review questions. We then analyzed those articles with the specific criteria outlined below.

***Inclusion/Exclusion Criteria***

After the initial screening of 129 titles, the lead author reviewed the abstracts and content of the remaining 59 articles, using the following inclusion and exclusion standards (Table 2).

**Table 2**

*Exclusion and Inclusion Criteria Applied to Database Search Results*

| Exclusion criteria                                           | Inclusion criteria                                                                                    |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Teachers in K-12, commercial, or informal education contexts | Experiences of instructors in higher education                                                        |
| Technology integration in traditional classrooms             | Online or blended classes                                                                             |
| Dissertations, conference papers, or literature reviews      | Journal articles                                                                                      |
| Prior to 2010                                                | 2010-2022                                                                                             |
| COVID-19/pandemic/emergency remote teaching (ERT)            | Instructors intentionally designing for, and teaching in, typical, representative online environments |
| Student or administrator experience                          | Teacher experience                                                                                    |

|                                                          |                                                                                   |
|----------------------------------------------------------|-----------------------------------------------------------------------------------|
| Instructors with < 3 years of online teaching experience | Novice online instructors, or those reflecting on their early experience          |
| Exclusively quantitative or theoretical                  | Qualitative research methods, appropriate for a qualitative synthesis of research |

*Note.* Where a study included both novice and experienced online instructors, we focused our analysis on novice instructors where possible.

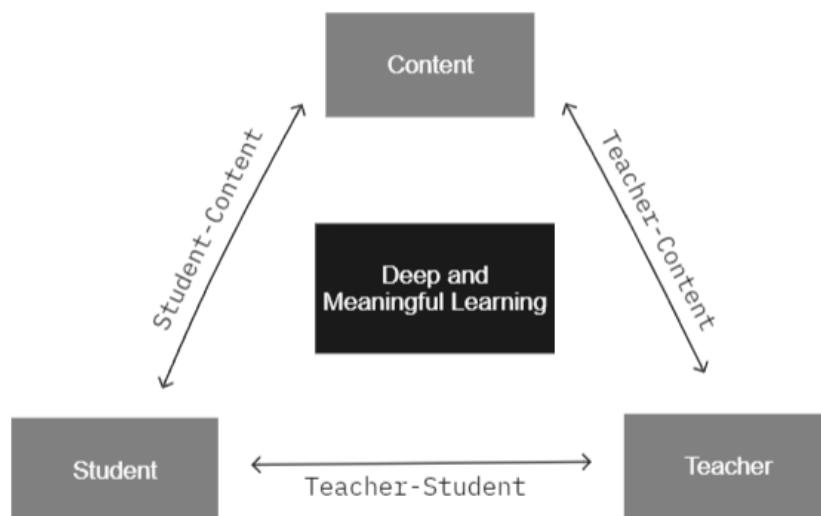
In addition to this process, we added relevant articles cited within the initial findings and other articles discovered outside of the above formal process (e.g., expert recommended or discovered through other methods). The results were 31 articles for review: 22 qualitative studies about HE instructors' experiences in the transition to online environments and nine studies about professional development and support interventions for instructors in that transition. We set aside the nine professional development articles to contextualize their findings in the recommendations section and focused on the 22 instructor experience studies for analysis of the review questions.

### ***Theoretical Framework***

We used Anderson's (2003) model of educational interactions in online learning communities to analyze the articles. His model described reciprocal interactions with social and pedagogical impact on distance education, taking place between teachers, students, and content (Figure 1). For the purposes of this literature synthesis and given that the review questions sought to understand the teacher experience, we focused on teacher-student interactions and teacher-content interactions.

**Figure 1**

*Anderson's Modes of Interaction in Distance Education, adapted from Anderson (2003)*



An instructor who has taught predominantly in a traditional, face-to-face (F2F) classroom will be accustomed to a variety of methods for interacting with course content and students. When instructors move to an online learning environment, they often experience those interactions with learners and content differently. Their practiced approaches to instruction and communication may not work in the same ways to bring about familiar interactions. A change in modality invites teachers to reevaluate where, when, and how those interactions occur.

### ***Data Analysis***

Once a comprehensive body of relevant research was identified, the lead reviewer did line-by-line coding of each article's reported teacher experiences, guided by the research questions, with a lens toward Anderson's (2003) interactions. To focus on qualitative data in the sample of articles, her coding process targeted teachers' quotes in the reported data or researchers' summaries of instructors' experiences. She analyzed the data for any mention of teacher interactions with content or students and applied thematic codes using a combination of deductive and inductive coding (see Table 3). As prescribed by Thomas and Harden (2008), line-by-line codes were compared within and across studies to identify frequency and build themes.

**Table 3**

#### *Deductive and Inductive Codes Used to Analyze Literature*

| Deductive codebook           | Inductive coding<br>The most frequent themes (with subthemes) that emerged within the deductive categories                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interaction: Teacher-Content | Course design/organization<br>Preparation/planning time<br>Course structure and clear instructions<br>Align content with values<br>Scope of content segments<br>F2F content hard to transfer<br>Preparation/planning time<br>Technology usage<br>Tools used<br>Finding tools to solve problems<br>Learning new tools<br>Frustration with technology<br>Inexperienced with tech/online<br>Inadequate technology<br>Changing technology<br>Learning activity design<br>New content creation<br>Assessment<br>Embracing technology/creativity |
| Interaction: Teacher-Student | Communicating with individuals and classes<br>Teacher-individual student interactions<br>Teacher-class interactions<br>Feeling connection and community<br>Lack of connection<br>Positive connections<br>Giving and receiving feedback                                                                                                                                                                                                                                                                                                     |

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|                             |                                             |
|-----------------------------|---------------------------------------------|
|                             | Instructor feedback                         |
|                             | Student feedback                            |
|                             | Establishing teacher presence               |
|                             | Encouraging Discussion                      |
| Research Methods            |                                             |
| Method-Approach             | See Table 4 for a summary of these research |
| Method-Context              | categories                                  |
| Method-Participants/ Sample |                                             |
| Method-Data Collection      |                                             |
| Method-Data Analysis        |                                             |

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*Note.* All codes listed in this table are addressed and analyzed in the Findings section. The teacher-content and teacher-student themes are presented in the order set forth in the table.

### ***Limitations***

We synthesized literature about a variety of individual instructors' experiences to reveal trends, but not all findings are transferable to all contexts. Due to constraints in the database thesaurus search terms and subjective decisions about relevant results, other useful studies may have been excluded in our analysis. Approximately half of the articles in this review included both novice and experienced HE online instructors. To best answer the research questions, we attempted to isolate the experiences of instructors transitioning to online teaching. Some researchers did not distinguish teachers' length of experience in their findings; in other cases, we may have coded data from more experienced teachers. Nevertheless, we believe seasoned instructors' challenges are likely to be experienced by new instructors as well and can still prepare potential online teachers or inform the direction of institutional support.

This review was limited to the ERIC (EBSCO) database, a leading source for educational research. While it yielded a sufficient number of relevant studies, similar searches in other databases may have identified additional literature that could enhance understanding of the research questions.

One further limitation of this study is its narrow scope. By focusing only on the experiences of early online educators, prospective instructors may not comprehend the potential for problem solving and success in online teaching over time. Readers will, however, be able to identify and anticipate shared challenges that occur during the early transition to online learning environments.

## **Results**

To answer the review questions about teachers' experiences when transitioning to teaching in online learning environments, we present the findings in two categories: (a) teacher-content interactions, and (b) teacher-student interactions. Within each category, we identify predominant, emergent themes and summarize the related instructor experiences. The reported data represent collected experiences from more than 200 instructors in various articles representing diverse HE qualitative research contexts. See Table 4 for an overview of the



collected research articles for this literature synthesis, including the scope and context of each study, its qualitative approach, and the applied methodology for data collection and analysis.

**Table 4**

*Summary of Research Methods and Context for All Analyzed Literature*

| Author(s) (date)      | Approach                        | Context                                                                           | Participants                                                                                                                         | Data collection and analysis                                                                                                        |
|-----------------------|---------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Andrews Graham (2019) | Phenomenological                | Two historically Black colleges and universities in southeastern US               | 41 participants: 28 full-time faculty members and 13 adjunct faculty                                                                 | Surveys and interviews over three months, and content analysis to identify common themes and patterns.                              |
| Ata (2016)            | Case study                      | School of Management at a UK-based university.                                    | 10 faculty members who were teaching a course using Second Life as a platform for blended learning                                   | Observations, semistructured interviews, chat logs, snapshots, and field notes; analyzed using thematic analysis                    |
| Baran et al. (2013)   | Multiple case study             | Large research university in Midwestern US                                        | Six teachers who were the first-ranked nominees from each college/program, reflecting on their transition to online teaching         | semistructured interviews and thematic analysis as the method of data analysis                                                      |
| Burke (2021)          | Basic qualitative               | Australian higher education institutions                                          | Ten online educators who taught creative arts courses                                                                                | Semistructured interviews, analyzed using thematic analysis                                                                         |
| Englund et al. (2017) | Mixed-method                    | Two universities in Sweden: one traditional and one distance education university | Nine university teachers using technology in their teaching practices, some in blended classes                                       | Qualitative semistructured interviews with the participants, classroom observations, course syllabi, and online learning resources. |
| Glass (2017)          | Post-positivist grounded theory | Major Carnegie research institution in Midwestern US                              | 16 faculty from six departments: six females, ten males; five assistant professors, three associate professors, and eight professors | Two-stage semistructured interviews, coded for emotions, then analyzed for relationships between patterns and subgroups             |
| Huang & Hsiao (2012)  | Basic qualitative               | a Midwest university                                                              | 16 instructors from 13 departments in five colleges at the university,                                                               | Semistructured interviews, 60-90 minutes; analyzed with                                                                             |

|                            |                                      |                                                                    |                                                                                                                                                                                         |                                                                                                                                                                                                                  |
|----------------------------|--------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            |                                      |                                                                    | including 10 females and six males                                                                                                                                                      | constant comparative method, organizing categories until themes emerged                                                                                                                                          |
| Jensen et al. (2020)       | Basic qualitative                    | Three Swedish universities                                         | 15 university teachers (equivalent to US faculty) who had online teaching experience, but were asked to reflect on their transition from traditional teaching                           | Semistructured interviews; thematic analysis, with iterative themes and subthemes to clarify patterns                                                                                                            |
| Kayaduman & Demirel (2019) | Mixed methods descriptive case study | University in Turkey                                               | Nine first-time online instructors assigned to teach online by their administration; they all had previous in-person tec                                                                | Quantitative and qualitative data from interviews and questionnaires; two semistructured interviews, one before the semester and after four weeks; two experts did content analysis to identify codes and themes |
| Kupczynski et al. (2012)   | Basic qualitative                    | Unnamed context, but all three authors are at Texas A&M-Kingsville | Five faculty members, two which were novices in online teaching, four females and one male, three white and two Hispanic                                                                | 10-week observation, formal interviews and a survey, prolonged engagement via emails, Skype, online and face-to-face conversations; coded deductively and then with inductive patterns                           |
| Martin et al. (2013)       | Case study                           | Southeastern university in US                                      | Six instructors: Three participants from the nursing school and three participants from the school of education; they taught graduate and undergraduate courses; five females, one male | Survey, then follow-up interviews; transcripts coded and analyzed for common themes.                                                                                                                             |
| Russell (2015)             | Phenomenological research            | University in Northeast US                                         | Six long-time university faculty members teaching in five departments, reflecting on their experiences designing and teaching online courses, including early transition                | Interviews with each participant and member checking. Thematic analysis of transcripts.                                                                                                                          |
| Samuel (2020)              | Interpretive Phenomenological        | Urban, public, four-year, Midwestern                               | 25 instructors across diverse disciplines; 13                                                                                                                                           | Course syllabi, semistructured interviews                                                                                                                                                                        |

|                         |                                              |                                                                                          |                                                                                                                             |                                                                                                                                                                                                                |
|-------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | Analysis (IPA)                               | institution (HE)                                                                         | experienced in online education, 12 novice instructors                                                                      | 60-90 min., observation of participants' online course sites for 12 weeks; analyzed by IPA with themes identified and clustered, then organized with deductive codes                                           |
| Samuel (2022)           | Interpretive Phenomenological Analysis (IPA) | Four-year public university in US Midwest                                                | 25 instructors across diverse disciplines; 13 experienced in online education, 12 novice instructors                        | Documents collected, interviews, observation of participants; analyzed by IPA to identify emergent themes                                                                                                      |
| Schmidt et al. (2013)   | Basic qualitative                            | Large southeastern university                                                            | Online instructors with varied experience (novice to expert) from different programs within the college of education; (N=?) | Three 90-min. focus groups during one academic year; transcripts read and coded for themes, then compared for reliability.                                                                                     |
| Scott (2016)            | Ethnographic multiple case study             | Large Australian research university                                                     | Six traditional professors teaching online for the first time                                                               | Repeated interviews over three years, discussion of artifacts. Iterative analysis throughout to create categories and broad concepts, then final analysis to identify patterns and address research questions. |
| Seaton & Schwier (2014) | Exploratory case study                       | University of Saskatchewan                                                               | 12 instructors outside the field of Education and Computer Science, varied levels of online teaching experience             | Collected demographic information, semistructured interviews; coded with deductive codes to identify positive and negative experiences                                                                         |
| Smith et al. (2016)     | Auto-ethnographic case study                 | Outdoor and Sustainability education at University of Tasmania                           | Two tertiary educators required to teach outdoor education online                                                           | (Auto) ethnographic semistructured formal interviews; thematic coding with deductive and inductive themes, analyzed by the PI and both participant-researchers.                                                |
| Taylor & Wright (2020)  | Case study                                   | College of Business at a four-year, public, non-profit HE institution in Southeastern US | Experienced business faculty with mixed levels of experience teaching online (N=?)                                          | Interviews and document review, including website and course syllabi, used a document summary form; analyzed by identifying key phrases, organized into themes                                                 |
| Thanaraj (2016)         | Narrative case                               | Teaching-focused                                                                         | 3 academics across                                                                                                          | Interviews at three                                                                                                                                                                                            |

|                        | study            | institutions in England                                         | multiple disciplines, combined 30-years' experience, first-time online teaching. Lecturers in law, language, and business. | intervals and observations of the online platform, written interview notes; then summarized and identified representative quotes based on research questions  |
|------------------------|------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Torrissi-Steele (2014) | Mixed-method     | Griffith University                                             | 8 academics were selected from the 53 survey respondents based on outlier sampling                                         | Survey, semistructured interviews; qualitative data used to enhance quantitative findings.                                                                    |
| Tuapawa (2016)         | Phenomenological | Tertiary education institutes (HE) in Australia and New Zealand | 10 faculty with experience in blended teaching                                                                             | Phenomenological interviews, semistructured with 27 questions, recorded and transcribed; analyzed using Nvivo to create categories, nodes, groups, and memos. |

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*Note.* We labeled a study as “basic qualitative” if the authors did not identify a theoretical framing to their study. These studies all involve qualitative data.

### ***Teacher-Content Interaction***

The thematic, aggregated data revealed a variety of frustrations, observations, and discoveries during the instructors' process of repurposing their content and media use for online course delivery. Table 3 showed the most frequent themes related to teacher-content interaction that we used in our coding. We organized our synthesis of these themes into the following two sections: (a) course organization and design, and (b) learning activity design.

#### **Course Organization and Design**

Qualitative coding of the data from all collected articles revealed the following emergent subthemes related to course organization and design: (a) preparation and planning time, (b) course structure changes and associated design pedagogy shifts, (c) manageable content segments, (d) aligning content with values and purposes, and (e) the difficulty of F2F content transfer.

**Preparation and Planning Time.** Participants in five studies mentioned the scheduling advantage of anytime, anywhere teaching (Englund, 2017; Huang & Hsiao, 2012; Samuel, 2022; Schmidt et al., 2013). One instructor said, “Whatever I want to do I can do anytime, even during midnight” (Huang & Hsiao, 2012, p. 18), while another quipped that working in pajamas did not make the work easier (Schmidt et al., 2013). However, participants in more than half of the studies expressed that the time required to plan, prepare, and maintain their courses was more demanding than they had anticipated. One participant in Huang and Hsiao's study (2012) said,

The only way I found to keep things clear is put a lot of time into it, up front, and before you even start because otherwise...it's so difficult. You are doomed. You don't have everything in place...so that takes a tremendous amount of work (p. 19).

Some participants felt they had to take an extra role as a manager or administrator because of the amount of time needed to organize, plan, grade, and maintain records (Andrews Graham, 2019). One study reported that “the work for the instructors was more cumbersome in the online setting but did not necessarily take longer to complete” (Seaton & Schwier, 2014, p.10). Some teachers complained that the allotted pre-semester preparation time for typical F2F classes was insufficient for online teaching (Schmidt et al., 2013; Taylor & Wright, 2020).

**Course Structure and Pedagogical Development.** The majority of research participants found that online teaching required significantly more course structure than traditional F2F classes (Burke, 2021; Jensen et al., 2020; Schmidt et al., 2013; Scott, 2016; Smith et al., 2016), including more explicit instructions and organized information for students (Andrews Graham, 2019; Englund et al., 2017; Jensen et al., 2020; Kayaduman & Demirel, 2019; Scott, 2016). One instructor explained his priority was “to plan well, to create a good structure for the course so that it is very clear to the students” (Jensen et al., 2020, p. 1155). Some faculty recognized the need to make content and directions clear and accurate as they were “repeatedly accessible by students throughout the semester” (Burke, 2021, p. 353).

During course organization, faculty experienced changes in their approach to teaching and learning. This pedagogical shift is beyond the scope of the current review, but in summary, instructors' design more carefully considered the physical and psychological distance of online environments (Englund et al., 2017), balanced information dissemination and social interaction (Andrews Graham, 2019; Thanaraj, 2016), and translated experiential or studio learning to digital contexts (Baran et al., 2013, Smith et al., 2016). One instructor described her struggle: “I remember the four days between orientation and classes starting and having index cards [on] my living room floor. And trying to plan out, if I was doing this face-to-face, then this is how I would do it [online]” (Schmidt et al., 2013, p. 135). One instructor recognized, “It doesn't work just to upload a number of Internet lectures and then add an exam at the end” (Jensen et al., 2020, p. 1155).

**Aligning Content with Values and Purposes.** Glass (2017) found that several teachers in his study struggled to create an online course that reflected their priorities; for example, some felt their creativity and personality were stifled in the online space. Additionally, two participants in Scott's study (2016) did not believe in micromanaging student engagement but found that some of their online content was largely ignored without frequent touchpoints or assessments.

**Scope of Content Segments.** Many participants discovered that they needed to present their content in manageable chunks for their learners, often in modules or a serial format (Baran, 2013; Burke, 2021; Scott, 2016). One participant created copious instructional materials to compensate for the lack of in-person teaching but later regretted limiting students' autonomy to do their own research (Thanaraj, 2016). Another professor in Glass's study (2017) expressed a similar concern after noticing decreased scores: “I'm wondering if the more smooth the

presentation, the worse they do. They see this stuff; ‘I don’t have to think hard about that because he’s spoon-feeding it to me’” (p. 246).

**F2F Content Hard to Transfer.** In many disciplines, instructors grappled with translating their face-to-face content to an online setting. Those who considered themselves lecturers or focused on information delivery later realized they had failed to consider design elements like interactivity, community, and student support (Thanaraj, 2016). Furthermore, instructors of highly situated, hands-on courses asked questions like: “How could I possibly replicate [online] the experiential nature of my teaching and the emphasis I put on place?” (Smith et al., 2016, p. 311). Multiple instructors in Baran et al.’s (2013) and Russell’s (2011) studies experienced similar tension and agreed that a successful online transition required expertise and confidence in their subject matter. When disproved of their belief that “it would be no different to classroom teaching” (Thanaraj, 2016, p. 44), instructors found themselves adapting their content and course design, at times reacting frantically to student issues or questions (Scott, 2016; Taylor & Wright, 2020; Thanaraj, 2016).

### Learning Activity Design

A second emergent theme related to instructors’ interaction with content was designing learning activities in the online context, including the following additional subthemes: (a) new content creation, (b) assessment, and (c) embracing technology and creativity. Learning activity design differs from course design because it refers to specific tasks, resources, or assessments within the course that are building blocks of the learning process. Linda, an art and design professor in Baran et al.’s study (2013), described the process:

I tried to simulate the actual experiences as much as possible, so I just broke it down in tasks...I sat down and said to myself, “What activities must I do to teach you?” And I kind of broke them down. ...- And then I realize as an online teacher, I don’t need to literally be in the same room with you to do these things (p. 22).

**New Content Creation.** Across research articles, instructors shared details about their experiences transferring in-person learning activities into an online environment, which required changing the media used for delivery and presentation. They often created new activities or adapted existing activities to available technology. Many instructors prepared videos of lecture content or slide decks and added recordings and notes to their online courses (Baran et al., 2013; Glass, 2017; Martin et al., 2013; Russell, 2011; Tuapawa, 2016; Thanaraj, 2016). All participants in Thanaraj’s study (2016) tried to “hold on to the identity and role of a lecturer” or “knowledge expert” but experienced tension knowing that recorded lectures were not the best practice for online teaching (p. 44). Instructors’ content creation took on many media forms, including weekly audio announcements, online discussions, digital archives with instructional materials, course websites, webcast field trips, modules, and even some custom-built tools (Baran et al., 2013; Jensen et al., 2020; Martin et al., 2013; Russell, 2011; Scott, 2016; Smith et al., 2016). Notably, one instructor sought student input to collect and submit subject-specific materials to incorporate into the course content (Baran et al., 2013).

**Assessment.** One design subtheme that emerged across the research was assessment. Scott's participants (2016) often spoke of assessment issues that arose in their online courses. Several experimented with discussion boards and quizzes and struggled to know whether students would engage without graded assessment. One instructor brought case study scenarios from her traditional classroom into online discussions but did not know how to properly assess them in that setting. One e-learning skeptic only made online modules available in his blended class as an assessment-preparation resource. Other instructors' experiences included developing explicit rubrics and self-assessments (Andrews Graham, 2019) and feeling more confident about practical learning outcomes because they were embedded in assessments (Burke, 2021).

**Embracing Technology and Creativity.** Many instructors found that a new modality and new media tools brought new opportunities for creativity (Englund et al., 2017; Glass, 2017; Russell, 2011; Samuel, 2020). One initially apprehensive teacher later reflected, "It's positive being forced to create material that is more thought-out than usual. I've learnt a lot about how to use the different [technology] tools and what I can use them for in my teaching" (Englund et al., 2017, p. 81). Glass (2017) concluded: "Faculty members described a widening of creative expression, such that online teaching felt more expansive, more open, and freer than their face-to-face classroom experiences" (p. 245). Participants from many different disciplines and contexts described their content creation experiences as "It's kind of fun, It's a challenge," (Samuel, 2020, p. 84), and "It's my way to be creative. . . . This is my Mona Lisa" (Glass, 2017, p. 245). Notwithstanding their increased play and experimentation with tools, content, and media, many faculty found it a time-consuming and sometimes overwhelming endeavor (Baran et al., 2013; Huang & Hsiao, 2012; Seaton & Schwier, 2014).

### ***Teacher-Student Interaction***

In addition to experiencing a change in their relationship to the content, instructors with traditional classroom experience, whether lecture-based or student-centered, found that online modalities required new kinds of teacher-student interactions. We identified the following emergent themes in their teacher-student interactions: (a) communicating with individuals and classes, (b) feeling connection and community, (c) giving and receiving feedback, and (d) establishing teacher presence.

### **Online Course Communication**

**Teacher-Student Communication.** Rather than addressing an in-person student question with all students hearing the response, the instructors now entered a digital world where email was a main communication form and multiple one-on-one email conversations became more frequent and time consuming (Huang & Hsiao, 2012; Jensen et al., 2020; Samuel, 2020). Some felt that this allowed them to experience better communication with more individuals (Englund et al., 2017; Samuel, 2022). In Englund et al.'s study (2017), an instructor explained, "You often have just as much contact with online students as with campus students, since you can communicate with them through the learning platform, through chat, email and so on" (p. 80). One professor pointed out the importance of responsible email communication: "It is just like in face-to-face, there are instructors that don't respond to the students. They never respond. That's just extremely frustrating to students. So, you have to be responsive even if it's a two-sentence email" (Baran et al., 2013).

Teachers used additional communication tools, such as chat (Burke, 2021; Englund et al., 2017), voice or video recordings (Baran et al., 2013), discussion boards (Samuel, 2020; Smith et al., 2016), and LMS features that allowed social interaction (Jensen et al., 2020). One outdoor education professor unexpectedly enjoyed the online discussion boards because she could engage with individual students who were eager to learn more, which in-person dynamics didn't always accommodate (Smith et al., 2016). Other communications like questions and feedback sometimes happened during online office hours or one-on-one web conferencing (Andrews Graham, 2019; Baran et al., 2013; Schmidt et al., 2013)

**Teacher-Class Communication.** Online instructors communicated with the class as a group by using media and methods like weekly email announcements, recorded videos, or live chat (Baran et al., 2013; Burke, 2021; Englund et al., 2017). Online synchronous classes allowed teachers to “use videoconferencing in place of face-to-face lectures” and communicate in similar ways to traditional classrooms (Schmidt et al., 2013). Some instructors found that synchronous or asynchronous discussions let them respond in ways that could be seen or heard by all students (Baran et al., 2013; Jensen et al., 2020; Schmidt et al., 2017). One teacher stated, “We invest a lot in providing supervision where [the students] get help and where you get to discuss questions” (Jensen et al., 2020, p. 1156).

### Feeling Connection and Community

Although technology provided communication tools, an abundant theme in the research was instructors' mixed feelings about how connected they felt to their students. It may be assumed that online learning cannot replicate traditional classroom communities or create genuine connection. Instructors in the collected research did experience such realities, but others felt the modality enhanced connection.

**Lack of Connection.** Instructors' prevailing grievance about student interactions was the struggle to connect with them. Many felt the physical distance resulted in a sense of psychological distance and fewer opportunities for engagement (Burke, 2021; Englund et al., 2017; Glass, 2017; Huang & Hsiao, 2012; Smith et al., 2016). One instructor explained, “Teaching online is a little bit isolating, maybe more so than teaching in a face-to-face environment. . . . you have to close the door and put up a sign that says, ‘Do not disturb, I’m recording a lecture’” (Glass, 2017, p. 248). Two professors in the Smith et al. (2016) study strove to create a class community but felt students stayed distant and were hard to reach. Two participants in Samuel's study (2022) admitted they felt connected to students “individually, yes. Not as a group” (p. 127).

Connections were especially difficult in an online setting because instructors struggled to perceive how students were feeling about course content and online communications (Andrews Graham, 2019; Baran et al., 2013; Englund et al., 2017; Glass, 2017; Huang & Hsiao, 2012; Kayaduman & Demirel, 2019; Martin et al., 2013; Russell, 2011; Samuel, 2020; Samuel, 2022; Seaton & Schweier, 2014; Taylor & Wright, 2020). Seaton and Schwier (2014) summarized the experience of eight of their 12 participants: “In an online course, they cannot see if a student is confused. . . . This lack of presence made it difficult for the instructors to understand who their students were and if they were interested in the subject...or understood the content” (p. 10).



Baran et al. (2013) summarized the reflections of experienced online teachers about their initial transition from the traditional classroom: “All teachers acknowledged that staying engaged in the online conversation and guiding the discussions required intense effort to create a mental image of the students, especially during the first couple of weeks of the course” (p. 26). Their effort to patiently establish those relationships included interacting daily, tracking performance, and inviting students to be present. A participant in Schmidt et al.’s study (2013) described her effort to connect with students:

It’s like throwing darts at a dart board. You’re just trying to find one way to hit a bullseye with each and every student. It is harder (than teaching in a traditional classroom). Someone who is good at distance ed., (they) are finding different ways (to reach each student) and you are spending so much more time and it is hard (p. 138).

Some instructors expressed concern that their online interactions seemed empty and unfulfilling (Baran et al., 2013; Glass, 2017; Huang & Hsiao, 2012; Samuel, 2020; Smith et al., 2016). One instructor felt a loss of self-expression in his personality and teaching style when trying to communicate solely online. Another felt she couldn’t mentor in the same ways she had been mentored (Smith et al., 2016). A participant in Glass’s study (2017) experienced less enthusiastic interactions because relationships felt transactional. She explained, “I mean, you teach it, you do it, you post it, bleh. They do it; you grade it” (p. 247). Two participants in Samuel’s study (2020) pointed out the need for both a teacher *and* a student to have a conversation, and one quipped, “I can’t explain something to a wall” (p. 85). All the teachers in one study agreed upon the need for establishing trust (Baran et al, 2013). One professor summarized the problem:

There is so much when you take a physical person and reduce some down to a piece of email. You’ve taken away everything. You have taken away their personality, their gender, their culture, their attitudes there, and their spirit. You just rob your student. So online, I think you have to figure out how do I reinvest them in their personhood and their spirit? How do I give them a presence...? So, we have to remake us as persons online (p. 26).

**Positive Connections.** Many instructors also experienced positive connections and satisfying interactions with their students; in fact, 10 of the articles included examples of good teacher-student synergy. One participant claimed that technology made it possible to feel close to students even when they were far away (Huang & Hsiao, 2012), consistent with findings among many instructors across the research articles (Baran, 2013; Englund et al., 2017; Jensen et al., 2020, Martin, 2013; Samuel, 2020; Samuel, 2022; Smith et al., 2016). Some faculty preferred synchronous over asynchronous online classes because knowing names and faces made it easier to connect and create a community (Huang & Hsiao, 2012; Martin et al., 2013).

Participants shared how those connections emerged in their online classes. An instructor in Smith et al.’s study (2016) described her rich experiences in discussion boards. She said, “In the online teaching space, I found a level of engagement with some students to be at a level I’d never seen before with undergraduates” (p. 9). Participants in Schmidt et al.’s (2016) and

Russell's (2011) studies intentionally showed enthusiasm in their communications and perceived that students caught their enthusiasm for the course material.

In the Jensen (2020) study, eight of the 15 faculty found online student relationships to be closer, with all participants citing more frequent one-on-one interactions than their on-campus classes. One stated, "Those 30 sitting in a classroom [on campus], each of them tends to stay a bit anonymous, but in a distance course it becomes more personal. It is a bit contradictory" (p. 1154). Two instructors in the Samuel (2022) study said they did not experience the same connection with the class as a whole, but when they shifted their one-many teaching approach to one-one, they experienced satisfaction in those interactions.

Baran et al. (2013) reported that participants "put greater emphasis on getting to know their students than they did in their face-to-face classes" (p. 32). Three instructors in the Samuel (2020) study shared that online discussions and assignment submissions helped them connect with students. One explained, "Through their assignments, every week they're saying, 'well here's something that happened to me at work,' 'here's what I'm going through,' 'I'm really interested in this.' So, I'm getting to know them pretty well" (p. 83).

Overall, instructors in multiple studies found ways to overcome the assumption that isolation would dominate the online teaching experience. One instructor experienced "kinetic energy" while watching groups of students engage with his class (Glass, 2017). He stated, "People not in online courses think [that] it's totally disembodied and you don't have any sense of who the student is, but you really get a very interesting, more connected response than I've actually had in some face-to-face courses" (p. 247). In Englund et al.'s study (2017), one participant was eventually able to connect with students on the other side of the technology; in fact, she became as excited about online learning as she was about her subject matter. An instructor in Samuel's study (2022) shared similar enthusiasm: "I love it. I really love it. The odd thing is, I feel like I develop closer relationships teaching online" (p. 126).

### Giving and Receiving Feedback

Feedback was a common conduit for teacher-student interaction. Instructors commented on students' work and participation, and also better understood the student experience by welcoming their feedback.

**Instructor Feedback.** Instructors in various articles discussed the importance of providing commentary when students submitted assignments or sent other communications (Andrews Graham, 2019; Baran et al., 2013; Samuel, 2020; Taylor & Wright, 2020; Thanaraj, 2016). One instructor in the Andrews Graham (2019) study believed that face-to-face students just wanted to be passively spoon-fed, but online students were more actively engaged learners. Because of that increased engagement, they felt online students required more feedback more often. Several instructors agreed that timely feedback to students' concerns and questions was important, in part because it created a sense of immediacy and enthusiasm (Baran et al., 2013; Jensen et al., 2020). A participant in the Taylor and Wright study (2020) expressed the concern that distance-learning class sizes should be capped at reasonable sizes considering that instructor feedback is so important to helping students comprehend educational outcomes. Another teacher explained her attitude toward feedback on student projects, "I need to be able to

give you feedback on what you are doing, and kind of encourage and guide you” (Baran et al., 2013, p. 22). Instructors offered this feedback in a variety of ways: Quick emails, audiovisual recordings, online critique session meetings (Baran et al, 2013), commenting on discussion posts or submissions (Samuel 2020; Thanaraj, 2016), and utilizing rubrics (Andrews Graham, 2019).

**Student Feedback.** Feedback can be two-way communication, and instructors found that they needed feedback *from* their students as well (Andrews Graham, 2019; Russell, 2011; Seaton & Schwier, 2014). Because nonverbal cues and expressions are harder to read in an online setting, one instructor concluded, “You need to be very inviting in terms of feedback from students” (Andrews Graham, 2019, p. 150). Seaton and Schwier (2014) reported that eight of the 12 participants in the study struggled with the absence of student presence. In part, this was because they did not receive any feedback regarding students’ comprehension until assignments were graded, which felt too late for intervention.

Some instructors solicited ideas and resources as they designed learning activities, asking students for suggestions about how to achieve the learning objectives (Baran et al., 2013). Six participants asked students to complete rubrics as self-assessments (Andrews Graham, 2019). In the Baran et al. study (2013), a common practice was midsemester course evaluations to elicit student feedback. Justin, an agricultural engineering professor, found that he needed flexibility in his course structure so he could change direction based on student feedback (Baran et al., 2013). When some teachers in the Jensen et al. study (2020) noticed dwindling participation in the discussion platform, they asked students where they were. They discovered students were communicating with another tool, so they moved the discussions there. Feedback from students helped teachers in many of the reviewed studies improve their instruction and have a better sense of student presence.

### Establishing Teacher Presence

Teacher presence in the online learning environment became an important objective for many teachers and a key component to facilitating teacher-student interaction. One instructor made this compelling argument about instructor presence in online teaching:

The minute you factor yourself out, you’ve just made your coursebook into a textbook. If there is no role for you as a teacher or you as a human, you are not really teaching, and you don’t really exist....Don’t let yourself become [an automated grading] machine. You always have to take ownership of your class and ownership of the experience of those people. (Baran et al., 2013, p. 29)

Several instructors felt it was important to consider the role they played in the class (Baran et al. 2013) and tried to take on their preferred face-to-face instructor roles in the online setting, for example, subject matter expert, nurturer, or master lecturer (Glass, 2017). Teacher presence included offering timely support, and making themselves visible (Englund et al., 2017). Jensen et al. (2020) reported, “Respondents described how the most important thing they did for students to learn was to show engagement and make it clear that they as teachers were accessible to students” (p. 1156); this included supervision, providing places to meet or means to communicate, and initiating discussion with individuals and groups.

Finally, instructors in the Samuel (2020) study recommended incorporating essays and open-ended tasks to invite deeper connection with students rather than relying on auto-graded quizzes that establish no teacher presence. Soliciting student feedback and involvement also invited more opportunities for teachers to engage. Samuel (2020) reported, “The instructors’ sense of presence was impacted by the level of student participation. When students disappeared, the participants also disengaged” (p. 86).

**Encouraging Discussion.** An instructor in the Thanaraj (2016) study struggled in his online teaching because his typical in-class skills and strengths seemed less important than coaching and guiding the students through discussions. He concluded that those coaching skills were a greater responsibility in online classes. Many faculty wondered how much of a role they should play in online discussions, fearing that being over-present might stifle honest discussion (Huang & Hsiao, 2012; Kupczynski et al., 2012; Seaton & Schwier, 2014). One respondent said that because of their efforts to connect with students outside of the discussion boards, “students were more involved in the discussions, and thus believed, and rightfully so, that I would be, too” (Kupczynski et al., 2012, p. 90). Thanaraj (2016) surmised from the participants’ experiences that online teaching needed “knowledge and skills beyond the content being taught such as monitoring discussions” (p. 45).

Teachers in the combined studies shared many experiences about encouraging discussion with their students, including establishing norms about length and levels of student responses, using asynchronous discussion tools to invite participation from more students, creating prompts that solicited meaningful responses, writing their own posts in discussions to model rich answers, and asking students to submit questions before synchronous class activities (Baran et al., 2013; Burke, 2021; Huang & Hsiao, 2012). In addition to discussion boards, these discussions took place in a variety of digital settings such as asynchronous video, breakout rooms, whiteboards, and screen sharing (Burke, 2021). All the teachers in the Baran et al. (2013) study agreed that in an asynchronous setting, they had to make an intense, mental effort to visualize the students as they guided discussions. Despite some instructors’ efforts, they felt unsuccessful in creating meaningful online interactions, but they acknowledged it was an important goal of distance learning (Smith et al., 2016).

## Conclusion

This literature synthesis reviewed qualitative studies about the experiences of over 200 HE instructors from a variety of disciplines and contexts as they transitioned from traditional classrooms to digital learning environments. In accordance with the Anderson model of educational interactions (2003), the combined teachers’ experiences reflected the modality transition process in their interactions with content and with their students. Some of the changes they encountered were challenging, and others were satisfying.

Overall, in terms of instructor-content interaction, participants experienced varying levels of success in course design and organization, with most finding the transition process to be time consuming and effort intensive. They attempted to align their courses with their own values and priorities and do so in ways that students could reasonably engage with the content. Teachers adapted traditional learning activities for meaningful online engagement and often found themselves creating new content, including assessments to measure learning. Many of the

teachers enjoyed this creative process despite its required time and effort, but others found it overwhelming.

All instructors used technology more frequently and many experienced new uses of technology. They learned about new tools for classroom instruction and communication, some of which resolved problems that arose in their digital classrooms. However, many felt frustrated with technology use, in some cases because of their lack of experience or training in those technologies, and in other cases because the technology was inadequate or changing.

Regarding teacher-student interaction, instructors leveraged the available technology to communicate with individual students and with their class communities. The instructors experienced divergent levels of satisfaction with their sense of connection to their students. Many teachers expressed an increased connection, especially with individuals, while others felt uninspired and isolated. Feedback was a principal tool for initiating interaction: Most faculty recognized the importance of commenting on student work and communications but also benefited from soliciting and receiving student feedback about their course experience. Overall, instructors understood that their presence was an important part of a successful course. Many were able to establish that presence through engagement in discussions and frequent, intentional communications, but other instructors became frustrated and withdrew when students seemed to be unresponsive.

These faculty experiences, though collected from many bounded qualitative studies, suggest that teachers new to online teaching face common challenges in their interactions with students and content. Some instructors felt open to learning and thriving in those challenges and had favorable results, but others felt inadequate for the task and were disappointed with their online experience. In general, it can be said that when the higher education instructors in this literature review transitioned to teaching in online environments, they interacted with students and content in new and challenging ways, and they experienced diverse levels of success and satisfaction.

## **Recommendations**

This synthesis of novice online teachers' experiences draws attention to potential recommendations for practice and for research in higher education, both with the purpose of better understanding and supporting teachers as they transition from traditional classrooms to online instruction.

### ***Recommendations for Practice***

The synthesized results of this research can help prospective online faculty members be aware of shared challenges and areas that will demand attention as they transition to online learning environments, such as course design, teacher presence, encouraging interactions, and learning new technology tools. This awareness can inform their planning and preparation, and they can learn from the course corrections of other instructors who struggled. In a similar fashion, novice online instructors may want to collaborate with other online instructors at their local institutions or other education communities to share experiences and solutions.

One instructor in the literature stated that teaching online and trying to connect with students was “like throwing darts at a dart board” (Schmidt et al., 2013, p. 138). This description implies a level of guesswork and lack of direction that can cause frustration for online teachers; thus, it invites more training and support from their sponsoring institutions. Some mentioned helpful interventions and many desired assistance. Here are several examples where the instructors received or wished for specific support: Early and in-depth, face-to-face training (Kayaduman & Demirel, 2019; Schmidt et al., 2013), experience as an online student (Schmidt et al., 2013), access to mentors (Samuel, 2020) or peer groups (Englund, 2017; Samuel, 2020), genuine answers and suggestions when students reach out for help (Schmidt et al., 2013), anytime access to tech support (Samuel, 2020), and more current, updated training modules (Burke, 2021; Schmidt et al., 2013).

Based on the experiences in this review, when instructors transition to online teaching, we recommend that higher education institutions provide (a) professional development to prepare educators with needed skills for technology management and online pedagogy, (b) robust institutional support for the LMS and technical issues, (c) faculty mentorship, and (d) opportunities for problem-solving and collaboration. Regarding the recommended pedagogy training, some of the most shared challenges that novice instructors faced were the facilitation of teacher-student interaction, including when and how to meaningfully participate in discussion boards, and instructional design skills for moving in-person learning activities to online platforms in dynamic ways.

In the database search results for this literature review, there were nine qualitative studies about professional development and institutional support for new online teachers. Based on qualitative data collection and analysis in a variety of professional development settings, these articles provided additional evidence for the positive impact of particular interventions and support:

- Collaborative course design (Burrell et al., 2015; Chao et al., 2010),
- Live observation of instructional conversation strategies (Meskill & Sadykova, 2011),
- Online training courses and resources (Lackey, 2011; Wargo, 2022),
- Feedback from mentors and colleagues (Alemdag & Erdem, 2017; Lackey, 2011; Meskill & Sadykova, 2011, Wargo, 2022),
- The consideration of faculty’s perspective about the role of training (Esterhuizen et al., 2013; Kang, 2012),
- IT support (Raphael & Mtebe, 2016), and
- Critical reflection about teaching and learning values and beliefs (Wargo, 2022).

Many of the suggested categories correspond with areas where teacher participants in the literature review expressed a desire for more support: The studies about professional development, together with this literature synthesis of instructor experiences, corroborate some of the most impactful areas of potential support, where institutions could provide teachers transitioning to online teaching with the training and help they need to overcome common challenges.

### ***Recommendations for Research***

The collected research calls attention to several areas for further study. Considering the practical recommendations for professional development and institutional support, more qualitative research surrounding their implementation could provide a greater understanding of their benefit for inexperienced online instructors. Future research could focus on the effect of any training and support on the experiences of novice online instructors and also examine the impact of individual training and support strategies.

One interesting theme that emerged across several articles was the potential impact of online teaching on an instructor's face-to-face teaching. Andrews Graham (2019) interviewed and surveyed 41 faculty members who all commented on how their approach to in-person teaching changed after teaching online. In one study prior to the range of this literature review, McDonald (2002) suggested that "distance education formats are increasingly being used to enrich, improve, and expand face-to-face instruction, thus resulting in a 'convergence' of educational practices" (p. 12). This is an area that warrants further research to determine in what ways traditional teaching methods are specifically impacted by online teaching experience.

Additionally, since this literature review only addresses the challenges instructors experience in the transition to online learning environments, it may be useful to capture more seasoned teachers' experiences and perspectives. Qualitative research about their growth and progress could identify in what ways teachers overcome the initial challenges of online instruction.

Finally, the participants in the literature review articles experienced different feelings about their transition to online teaching and learning. Some loved their experience, and some hated it. Some teachers felt distance and isolation while others felt rich connections and engagement. Future research could compare the perspectives of instructors who experience the same modality differently and identify which factors most influence their perception of their successes and failures. In summary, the current authors encourage continued research that will help teachers, administrators, and support staff to better understand the complexities of instructor interaction with students and content in online learning environments, especially where that research can provide insight into improving their experiences and their impact.

### **Declarations**

The authors declare that there are no conflicts of interest related to the research, authorship, or publication of this article. No ethical violations were made in the conduct of this study. This study did not involve human subjects and therefore did not require Institutional Review Board (IRB) approval.

## References

- Alemdag, E., & Erdem, M. (2017). Designing an e-mentoring program for novice teachers in Turkey and investigating online interactions and program outcomes. *Mentoring & Tutoring: Partnership in Learning*, 25(2), 123–150. <https://doi.org/10.1080/13611267.2017.1327394>
- Anderson, T. (2003). Modes of interaction in distance education: Recent developments and research questions. In M. G. Moore & W. G. Anderson (Eds.), *Handbook of Distance Education* (pp. 129–144). L. Erlbaum Associates.
- Andrews Graham, D. (2019). Benefits of online teaching for face-to-face teaching at Historically Black Colleges and Universities. *Online Learning*, 23(1), 144–163. <https://doi.org/10.24059/olj.v23i1.1435>
- Ata, R. (2016). An exploration of higher education teaching in Second Life in the context of blended learning. *Turkish Online Journal of Educational Technology*, 15(3), 9–26.
- Baran, E., Correia, A. P., & Thompson, A. (2011). Transforming online teaching practice: critical analysis of the literature on the roles and competencies of online teachers. *Distance Education*, 32(3), 421–439. <https://doi.org/10.1080/01587919.2011.610293>
- Baran, E., Correia, A. P., & Thompson, A. (2013). Tracing successful online teaching in higher education: Voices of exemplary online teachers. *Teachers College Record*, 115(3), 1–41. <https://doi.org/10.1177/016146811311500309>
- Bas, G., & Kivilcim, Z. S. (2021). Traditional, cooperative, constructivist, and computer-assisted mathematics teaching: A meta-analytic comparison regarding student success. *International Journal of Technology in Education*, 4(3), 464–490.
- Burke, K. (2021). “How can the creative arts possibly be taught online?” Perspectives and experiences of online educators in Australian higher education. *Asia-Pacific Journal of Teacher Education*, 49(3), 347–361. <https://doi.org/10.1080/1359866x.2020.1777531>
- Burrell, A. R., Cavanagh, M., Young, S., & Carter, H. (2015). Team-based curriculum design as an agent of change. *Teaching in Higher Education*, 20(8), 753–766. <https://doi.org/10.1080/13562517.2015.1085856>
- Chao, I. T., Saj, T., & Hamilton, D. (2010). Using collaborative course development to achieve online course quality standards. *International Review of Research in Open and Distance Learning*, 11(3), 106–126. <https://doi.org/10.19173/irrodl.v11i3.912>
- Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <http://doi.org/10.2307/249008>
- Englund, C., Olofsson, A. D., & Price, L. (2017). Teaching with technology in higher education: understanding conceptual change and development in practice. *Higher*



- Education Research and Development*, 36(1), 73–87.  
<https://doi.org/10.1080/07294360.2016.1171300>
- Esterhuizen, H. D., Blignaut, S., & Ellis, S. (2013). Looking out and looking in: exploring a case of faculty perceptions during e-learning staff development. *International Review of Research in Open and Distance Learning*, 14(3), 59–80.  
<https://doi.org/10.19173/irrodl.v14i3.1358>
- Glass, C. R. (2017). Self-expression, social roles, and faculty members' attitudes towards online teaching. *Innovative Higher Education*, 42(3), 239–252. <https://doi.org/10.1007/s10755-016-9379-2>
- Goodman, J., Melkers, J., & Pallais, A. (2019). Can online delivery increase access to education? *Journal of Labor Economics*, 37(1), 1–34.  
<https://www.journals.uchicago.edu/doi/abs/10.1086/698895>
- Gonzalez, B. Y. (2014). Two-year community: a six-year review of student success in a biology course using lecture, blended, and hybrid methods. *Journal of College Science Teaching*, 43(6), 14–19. [https://doi.org/10.2505/4/jcst14\\_043\\_06\\_14](https://doi.org/10.2505/4/jcst14_043_06_14)
- Graham, C. R. (2021). Exploring definitions, models, frameworks, and theory for blended learning research. In A. G. Picciano, C. D. Dziuban, C. R. Graham, & P. D. Moskal (Eds.), *Blended learning: Research perspectives*, Volume 3 (pp. 10–30). <https://doi.org/byu.idm.oclc.org/10.4324/9781003037736>
- Guppy, N., Verpoorten, D., Boud, D., Lin, L., Tai, J., & Bartolic, S. (2022). The post-COVID-19 future of digital learning in higher education: Views from educators, students, and other professionals in six countries. *British Journal of Educational Technology*, 53(6), 1750–1765. <http://doi.org/10.1111/bjet.13212>
- Hargreaves, A. (2000). Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and teacher education*, 16(8), 811–826.  
[https://doi.org/10.1016/S0742-051X\(00\)00028-7](https://doi.org/10.1016/S0742-051X(00)00028-7)
- Huang, X., & E.-Ling Hsiao. (2012). Synchronous and asynchronous communication in an online environment: Faculty experiences and perceptions. *Quarterly Review of Distance Education*, 13(1), 15–30.
- Jensen, L., Price, L., & Roxå, T. (2020). Seeing through the eyes of a teacher: differences in perceptions of HE teaching in face-to-face and digital contexts. *Studies in Higher Education*, 45(6), 1149–1159. <https://doi.org/10.1080/03075079.2019.1688280>
- Kang, H. (2012). Training online faculty: A phenomenology study. *International Journal on E-Learning*, 11(4), 391–406.
- Kayaduman, H., & Demirel, T. (2019). Investigating the concerns of first-time distance education instructors. *International Review of Research in Open and Distributed Learning*, 20(5), 85–103. <https://doi.org/10.19173/irrodl.v20i5.4467>

- Kebritchi, M., Lipschuetz, A., & Santiago, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems*, 46(1), 4-29. <https://doi-org.byu.idm.oclc.org/10.1177/0047239516661713>
- Kupczynski, L., Mundy, M.-A., & Maxwell, G. (2012). Faculty perceptions of cooperative learning and traditional discussion strategies in online courses. *Turkish Online Journal of Distance Education*, 13(2), 84–95.
- Lackey, K. (2011). Faculty development: An analysis of current and effective training strategies for preparing faculty to teach online. *Online Journal of Distance Learning Administration*, 14(4).
- Lederman, D. (2020, October 5). Faculty confidence in online learning grows. *Inside Higher Ed*. <https://www.insidehighered.com/digital-learning/article/2020/10/06/covid-era-experience-strengthens-faculty-belief-value-online>
- Luna, Y. M., & Winters, S. A. (2017). “Why did you blend my learning?” A comparison of student success in lecture and blended learning introduction to sociology courses. *Teaching Sociology*, 45(2), 116–130. <http://doi.org/10.1177/0092055X16685373>
- Maeda, Y., Caskurlu, S., Kenney, R. H., Kozan, K., & Richardson, J. C. (2022). Moving qualitative synthesis research forward in education: A methodological systematic review. *Educational Research Review*, 35, 100424. <https://doi.10.1016/j.edurev.2021.100424>
- Maguire, L. L. (2005). Literature review—faculty participation in online distance education: Barriers and motivators. *Online Journal of Distance Learning Administration*, 8(1), 1-16.
- Martin, F., Parker, M., & Allred, B. (2013). A case study on the adoption and use of synchronous virtual classrooms. *Electronic Journal of E-Learning*, 11(2), 124–138.
- Mayes, R. (2011). Themes and strategies for transformative online instruction: A review of literature. In S. Barton, J. Hedberg & K. Suzuki (Eds.), *Proceedings of Global Learn Asia Pacific 2011--Global Conference on Learning and Technology* (p. 2121-2130). Melbourne, Australia: Association for the Advancement of Computing in Education (AACE).
- McDonald, J. (2002). Is “as good as face-to-face” as good as it gets? *Journal of Asynchronous Learning Networks*, 6(2), 10-23. <https://doi.org/10.24059/olj.v6i2.1866>
- Meskill, C., & Sadykova, G. (2011). Introducing EFL faculty to online instructional conversations. *ReCALL*, 23(3), 200–217. <https://doi.org/10.1017/s0958344011000140>
- Moloney, J. F., & Oakley, B., II. (2010). Scaling online education: increasing access to higher education. *Journal of Asynchronous Learning Networks*, 14(1), 55–70. <https://doi.org/10.24059/olj.v14i1.1639>

- National Center for Education Statistics. (2022). Undergraduate enrollment. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences.  
<https://nces.ed.gov/fastfacts/display.asp?id=80>
- Raphael, C., & Mtebe, J. S. (2016). Instructor support services: An inevitable critical success factor in blended learning in higher education in Tanzania. *International Journal of Education and Development Using Information and Communication Technology*, 12(2), 123–138.
- Russell, A. (2015). Online teaching as a catalyst for re-examining pedagogical assumptions. *Journal on Excellence in College Teaching*, 26(3), 57–91.  
<http://celt.muohio.edu/ject/issue.php?v=26&n=3>
- Samuel, A. (2020). Zones of agency: Understanding online faculty experiences of presence. *International Review of Research in Open and Distributed Learning*, 21(4), 79–95.  
<https://doi.org/10.19173/irrodl.v21i4.4905>
- Samuel, A. (2022). “I’m not trying to recreate the classroom”: A qualitative study to help faculty make sense of online interactions. *American Journal of Distance Education*, 36(2), 121–134. <https://doi.org/10.1080/08923647.2022.2049150>
- Schmidt, S. W., Hodge, E. M., & Tschida, C. M. (2013). How university faculty members developed their online teaching skills. *Quarterly Review of Distance Education*, 14(3), 131–140. <https://www.researchgate.net/publication/276997259>
- Scott, K. M. (2016). Change in university teachers’ elearning beliefs and practices: a longitudinal study. *Studies in Higher Education*, 41(3), 582–598.  
<https://doi.org/10.1080/03075079.2014.942276>
- Seaton, J. X., & Schwier, R. (2014). An exploratory case study of online instructors: Factors associated with instructor engagement. *International Journal of E-Learning & Distance Education*, 29(1). <https://www.ijede.ca/index.php/jde/article/view/870>
- Shreaves, D., Ching, Y., Uribe-Flores, L., & Trespalacios, J. (2020). Faculty perceptions of online teaching at a mid-sized liberal arts university. *Online Learning Journal*, 24(3), 106–127. <https://doi.org/10.24059/olj.v24i3.2199>
- Singh, J., Evans, E., Reed, A., Karch, L., Qualey, K., Singh, L., & Wiersma, H. (2022). Online, hybrid, and face-to-face learning through the eyes of faculty, students, administrators, and instructional designers: lessons learned and directions for the post-vaccine and post-pandemic/COVID-19 world. *Journal of Educational Technology Systems*, 50(3), 301–326. <https://doi.org/10.1177/00472395211063754>
- Smith, H. A., Dymont, J. E., Hill, A., & Downing, J. (2016). “You want us to teach outdoor education where?” Reflections on teaching outdoor education online. *Journal of Adventure Education and Outdoor Learning*, 16(4), 303–317.  
<https://doi.org/10.1080/14729679.2016.1147966>

- Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76(1), 93-135. <https://doi.org/10.3102/00346543076001093>
- Taylor, S., & Wright, D. A. (2020). A case study of college of business (COB) faculty attitudes, perceptions, and concerns related to distance learning. *Online Journal of Distance Learning Administration*, 23(4).
- Thanaraj, A. (2016). Making a transition: The development of academics' role and identity in online teaching. *Practitioner Research in Higher Education*, 10(2), 40–53. <http://194.81.189.19/ojs/index.php/prhe>
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8(1), 45. <https://doi.org/10.1186/1471-2288-8-45>
- Torrissi-Steele, G. (2014). Factors predisposing academics towards the use of blended strategies: A model. *International Journal of Adult Vocational Education and Technology*, 5(3), 1–20. <https://doi.org/10.4018/978-1-4666-8246-7.ch005>
- Tuapawa, K. (2016). Interpreting experiences of teachers using online technologies to interact with students in blended tertiary environments. *International Journal of Information and Communication Technology Education*, 12(4), 76–87. <https://doi.org/10.14742/ajet.2964>
- Wargo, K. (2021). Faculty development for online learning: Catalysts for transforming practice across modalities. *Online Journal of Distance Learning Administration*, 24(3). <https://ojdla.com/articles/faculty-development-for-online-learning-sparking-transformation-of-perspectives-and-practice>
- Wingo, N. P., Ivankova, N. V., & Moss, J. A. (2017) Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework, *Online Learning*, 21(1), 15–35. <https://doi.org/10.10.24059/olj.v21i1.761>

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# TiLTing the Discussion Board: Rethinking the Purpose of Online Discussion in an Online GE Writing Course

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## Abstract

In 2021, I completed an instructional redesign of an online section of a general education (GE) course titled “Criticizing Television.” The redesign focused on utilizing Transparency in Learning and Teaching (TiLT) to create more meaningful engagement and deeper learning opportunities through discussion boards. Using the action research cycle of look, think, and act, this paper documents the redesign process and analyzes the Instructional Redesign assessment data to explore evidence-based practices for supporting meaningful inquiry and student engagement in online undergraduate general education course using TiLT. Strategies to support meaningful inquiry among students engaged in asynchronous online discussions using TiLT are offered.

*Keywords:* TiLT; Asynchronous discussion; Action research, General education

Smith, R. (2025). TiLTing the discussion board: Rethinking the purpose of online discussion in an online GE writing course. *Online Learning*, 29(4), 517-534.  
<https://doi.10.24059/olj.v29i4.3903>

“Lively, substantive online discussions are as rare as hen’s teeth...Discussion boards only rarely promote genuine exchange of ideas or the sophisticated interchange of opinions,” (Mintz, 2020, para. 4).

## Introduction

When I first began teaching online in 2013, I utilized online discussions as many other instructors did—as a virtual replacement for face-to-face conversations. Discussion boards potentially offer students an opportunity to engage with each other and the course material, and research has shown that online discussion boards can support student engagement, enhance active learning, and co-produce knowledge (Aderibigbe, 2021; Douglas et al., 2020; Han & Hall, 2019; Hew et al., 2010; Howard et al., 2019; Shi et al., 2023). However, active engagement in online discussion does not always occur (Valenti et al., 2019) and depends on the skill of the facilitator (Douglas et al., 2020), interactions with peers (Bletcher et al., 2015), and the design of the discussion assignment (Aderibigbe, 2021). While research has shown that students benefit from asynchronous discussion, Farrell (2018) and Mintz (2020) confirm the sort of student dissatisfaction I received in Student Evaluations of Instruction (SEIs) such as this: “My one critique of the class was the use of discussion posts which I feel were just busy work and have a little educational value.” I observed that students were not using discussion boards as originally intended or critically engaging with the course material and set about rethinking the way I was doing asynchronous discussions.

This article presents an instructional redesign that utilizes the Transparency in Learning and Teaching (TiLT) framework to improve student engagement with discussion boards in an undergraduate general education (GE) online course. After reviewing literature related to TiLT and its application to online learning, this study presents detailed descriptions of interventions, analyzes instructional redesign assessment data, and offers evidence-based practices for supporting meaningful inquiry and student engagement in online undergraduate general education course using TiLT.

### *Transparency in Learning and Teaching (TiLT)*

TiLT is a framework for course design that aims to improve students’ understanding of how they learn, encourages instructors to communicate how individual activities work towards learning objectives and outcomes, and advance more equitable teaching and learning practices. Methods that assist student understanding towards this end include:

- Clearly articulating learning goals and the rationale for each assignment
- Providing grading rubrics and detailing expectations
- Debriefing graded tests and assignments by identifying patterns and reviewing changes or revisions
- Asking students to record and reflect on their process of working and learning (Winkelmes, 2014)

Bata (2022) applies Winkelmes’ (2014) work on TiLT to online teaching broadly, explaining,

Redesigning online learning materials using TiLT principles would include a clear and concise purpose, appropriate tasks, and criteria to increase academic confidence, sense of belonging, and metacognitive awareness of all students, with minority and disadvantaged students reaping the most benefits. (Bata, 2022, p. 163)

There are many benefits to utilizing TiLT. Howard et al. (2020) and Bata (2022) found that the adoption of transparent assignment guidelines improved the learning outcomes for underserved students. Wengier and Dubuisson (2023) found that TiLT helped establish teacher, social, and cognitive presence, “rekindled [teacher] enthusiasm for pedagogical experimentation” (p. 112), and increased student ownership and engagement in online courses.

TiLT offers tools to facilitate meaningful inquiry and promote deep learning. Aderibigbe (2021) describes deep learning as the “thorough reflection and critical analysis” (p. 2) of material, which entails relating ideas to previous knowledge and experience and reflecting on the logic. Conversely, surface learning is evidenced by a performance orientation (Folk, 2018) that attends “only on what is required for assessment, not reflecting on purpose or strategies, and failing to distinguish guiding principles or patterns” (Aderibigbe, 2021, p. 4). Ambrose et al.’s (2010) strategies to cultivate deep learning parallel those offered by TiLT, including creating a supportive environment, showing relevance to students’ current academic lives and future professional lives, and giving students the opportunity to reflect.

Though few studies explore the use of TiLT in an online context (Bata, 2022; Wengier & Dubuisson, 2023), and none focused on its usefulness for asynchronous discussion, TiLT offers a framework to reconsider how and why we use discussion boards to promote deep learning. Research has much to say about asynchronous discussion boards, but few developed applied teaching models (Hammond, 2005). So, how do we structure discussions to better engage students and encourage participation? Several researchers have offered recommendations.

1. Create clear expectations for discussions (Blecher et al., 2015; Goshtasbpour et al., 2022; Simon, 2018) including identifying what is rewarded and valued (Ambrose et al., 2010)
2. Offer discussion board alternatives such as optional live discussion (Simon, 2018), collaborating on a wiki (Mintz, 2020) or submitting posts as an assignment rather than discussion post (Farrell, 2021).
3. Clarify instructor role and provide feedback and coaching (Blecher et al., 2015; Dixon et al., 2006; Goshtasbpour et al., 2022; Simon, 2018;). Ambrose et al. (2010) describe this as providing early opportunities for success and targeted feedback.
4. Track participation and provide rubrics for grading (Rossman, 1999).
5. Create better prompts (Mintz, 2020) such as questions students and instructors care about (Simon, 2018) and connecting material to student’s interests (Ambrose et al., 2010).

6. Use discussion leaders and limit the number of students in a discussion group (), what Mintz (2020) describes as raising the stakes.
7. Ask students to do something, rather than simply pose a question (Mintz, 2020)
8. Provide guidance on how to select posts to respond to (Goshtasbpour et al., 2022)
9. Offer alternative means of expression including different modes of contribution in addition to public discussion posts (Farrell, 2018)

While creating multiple formats for grading a single assignment may not be feasible for large, online sections, it does encourage moving outside the incentivization/punishment model, drawing on Universal Design for Learning (UDL) guidelines for providing multiple means of engagement, representation, action and expression, something Bata (2022) also recommends for TiLTing online learning.

This literature provided an overview of TiLT and its usefulness for online teaching to support deep learning and student success. Description of implementation and impact on student performance and perceptions addresses Hammond's (2005) call for more applied models of teaching related to asynchronous discussion. Therefore, the question guiding this research is: How has the use of TILT in a course redesign impacted student engagement, including evidence of deep learning and performance, in asynchronous discussion boards?

## **Instructional Redesign and Action Research**

This study utilized action research, a process of looking, thinking, and acting on a problem or issue (Stringer & Ortiz Aragon, 2021) to address the question of how using TILT in course redesign impacted student engagement in asynchronous discussions. This approach is appropriate given Stringer's (2007) assertion of the importance of "detailed description of the context(s), activities, and events that are reported as part of the outcomes of the study" (p. 59) in action research in responses to Hammond's (2005) call for more applied teaching models. This study began by noticing issues related to online discussion performance. After completing instructional redesign during summer 2021 using TiLT to redesign online discussions, data were collected from the subsequent two semesters to assess the changes by comparing student performance, identifying themes in student responses and exploring how the strategies for supporting meaningful inquiry and student engagement worked. Additional changes to the course were subsequently made based on these findings, many of which are presented throughout the paper, continuing the action research cycle of look, think, act.

### ***Context***

"Criticizing Television" is a three-credit hour undergraduate art education course that fulfills two GE requirements: cultural diversity and second-level writing. Six to 14 sections of this course are offered each semester, both in-person and online, and enrollment is capped at 25 students. The course is taught by faculty, lecturers, and graduate teaching associates. Subsequently, much of the content and structure of the course is standardized across sections, including the grading scheme. The online section is asynchronous and structured into weekly



modules on Canvas, the Learning Management System (LMS). Each module begins with a weekly overview page introducing the topic, content and activities through video and text. The modules also include a writing and research lesson, two to three assigned readings and/or viewings, a learning check, and a discussion. There are three formal writing assignments on topics related to television criticism. The weekly discussions make up 30% of the student grade, forming a backbone to the course structure.

### ***Participants***

This study examined selected coursework from four sections of “Criticizing Television” between spring 2021 and spring 2022 with 94 total enrolled students (24, 22, 25, and 23 respectively). Students enrolled in the class are typically non-major students (89.5% of students completing SEIs for this course during the period of study reported that the primary reason for taking this class was that it fulfilled a GE requirement) and often take the class as juniors or seniors despite it being a 2000-level course. No additional demographic information was documented.

### ***Methods***

The data collected for this study included student work typically assigned and completed in the course. All data were compiled anonymously and identified only by semester after final grades were submitted. This study was approved as exempt by the researcher’s Institutional Review Board. Data included:

1. SEI scores and comments from before and after the instructional redesign (spring 2021 through spring 2022)
2. Student responses from an ungraded midterm check-in survey during and after instructional redesign (summer 2021 through spring 2022)
3. Student responses to two discussion boards and average grades from before and after the instructional redesign (spring 2021, autumn 2021 and spring 2022)

### ***Instruments***

The midterm check-in was completed anonymously. Survey response rates from spring 2021 through spring 2022 were 95.83%, 95.45%, 100%, and 82.61%, respectively. The survey included the following questions:

1. Are you having any issues with the course technology?
2. What is the most important thing you’ve learned so far this semester?
3. Is there anything I can do to make this class better?
4. Is there anything I can do to make our student/teacher relationship better?
5. Which has been the most useful material provided to you so far this semester, and why?
6. What is one thing you’ve learned or practiced in this class that you’ve applied beyond this class?

The midterm check-in for summer 2021 asked an additional question to assist in the instructional redesign:

Tell me your thoughts about the discussions. Are the prompts engaging? Are the expectations clear and reasonable? Is the feedback from your classmates helpful to your thinking about the weekly topic and/or your writing? In an ideal world, what would this part of the class (weekly engagement with different ideas on television) look like for you?

### ***Data Analysis***

Data were analyzed using a layered analysis approach (Keifer-Boyd, 2013) and involved color coding two discussion boards (including threads and responses) and student responses to the midterm check-in survey. These codes were then reassembled in conversation with the literature. For example, to explore deep learning in diverse types of discussion board responses (a practice discussion typically assigned during week nine and a criticism discussion typically assigned during week 11) I began by highlighting places of repetition and interest. From there, I noticed that highlighted areas loosely corresponded with the indicators of deep learning presented in Aderibigbe (2021, p. 4), and I returned to the data to look more carefully for places where students asked questions, offered feedback, extended ideas, connected to readings/viewings, and related to past experience. This was then organized into a chart counting frequency per type of response. Student responses to the midterm check-ins were coded according to what was identified by students as important or impactful. These were then categorized according to which aspect of the class was addressed. These were again organized into a chart calculating frequency. These frequencies of codes were then layered with highlighted examples, student performance measures (report of average discussion board scores), and notes of my own perceptions of the quality of work presented in relation to previous terms. Finally, I utilized these findings to make further changes to the course, continuing the action research cycle. The themes that emerged from this process are presented and discussed in the findings section.

### ***The Interventions***

In summer 2021, three initial elements of discussion redesign were implemented to better articulate the learning objectives and expectations. These included:

1. Adding explicit expectations in the discussion guidelines that students reply to all comments left on their post, explaining: “I require replies to comments left on your work to establish a baseline of gratitude for your peers taking the time to read, think and respond to your work.”
2. More explanation of discussion rationale in the first week’s announcements.
3. Adding a mini-criticism focused discussion, which was an adaptation of a formal paper assignment to accommodate the shift from a 15-week semester to 6-week summer term. The discussion response guidelines asked students to provide feedback on the writing of the discussion post in addition to discussing the content, becoming an informal peer

review. Though not directly informed by TiLT at this stage of the intervention, the addition of writing feedback into the discussion response expectations became a crucial element of rethinking the purpose of discussions.

Following student feedback on these initial interventions and utilizing TiLT, I rewrote the discussion guidelines in autumn 2021 to clarify the purpose of and expectations for each discussion as follows:

The purpose of discussion boards in this class is to provide a place for students to complete weekly assignments and give feedback to one another. I use discussion forums to complete these assignments to give opportunity to “see other people's ideas and writing styles, for feedback on your writing, and look at television and social issues from a variety of perspectives” (student feedback about the value of discussions, Autumn 2020). There are different types of discussions with different goals.

1. **Practice discussions** ask students to complete an exercise to apply knowledge from the textbook to their own viewing of television. The audience for this writing is primarily the instructor, and feedback from classmates and instructor provides additional insight and questions.
2. **Reflection discussions** ask students to think about their own experiences with writing and television criticism as well as think deeply about what you learned and how you learned it. The audience for this writing is mainly yourself, and feedback from classmates and instructor provide additional insight and questions. These can be written or video/audio recordings.
3. **Criticism discussions** ask students to apply the frameworks and lessons from class to their own television viewing to persuade their peers about an idea or to watch the show. The audience for this writing is your peers. Feedback from classmates and instructor will assist in developing writing as well as contribute additional insight and questions.
4. **Peer Review discussions** ask students to share a draft of their writing assignments and give feedback to their peers. (Smith, 2021a)

Finally, I added the discussion guidelines to the “Getting Started” module, which students are required to complete prior to beginning the course, and to the top of corresponding discussion prompts. Clarifying, and then repeating, the purpose for each discussion helped remind students the intent for the activity and how to best utilize the space, an example of redundancy (Bata, 2022), “reduc[ing] the cognitive resources that learners have to expend on tracking course organization” (Eblen-Zayas, 2021, p. 69), and better understanding assignments (Wengier & Dubuisson, 2023).

## Findings

Student feedback from the summer 2021 midterm check-in showed that prompts worked well and expectations clearly stated. One student summarized the consensus:

I think that the discussions are a great and reasonable weekly assignment for the course. The expectations are clear and it's great that you force us to engage with our classmates and communicate with them so that we all can improve together. I like how you give us choice for the topic and prompts we are almost interested in to write about. They always make me think outside of the box, too, which is nice. I think that these assignments are ideal and give us all the opportunity to better our writing skills while discussing important topics with our peers.

Students shared ways that discussions contributed to their learning in the course. Some mentioned the feedback provided in the peer responses. For others, the discussions provided accountability for the course materials, one student commenting in the autumn 2021 midterm check-in that “writing [my discussion post] causes me to read more, understand the concepts, and apply them to my own experiences.” This feedback confirmed the need for reconsidering and better defining the purpose of discussion board assignments beyond a replacement for face-to-face conversation.

Discussions increased in importance for students. Before and during redesign, few students identified discussions as the most important material presented in class (13.04% in spring 2021 and 14.29% in summer 2021). After redesign, most students (56% in autumn 2021 and 68.42% in spring 2022) identified discussions as the most important material. Students identified several varied reasons for this, including:

- The opportunity to give and receive feedback on their writing from peers as well as instructor, which “helps me improve my writing for future assignment.”
- Exposure to different perspectives on the same topic.
- The opportunity to practice writing skills and apply the lessons in a more informal space.
- The opportunity to apply the lessons about analyzing TV, including theory and production elements.

From the midterm check-in responses and discussion boards, I found significant ways that TiLT, specifically the strategies of articulating learning goals and rationale and providing grading rubrics and detailed expectations, improved student performance, and engagement on discussion boards.

### ***Clear Guidelines and Expectations Promote Student Success by Establishing Clear Patterns of Engagement***

In the summer 2021 midterm check-in, students expressed confusion about discussion deadlines and demonstrated performance orientation toward discussions. For example, one student complained in the spring 2021 SEI comments that “points were taken for the smallest of errors and I felt as if I had to do things the instructor's way or I would lose points. This made it

impossible to actually learn and enjoy the class.” These comments prompted me to write more transparent and explicit grading practices to clarify expectations for class participation. Previously, I only communicated how much the discussions are worth (5 points) and that students would lose points for not meeting expectations. In autumn 2021, I expanded the discussion guidelines grading section as follows:

How will your blog posts and discussion contributions be scored?

These are participation points (5 points). Participation is 30% of your total grade (so each discussion is roughly 2% of your grade). No discussion posts are accepted after the posted deadline.

Discussions are graded as follows:

- Initial discussion post submitted on time (1 point)
- Discussion post follows prompt instructions (1 point)
- References all assigned readings and viewings (1 point)
- Peer responses (2 points)

So, if you were to submit a discussion prompt, but did not reference the assigned readings, you would earn 4/5 points. If you submitted a discussion post and no peer responses (and 2 were required), you would earn 3/5 points. (Smith, 2021a)

In addition to clarifying the criteria, I began offering more substantial feedback using submission comments during the first few weeks of the semester. This provided many opportunities for students to acclimate to the expectations and make changes to their performance, something Ambrose et al. (2010), Goshtasbpour et al. (2022), and Simon (2018) encourage. I utilized the following messaging to explain why students lost participation points and how students could fulfill the discussion expectations:

To receive full credit for future discussion, please do the following:

- Submit the initial post by the deadline to give your peers adequate time to read and respond.
- Reference all assigned readings and viewings. This is your opportunity to engage with the assigned readings and viewing. References do not need to be formal, but it is a good opportunity to practice APA citation formatting.
- Respond to 2 peer posts and to all comments left on your post.

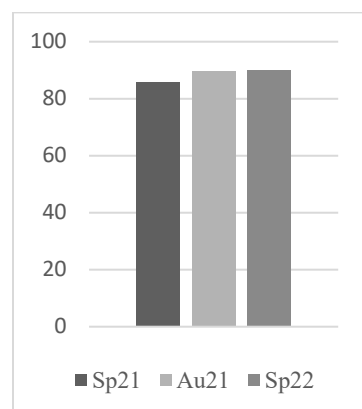
Review the Discussion Guidelines posted in the Getting Started module for further information about post requirements. (Smith, 2021b)

This resulted in an overall trend of student grades improving and plateauing the remainder of the semester. In addition, I received fewer questions about lost points. Clearer

description of participation expectations, creation of a rubric, and repeated reference back to this rubric in assignment comments mitigated student confusion and led to student performance increase between spring 2021 and spring 2022 as seen in Figure 1.

**Figure 3**

*Discussion Board Participation Score Averages*



Two unexpected outcomes from these changes emerged. First, while almost all students stated that the discussion expectations were clear, not all students met them. On average, 72.73% of students in summer 2021 lost one or more points on the weekly discussion. One student who frequently lost points also shared in the autumn 2021 midterm check-in, “I love your discussions because the directions are pretty clear. Also my classmate responses are helpful and they get me thinking.” This was a surprise. While it reiterated the importance of clear expectation guidelines and a grading rubric to create a baseline for participation and provide consistent feedback, I realized not all students will meet these expectations. This may occur for many reasons, and the role of an online instructor is to provide clear and repeated explanation of expectations so that students know how to improve their efforts (Bata, 2022; Belcher et al., 2015; Dixon et al., 2006; Rossman, 2019; Wengier & Dubuisson, 2023). This might take the form of explaining that peer responses provide opportunities to learn about different perspectives and receive valuable feedback on writing or sharing that by not taking advantage of reading and responding to peer posts deprives the student and the class of that contribution. Moreover, the comment was an important reminder that while students may not meet expectations laid out in the assignment guidelines, they may still be engaging with the materials in meaningful but less visible ways as Shi et al. (2023) also found.

Another unexpected outcome was a focus on the transferability of discussion etiquette. One intervention required students to reply to all peer comments on their initial discussion posts, about which one student commented in the summer 2021 midterm check-in: “I like that we are encouraged to reply to comments on our posts. I do not think I have been asked to do this in previous classes.” In the autumn 2021 and spring 2022 midterm check-in, 12% and 5.26% students respectively also identified discussion skills as something they applied outside of the course, including writing better posts and how to provide feedback to classmates. Not all students are prepared for online communication and providing a framework for how to engage

with peers online helps “[foster] learners’ capability to engage in online discussion [and] contribute to [a] successful learning experience” (Han & Hall, 2019, p. 47). TiLT encourages students to reflect on how they learn, and this includes the way they engage in discussions, which is especially significant when transferred to other academic contexts.

### ***Modeling Patterns of Engagement***

A key assumption of TiLT is that “transparent expectations combined with transparent assignments contribute to enhanced student engagement and academic achievement” (Howard et al., 2020, p. 199). In autumn 2021, I added specific peer response guidelines for peer review discussions. The new guidelines asked students to attach a file with track changes and use the 3-2-1 Model of Feedback to craft their responses, which included three suggestions for improvement, two interesting points, and one good question. Previously, I instructed students to provide specific and detailed feedback and suggested attaching a file with track changes. Only 40.91% of students attached at least one track changed document in their two required peer reviews. After adding explicit expectations, the peer review responses were more comprehensive. In autumn 2021 and spring 2022, 79.17% and 85% of students respectively attached two files. One student shared,

I was surprised to find that I was able to improve my own essay through peer editing other people’s essays, too. I think going through those papers looking for specific fixes made me realize I was making a lot of the same mistakes in my own paper that I might not have caught otherwise.

Moreover, two students specifically mentioned the 3-2-1 Model Feedback in the midterm check-in as something that they have used beyond the class. One student wrote,

I’ve adapted what I’ve learned in this class into the way I peer review assignments when a friend [asks] me to. I am more concise about ways that they could improve on their point or reasons why I am [confused].

Like the peer review discussions, criticism discussions focused on providing feedback in response to peers helped students prepare their formal papers. In a typical criticism discussion such as the one assigned in week eleven, nearly every peer response provided feedback on the writing and content of the post. Before clarifying the purpose of this discussion to include practicing analytical writing skills, applying the research and writing lessons, and including feedback as an element of response requirements, only 2.17% of responses in spring 2021 included any kind of feedback on writing. After the intervention, 89.58% peer responses in autumn 2021 and 88.10% in spring 2022 included feedback. More significant was that this feedback referenced specific writing elements discussed in the weekly writing and research lessons. Students shared that participation increased in the discussions, they learned from the varying perspectives of their peers, and gave them “ideas to think about for future writing assignments” through the process of giving and receiving feedback. Curiously, 17.78% of student responses in autumn 2021 and spring 2022 specifically related feedback to the discussion prompt guidelines such as connecting to the assigned readings or bolding the thesis statement.

By and large, clarifying the purpose of various kinds of discussions and providing the 3-2-1 Model of Feedback helped students develop their ability to engage with peers' posts. However, not all discussions were designed to give and receive feedback. In the practice discussion in week nine, 52.27% peer responses in autumn 2021 continued providing feedback on writing even though this was not explicitly required in the response expectations. In addition, only 52.27% of student responses expanded on an idea. Before the addition of the feedback requirement, 95.34% of student responses took an idea from the peer post and connected it to the assigned readings, their own choice viewing, personal experience, or other resources. While this attention to practicing writing skills met the learning objective of this second level writing course, it did so at the cost of critical engagement with the weekly topics.

Based on these observations, I concluded that students caught on to the feedback response pattern and added guidelines for discussion response requirements following the Spring 2022 course iteration to establish a clearer pattern of engagement that emphasized students' critical engagement first and writing feedback second:

1. **Reflect.** Choose an idea or question from your peer's post to reflect on. This is more than "I agree with...". If you agree (or disagree), why? What is your experience with this idea? How might you interpret it differently?
2. **Connect.** Make specific connections to the readings, shows, and other resources (include links where relevant) to offer other perspectives and interpretations, or to deepen the analysis.
3. **Question.** Ask the author questions about their ideas.
4. **Provide Feedback.** Please use the 3-2-1 model of feedback. (Smith, 2022)

Anecdotally, over two semesters of teaching with this addition, the response patterns have focused more on engagement of ideas and less on providing specific writing feedback. Clear guidelines promote patterns of participation that support the desired engagement for the learning community and learning objectives for the course.

### ***Evidence of Deep Learning Because of Requiring Questions and Replies***

Student performance does not necessarily indicate meaningful engagement as found with the student who consistently performed poorly according to their grade but indicated that discussions "got [them] thinking." One goal for rethinking discussion boards was to set them up to maximize the potential for deep learning. Looking at the ways in which the response guidelines shared in the previous section encouraged deep learning, I returned to the indicators shared by Aderibigbe (2021), including

an intention to understand material for oneself, vigorous and critical interaction with knowledge content, relating ideas to one's previous knowledge and experience, discovering and using organizing principles to integrate ideas, relating evidence to conclusions, [and] examining the logic of arguments. (Aderibigbe, 2021, p. 4)



Overall, initial discussion posts following redesign were not any more or less substantial than previous semesters. However, the impact of the interventions appeared in the quality of engagement with their peers through required responses, revealed in discussions as recognizing different perspectives, asking questions, and reflection.

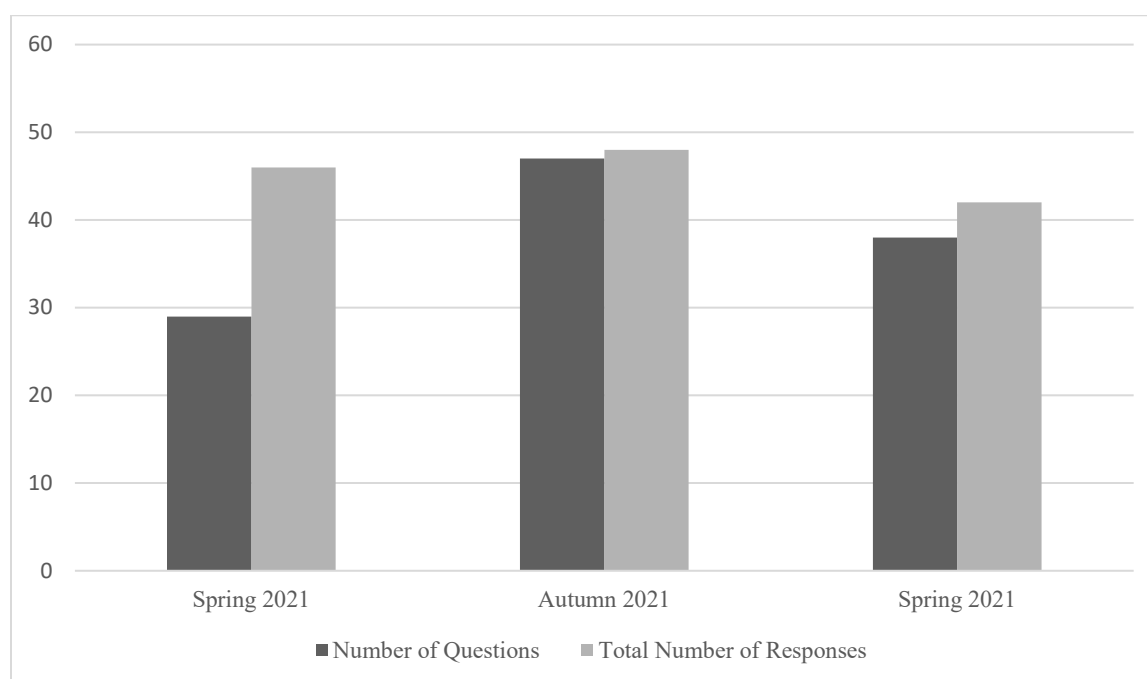
### Different Perspectives

Students appreciated reading and criticizing their classmate's posts and hearing about different perspectives. One student shared in the midterm check-in how they "once wrote a discussion on the same topic with my classmates, but we have different conclusions, but I still agree with her answer, but we choose different angles to answer." Another student shared multiple times throughout the course about a particular peer's post that was transformative in their thinking and spurred a reconsideration of the values leading to different interpretations of the same television show. These examples provide evidence of deep learning, in which students explore "different points of view, extending and expanding current understanding" (Han & Hall, 2019, p. 41) and recognize the logic behind arriving at different conclusions. The opportunity to explore different perspectives supports one of the course learning outcomes: "Explore and problematize a diversity of perspectives on television in American life, placing your personal experiences with television within a broad social and scholarly context" (Smith, 2021c).

The focus on different perspectives also promotes increased engagement with peers. One student shared in the autumn 2021 midterm check-in that "I am often surprised when reading other comments and I wonder what else the person thought about regarding the topic." Another student shared in spring 2022, "I often read more than just two of my peers' posts and the extent of differing ideas and opinions is very interesting. People can come up with such complex, good stuff" supporting Wengier and Dubuisson's (2023) finding that TiLT helps establish and sustain community of inquiry.

### Asking Questions

The peer response guidelines asked students to share a question and reply to comments left on their initial post, a change that supported increased deep learning indicators in peer responses. One challenge to implementing the requirement for replies to comments was that the LMS did not send notifications when a comment was made on a user's post; notifications were only sent when a comment has been made on the discussion board. Many students did not know that peers had commented on their post. However, there was an overall increase in the questions included in peer discussion comments as seen in Figure 3. Sixty-six percent of students on average replied to at least one comment left by a peer on their initial post. In these replies, students tended to extend an idea or connect to the assigned readings, viewings, or other individual experiences in a new way. While a "check-list mentality" seemed evident in many students' responses, the requirement to ask questions and reply to peer comments encouraged students to break the responses into multiple steps, including considering a different perspective, asking a question, and then answering those posed to them.

**Figure 4***Questions Included in Peer Discussion Comments*

### Reflection

Reflection discussions were designed specifically to focus on reflecting on learning or previous experiences, a strategy suggested by Ambrose et al. (2010) to support deeper learning. In autumn 2021, I rewrote the week one reflection discussion prompt to emphasize goal setting and personal interests. Then, I asked students to return to this post to review the goals they set and how they worked towards them over the course of the semester in the final reflection discussion. Another reflection discussion asked students to apply their analysis for the week to reflect on how their experiences with television shaped their views of the world. Integrating these reflection opportunities in discussions as well as learning check quizzes further connected the disparate elements of the class. Students clearly articulated both challenges and successes in the midterm check-in. In autumn 2021 and spring 2022, 68% and 68.42% of students respectively identified specific aspects of the class and/or student teacher relationship such as structure, feedback, multiple examples of lesson, and communication that contributed to their satisfaction with the class. This reflective practice cultivated a supportive learning environment, which Ambrose et al. (2010) cite as a principal element of student success.

### **Discussion**

This research is not definitive due to the limitations of a single instructor, single course action research study. While the purpose of action research study is primarily to create change for a specific community, in this case, the teaching practice of a single instructor benefiting students of a single course, there are some important transferable findings. These include

detailed descriptions of specific interventions related to asynchronous discussion design that can be adapted to other teaching contexts. Moreover, this narrative of redesign interventions and student feedback and outcomes joins Wengier and Dubuisson (2023) as an example of how TiLT can guide online course design, specifically supporting asynchronous discussion design and facilitation. Additional studies exploring the implementation and impact of TiLT in online learning for both students and teachers are needed on a larger scale.

This study asked how the use of TiLT in a course redesign improved student engagement in asynchronous discussions. Not only did student performance improve with the interventions described, but increased student engagement through asking and responding to questions and indicators of deep learning were presented. Overall, I found that defining an intentional use of discussion boards (to reflect, practice skills, offer peer review, or engage in criticism) supported deep learning. Clearly articulated guidelines and expectations for assignments, repeated in multiple places throughout the course, helped students better engage with those activities, improved student performance, and alleviated issues observed in previous iterations of the course. While clear guidelines did not guarantee a high level of critical engagement or maximum student performance, they established patterns of student engagement with the course. Additional research on how guidelines establish patterns of student engagement across multiple courses is needed to further generalize these findings.

Though this study focused on student performance with TiLT informed interventions, the role of the instructor was vital to the success of their implementation. Students appreciated instructor participation in the discussion board and feedback in the grading comments. These interpersonal variables support course design, suggesting that while the TiLT framework is an important element of equitable education, it must be backed with instructor presence and support. Further study of instructor role in teaching a TiLTed course is needed, building on studies such as Dixson et al. (2006).

Finally, these findings support those that indicate that transparent teaching online contributes to student success (Bata, 2022; Howard et al., 2020; Wengier & Dubuisson, 2023). None of these studies, including this one, are longitudinal or span multiple teaching contexts. However, students' identification of transferable skills and qualitative evidence suggests there is impact beyond an individual class. Providing opportunities for reflection on learning, including goal setting and application of course content and skills beyond the course, help extend student success in an individual course to other contexts, and would be worth further consideration in future studies.

## **Declarations**

The author has no conflicts of interest to disclose.

## References

- Ambrose, S.A., Bridge, M.W., DiPietro, M., Lovett, M.C., & Norman, M.K. (2010). *How learning works: Seven research-based principles for smart teaching*. San Francisco, CA: Jossey-Bass.
- Aderibigbe, S. A. (2021). Can online discussions facilitate deep learning for students in General Education? *Heliyon*, 7, 1-6. <https://doi.org/10.1016/j.heliyon.2021.e06414>
- Baldwin, S. & Ching, Y. (2019). Online course design: A review of the Canvas course evaluation checklist. *International Review of Research in Open and Distributed Learning*, 20(3), 269-282. <https://doi.org/10.19173/irrodl.v20i3.4283>
- Bata, H. (2022). Effectiveness of TILT across online learning platforms. In H. Bata, D. Akella, L. Paudel, N. Wickramage, M. Rogers, & A. Gibson (Eds). *Integrating transparency in learning and teaching (TILT): An effective tool for providing equitable opportunity in higher education*, 162-178. IGI Global.
- Belcher, A., Hall, B., Kelley, K. & Pressey, K. (2015). An analysis of faculty promotion of critical thinking and peer interaction within threaded discussions. *Online Learning*, 19(4), 1-8, <https://doi.org/10.24059/olj.v19i4.544>
- Dixon, M., Kuhlhorst, M., & Reiff, A. (2006). Creating effective online discussion: Optimal instructor and student roles. *Online Learning*, 10(4), 15-29. <https://doi.org/10.24059/olj.v10i4.1743>
- Douglas, T., James, A., Earwaker, L., Mather, C., & Murray, S. (2020). Online discussion boards: Improving practice and student engagement by harnessing facilitator perceptions. *Journal of University Teaching & Learning Practice*, 17(3), 1-14. <https://eric.ed.gov/?id=EJ1264456>
- Eblen-Zayas, M. (2021). Promoting transparency when experienced faculty transition to online teaching. *The Journal of Faculty Development*, 35(2), 65-71.
- Eodice, M., Geller, A.E., & Lerner, N. (2016). *The meaningful writing project: Learning, teaching, and writing in higher education*. Logan, UT: Utah State University Press.
- Farrell, M. (2018). Rethinking online discussions for inclusion. *Research Gate*. <https://doi.org/10.13140/RG.2.2.19115.28964>
- Folk, A.L. (2018). Drawing on students' funds of knowledge: Using identity and lived experience to join the conversation in research assignments. *Journal of Information Literacy*, 12(2), 44-59. <https://doi.org/10.11645/12.2.2468>

- Goshtasbpour, F., Swinnerton, B. J. & Pickering, J. D. (2022). Twelve tips for engaging learners in online discussions. *Medical Teacher*, 44(3), 244-248.  
<https://doi.org/10.1080/0142159X.2021.1898571>
- Hammond, M. (2005). A review of recent papers on online discussion in teaching and learning in higher education. *Online Learning*, 9(3), 9-23. <https://doi.org/10.24059/olj.v9i3.1782>
- Han, S. & Hill, J. (2015). Building understanding in asynchronous discussions: Examining types of online discourse. *Online Learning*, 10(4), 29-51.  
<https://doi.org/10.24059/olj.v10i4.1744>
- Hew, K.F., Cheung, W.S. & Ng, C.S.L., (2010). Student contribution in asynchronous online discussion: A review of the research and empirical exploration, *Instructional Science*, 38(6), 571-606. <https://doi.org/10.1007/s11251-008-9087-0>
- Howard, T. O., Winkelmes, M. & Shegog, M. (2020). Transparency teaching in the virtual classroom: Assessing the opportunities and challenges of integrating transparency teaching methods with online learning. *Journal of Political Science Education*, 16(2), 198-211. <https://doi.org/10.1080/15512169.2018.1550420>
- Keifer-Boyd, K. (2013). Critical action research activist: Social structure and human agency. In M. Buffington & S. W. McKay (Eds.), *Practice theory: Seeing the power of art teacher researchers*, 246-251. Alexandria, VA: NAEA Press.
- Kelly, R. (2009, Sept. 15). A modular course design benefits online instructor and students. *Faculty Focus: Higher Ed Teaching Strategies from Magna Publications*.  
<https://www.facultyfocus.com/articles/online-education/a-modular-course-design-benefits-online-instructor-and-students/>
- Mintz, S. (2020, February 20). Beyond the discussion board. *Inside Higher Ed*.  
<https://www.insidehighered.com/blogs/higher-ed-gamma/beyond-discussion-board>
- Pace, D. & Middendorf, J. (2004). Decoding the disciplines: Helping students learn disciplinary ways of thinking. *New Directions for Teaching and Learning*, 98, 1-12.  
<https://doi.org/10.1002/tl.142>
- Shi, H., Hur, J., Tang, Y. M., & Dennen V. P. (2023). Instructional strategies for engaging online learners: Do learner-centeredness and modality matter? *Online Learning*, 27(4), 271-294. <https://doi.org/10.24059/olj.v27i4.4038>
- Simon, E. (2018, November 21). 10 tips for effective online discussions. *Educause Review*.  
<https://er.educause.edu/blogs/2018/11/10-tips-for-effective-online-discussions>
- Smith, R. (2021a). *Discussion Guidelines* [Canvas page]. CarmenCanvas.  
<https://carmen.osu.edu/>

- (2021b). *Instructor Feedback* [submission comment]. CarmenCanvas. <https://carmen.osu.edu/>
- (2021c). ARTEDU 2700.03: Criticizing Television [Syllabus]. The Ohio State University, Columbus.
- (2022). *Discussion Guidelines* [Canvas page]. CarmenCanvas. <https://carmen.osu.edu/>
- Stringer, E. (2007). *Action research* (3<sup>rd</sup> ed). Thousand Oaks, CA: Sage.
- Stringer, E. & Ortiz Aragon, A. (2021). *Action research* (5th ed.). Thousand Oaks, CA: Sage.
- Valenti, E., Feldbush, T. & Mandernach, J., (2019). Comparison of faculty and student perceptions of videos in the online classroom, *Journal of University Teaching and Learning Practice*, 16(3). <https://files.eric.ed.gov/fulltext/EJ1224007.pdf>
- Wengier, S. & Dubuisson, L. (2023). Promoting student success with TiLT in asynchronous online classes. *Perspectives in Learning*, 20(1). <https://csuepress.columbusstate.edu/pil/vol20/iss1/10>
- Winkelmes, M. (2014). Transparency in Learning and Teaching Project. <https://TiLThighered.com/transparency>

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# Towards a Future of Qualifications: A Systematic Review of Micro-Credentials

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## Abstract

Micro-credentials are bite-sized collections of skills or knowledge, complementing formal, informal, or non-formal degrees or certificates. Clarifying the role of micro-credentials in open and distance learning, a comprehensive review of the existing literature is essential. This study presents the results of a systematic literature review employing the PRISMA method to analyze the integration of micro-credentialing systems, stakeholder perceptions of their value, the impact of emerging technologies on their recognition, and future trends. A total of 205 publications, encompassing as specified terms of micro-credentials in their title, were retrieved from the Web of Science and Scopus databases. The results were discussed in five principle impact areas including the strategies in higher education and lifelong learning, sector-specific upskilling and reskilling, the digital proof of competency, challenges in design and implementation, and critiques on micro-credentials. The study reveals the evolution of micro-credentials and provides a roadmap for their future advancement.

**Keywords:** Micro-credentials; Qualifications; Lifelong learning; Upskilling and reskilling; Digital badges; Higher education

Yıldırım, H., Kır, Ş., & Bozkurt, A. (2025). Towards a future of qualifications: A systematic review of micro-credentials. *Online Learning*, 29(4), 535-559.  
<https://doi.org/10.24059/olj.v29i4.4969>

## Introduction

The higher education system has been criticized for confining education within the campus walls, failing to respond to current needs in today's world where the flow of information is faster than in the past, not allowing learners to upskill or reskill themselves and not supporting lifelong learning processes sufficiently. In such a scene, what would it be like if there was a model that could counter these criticisms, link education with more flexible and lifelong learning processes, and provide different entry and exit points in our learning journey? As a response to this query, micro-credentials—stackable, combinable, or transferable qualifications—are emerging as a promising solution to the above-mentioned criticism. In this regard, the main purpose of this study explores the scholarly landscape of micro-credentials and provides a broader perspective by adopting systematic review and data mining and analytics approaches. This review aimed to answer the following research questions: (1) How are micro-credentials conceptualized and strategically positioned within the context of higher education and lifelong learning? (2) What roles do micro-credentials play in addressing sectoral needs for upskilling and reskilling, particularly through flexible curriculum solutions? (3) How are micro-credentials being implemented and validated as digital proofs of skills and competencies through emerging technologies such as blockchain and AI? (4) What frameworks and strategies are proposed for the design, development, and implementation of micro-credentialing systems? (5) What are the critiques and challenges associated with the adaptation, accreditation, and standardization of micro-credentials in online and distance learning environments?

## Literature and Background

### *What are micro-credentials?*

Micro-credentials, as an umbrella term (UNESCO, 2018), encourage inclusive learning pathways for everyone while also serving as a professional development strategy and addressing the workforce's demands for upskilling and reskilling. Since micro-credentials have characteristics including transparency, portability, and flexibility, learner-centered brief training programs may now match the rapidly changing learning demands of formal, informal, and nonformal learning environments. Micro-credentials are short, targeted learning certifications that formally recognize specific skills, knowledge, or competencies acquired through various learning modalities (Oliver, 2019; UNESCO, 2022). Unlike traditional qualifications, micro-credentials offer flexibility, stackability, and alignment with labor market needs, often verified through digital means such as badges or digital certificates.

Even though there are various definitions for this term, they generally refer to identical ideas. As “learning opportunities of smaller volume than for traditional qualifications,” micro-credentials, according to the European Commission (2021, p. 1), “enable the targeted, flexible acquisition and recognition of knowledge, skills, and competencies to meet new and emerging needs.” Furthermore, they state that “micro-credentials are not a substitute for regular qualifications. Rather, they can enhance traditional credentials and provide a chance for lifelong learning for anyone.” In addition to the definitions being comparable, what distinguishes McGreal and Olcott's (2022) definition from the European Commission's is the potential that micro-credentials could substitute for traditional education. One of the most commonly used definitions of micro-credentials highlights that they are an additional, alternative,



complementary, or part of a formal certification that belongs to an assessed learning process (Oliver, 2019). Micro-credentials, as a potential way for people outside of higher education to acquire competencies and expertise and confirm their competence (Bozkurt & Brown, 2022; Kır et al., 2025), present novel opportunities for lifelong, life-wide, and life-deep learning. Micro-credentials, with bundled or unbundled characteristics, enable personalized learning adventures for learners on their lifelong learning path (Pelletier et al., 2021). Because of their flexible nature, micro-credentials offer an opportunity to incorporate them into the formal educational process in the future. Besides, micro-credential programs that align with the Bologna process are more effortlessly integrated into undergraduate and graduate degrees (Şenocak & Kır, 2022).

The Council of the European Union has set certain standards on the niche and nature of micro-credentials, advising Member States and micro-credential providers on the principles that the designs should incorporate in 2022. It is highlighted that these principles are universal and serve as a basis for micro-credentials excellence in all areas of practice. Figure 1 depicts these ten fundamental principles that have several distinctive characteristics within their main subjects.

**Figure 1**

*European Principles Design and Issuance of Micro-Credentials*



The increasing interest in micro-credentials is not merely an innovation within higher education, but a response to longstanding concerns raised by employers over the past four decades regarding the misalignment between university qualifications and workforce needs. The

diminishing perceived value of traditional degrees in securing sustainable employment has significantly contributed to the emergence of alternative credentialing systems aimed at validating job-relevant skills.

***Why has the concept of micro-credentials grown so popular in research?***

With the development of more adaptable and accessible learning environments, more innovative applications and alternative platforms are created to address the personal learning needs and objectives of individuals. Micro-credentials are gaining some traction in higher education (Pelletier et al., 2021) to enhance alternatives to traditional degrees, diplomas, and certifications. As a result, higher education institutions have increasingly promoted micro-credentials programs and frameworks, and they have also built organizations around institutional or national initiatives (Resei et al., 2019).

Micro-credentialing programs can be a solution for upskilling in industry-recognized skills and employability competencies, which has been a worry for the workforce sector and employers that have anticipated a rapid learning of skills to boost productivity (Gauthier, 2020). Universities and colleges are tasked with addressing the market's demand for increasing expertise in relevant subjects at this time. As employers and job seekers become more aware of employment-enhancing micro-credentials programs, demand for such short-term upskilling opportunities is expected to increase. Ward et al. (2024) discusses the Universal Micro-Credential Framework, which incorporates badges and skills profiling to create interdisciplinary learning and assessment paths. Such frameworks not only validate the competencies acquired through micro-credentials but also enhance their credibility in the eyes of employers. Employers are increasingly recognizing the value of micro-credentials, particularly in relation to soft skills, which are often seen as essential for workplace success (Bruguera et al., 2024). All stakeholders, including governments, skills agencies, and higher education institutions, as well as accrediting associations, independent training providers, and global consortia, are able to strengthen their competitiveness by planning, marketing, and developing institutional strategies for incorporating micro-credentials into their current programs (McGreal et al., 2022). In an additional instance, the Canadian Higher Education system and labor market have taken the initiative to adopt micro-credentials. In the interest of upskilling and reskilling the workforce, the Ontario government recognized the value of micro-credentials and allocated \$60 million in funding through 2020. Researchers from the Higher Education Quality Council of Ontario subsequently defined micro-credentials and evaluated the value they provided to Canadian companies and students to figure out the most efficient manner to utilize the funds (Pichette et al., 2021).

The rise of micro-credentials and skills-based training is empowering companies to hire individuals with specific skills, while universities are scrambling to catch up by offering new programs and qualifications. While universities all over the world (e.g., Athabasca University and PowerED, Open University and FutureLearn, Deakin University, Royal Melbourne Institute of Technology, MIT, eCampusOntario, Udacity, Coursera, and edX) are currently creating training and new programs in this area, the demand for micro-credentials and skills-competency-based training has provided many private companies a chance to recruit employees. While industrialized countries with robust economies have been paving the way in addressing micro-credentials, other countries have also made advancements in this field as well.

## *Related Studies*

Very few studies have been reported that fully explore the potential of micro-credentials by analyzing published works in an academic context. For instance, Selveratnam and Sankey's literature review study (2021) is focused on certain research gaps in the literature, spots on core concerns to model key strategies for researchers and concludes with an overview of micro-credentials' practical uses and industrial cases, more specifically in the context of higher education in Australasia. Another study by Wolz et al. (2021) addresses weak areas related to digital credentials and lacks a comprehensive grasp of digital credentials by carrying out a systematic literature review. The majority of these studies have emphasized the conceptual background of the micro-credentials, or one particular component in a single setting. Although the literature on this topic has benefited considerably through conceptual frameworks, contextual examinations, and new perspectives on micro-credentials (Mhichil et al., 2023), much more research must be conducted to enhance the adoption and implementation process by institutions. Researchers disagree, meanwhile, on whether micro-credentialing in higher education will be adopted as an ongoing strategy (Ralston, 2021), though this could change according to adoption approaches and institutional and national situations.

Diverse research studies have investigated the micro-credential acceptance process, quality standards, design and development aspects, recognition methods, and employers' viewpoints (Gauthier, 2020), in addition to evaluating perspectives from various settings (Mischewski & Christie, 2018; Young et al., 2019). Thi Ngoc Ha et al. (2023) conducted an in-depth evaluation of research papers published between 2012 and 2022, underlining the potential benefits of integrating micro-credentials into the higher education system. Researchers point out that micro-credentials are still in their initial stages of growth and development, and that, despite increased interest and awareness in the sector, implementation issues remain. Ahsan et al. (2023) analyzed 56 articles on digital badges and micro-credentials that were published between 2015 and 2021 in the Scopus database of research for their systematic review. This study, similar to previous study (Thi Ngoc Ha et al., 2023), highlights the impact on higher education and provides a framework for the applicability of micro-credentials in higher education. Brown et al. (2023) concentrates on how to structure an institutional transformation strategy, which business models would be required, how to shepherd the process, and how to identify any possible risks. Those in charge of supervising the implementation of micro-credentials may need to consider through risks that might arise, create strategies that best advance the objectives of the institution, and demonstrate confidence through executing strong initiatives (Brown et al., 2023). Similarly, Varadarajan et al.'s (2023) systematic research primarily focused on the positive aspects and challenges of implementing micro-credentials and developed a framework for them for different stakeholders. In contrast to previous research, this study addresses the worries that an uptick in the use of micro-credentials would have a detrimental effect on higher education. Nevertheless, it was additionally noted that in spite of all of these challenges, higher education institutions' position with regard to micro-credentials is the center for every stakeholder involved and would undoubtedly affect the sequence of events in the near future (Varadarajan, Koh, & Daniel, 2023).

Tamoliune et al. (2023) carried out a systematic review to examine the consequences of micro-credentials on social and economic aspects of the post-COVID-19 recovery process. The review consisted of 32 studies which were undertaken in the field of higher education between 2015 and 2022. Consequently, it was demonstrated that micro-credentials improved learners'

employability skills in addition to their life skills, such as their psychosocial and interpersonal skills (Tamoliune et al., 2023). From a complementary perspective, Alsobhi et al.'s (2023) systematic review study provides a glimpse into how blockchain technology could potentially be used in higher education for verifying micro-credentials. To accomplish this, the review comprised 15 studies that offered blockchain-based micro-credentials in higher education between 2016 and 2022, illustrating an urgent need for additional research on this topic (Alsobhi et al., 2023).

As a result, it is necessary to investigate which elements and points were most prominent in all past studies that carried out a specific threshold. Therefore, the purpose of this article is to contribute to the field by exploring the whole potential and use of micro-credentials, as well as to outline the current state and overall picture. Another goal of this research is to create a future vision for strengthening the uptake of micro-credentials. In this regard, this study aims to explore and identify emerging research themes and patterns on micro-credentials in the educational landscape.

## Methods

### *Research Design*

For a comprehensive exploration of emerging research trends and patterns surrounding micro-credentials in education, this study employed a systematic literature review (Gough et al., 2012) alongside bibliometric analysis methods (Donthu et al., 2021). Complementing these approaches, the study used data mining and analytical techniques (Fayyad et al., 2002), incorporating t-SNE analysis of the titles (van der Maaten & Hinton, 2008), text mining of the abstracts (Feldman & Sanger, 2007) and social network analysis (SNA) of the keywords. The rationale behind employing a diverse array of analytical methods was to ensure the triangulation of data, thereby augmenting the reliability and validity of the analytics (Thurmond, 2001). This multifaceted approach enabled the investigation of various layers within the research corpus, facilitating a comprehensive understanding and addressing the research questions effectively. The study employed three complementary bibliometric and text-mining techniques—t-SNE visualization, co-word network analysis, and abstract keyword frequency analysis—to uncover thematic structures within the selected corpus. These approaches are well suited for identifying latent research trends in a manageable dataset ( $N < 250$ ), allowing for interpretative synthesis consistent with the aims of a systematic review.

To enhance the trustworthiness of findings, a methodological triangulation approach was employed. By integrating t-SNE-based title mapping, abstract-level text mining, and keyword co-occurrence analysis, the study cross-validates thematic patterns across different lexical layers. This triangulation strengthens the internal validity of the review and enables a more comprehensive identification of emergent research directions.

### *Inclusion Criteria and Sampling of Research Corpus*

The study focused on publications indexed in the Scopus and Web of Science (WoS) databases, accessible through library services or open access, which contained specified search strings in their titles (see Table 1). Scopus and WoS were chosen as the academic databases for

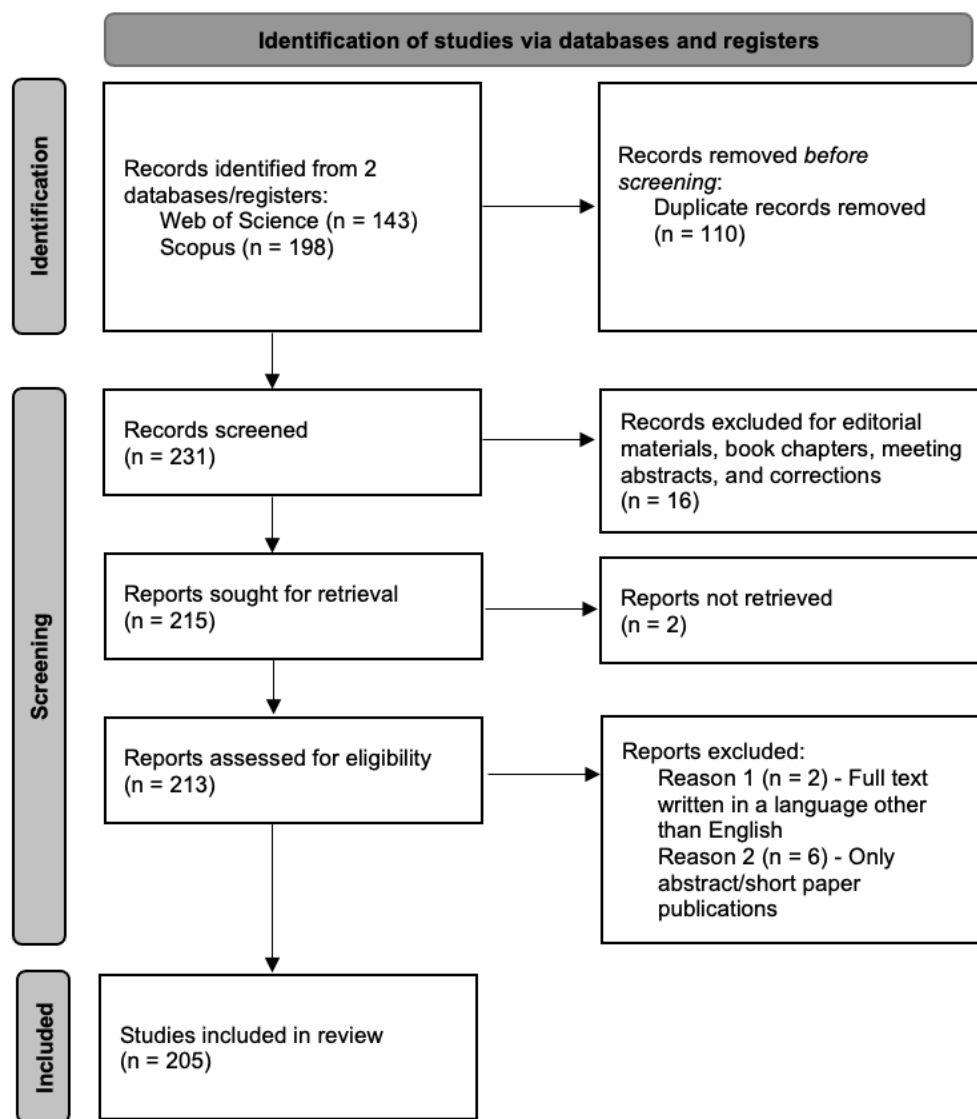
data retrieval due to their extensive coverage of publications, facilitating an inclusive approach. The construction of our research corpus involved the use of search strings related to micro-credentials in the educational landscape (see Table 1). Adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol (Page et al., 2021). Figure 2 illustrates the comprehensive process and measures undertaken in compliance with the PRISMA statement guidelines and principles. Initially, a total of 341 relevant documents were identified across two databases (198 in Scopus, and 143 in WoS) as of January 15, 2025. Among these documents, 110 were found to be duplicates and subsequently excluded. Consequently, 231 documents underwent screening. The final research corpus comprised 205 publications.

The search algorithm was meticulously designed to capture a broad spectrum of pertinent literature, using variations of the term “micro-credentials” within the titles of potential articles. This was achieved by including both “micro-creden\*” and “microcreden\*” as search terms, the asterisk (\*) serving as a wildcard character to encompass any extensions of the root word in publication titles. This approach was predicated on the assumption that the inclusion of these specific terms in article titles would yield a focused yet expansive collection of literature pertinent to the subject matter of interest. To align with the scope of online learning, only studies explicitly referring to online, digital, or technology-enhanced micro-credentialing systems were included. Publications focusing solely on face-to-face or workplace-based implementations without an online learning component were excluded.

**Table 1**

*Search Strings*

| Databases | Search Strings                                | Years Covered |
|-----------|-----------------------------------------------|---------------|
| Scopus    | TITLE (micro-creden*) OR TITLE (microcreden*) | 2014-2024     |
| WoS       | (TI=(micro-creden*) OR TI=(microcreden*))     | 2015-2024     |

**Figure 2***Flow Diagram of the PRISMA Statement**Data Analysis Procedures*

This study adopts a three-phased approach to investigate research trends, patterns, and themes in openness in education research. In the initial phase, bibliometric techniques (Donthu et al., 2021) are used to acquire descriptive findings. Moving to the second phase, the study employs lexical analytical approaches involving “two stages of co-occurrence, information extraction—semantic and relational—using a different algorithm for each stage” (Smith & Humphreys, 2006, p. 262). Finally, in the third phase, to gain a complementary perspective, the study uses Social Network Analysis (SNA) for keyword analysis. SNA “offers powerful ways to summarize networks and identify key people, [entities], or other objects that occupy strategic locations and positions within a matrix of links” (Hansen et al., 2010, p. 6). Within this context, lexical semantic relationships in titles and abstracts are identified through text mining.

Keywords related to openness in education studies are treated as nodes and analyzed based on their co-occurrence relationships, with the resulting patterns visualized on a network map.

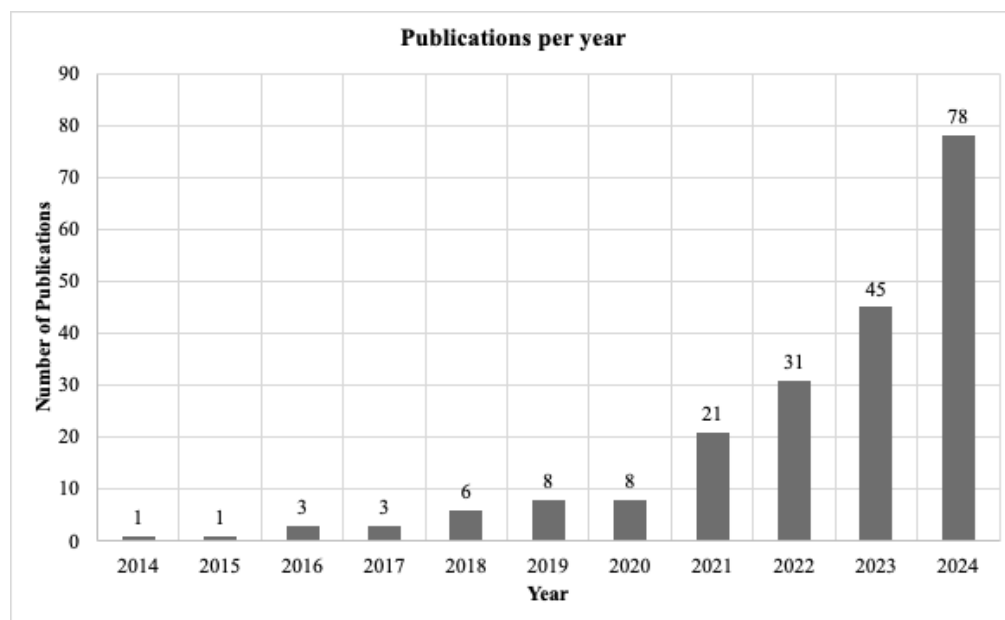
### ***Limitations***

This paper acknowledges several limitations in interpreting the study's findings. Primarily, while Scopus and WoS represent the largest databases for peer-reviewed publications, this study's findings are based on data obtained solely from these two scholarly sources. Despite the establishment of a substantial research corpus through this search, it is important to recognize that articles on micro-credentials may also exist in other databases, sources, and formats, including the grey literature. The study is limited to publications explicitly containing "micro-credentials" in their titles, which may have excluded relevant studies using synonymous or related terms. Furthermore, the reliance on Scopus and Web of Science databases may have led to language and publication bias. Finally, while efforts were made to ensure relevance to online learning, the interpretation of platform usage was dependent on how explicitly the source described the learning modality. As a result, this study offers only a partial perspective.

## **Findings and Discussion**

### ***Research Trends***

The annual publication count throughout the studied period is presented in Figure 3. A modest increase in publication volume from 2014 to 2020 precedes a significant surge in 2021, with the number of publications in that year tripling compared to the prior year. This upward trend continues in the following years, reaching 45 publications in 2023, which is approximately six times higher than that of 2020. It is important to note that this study accounts for publications up to January 2025. Our analysis up until 2024 revealed an increasing trend in the number of publications, which continued in 2024. Based on this trend, we anticipate a continued increase in publications in the coming years.

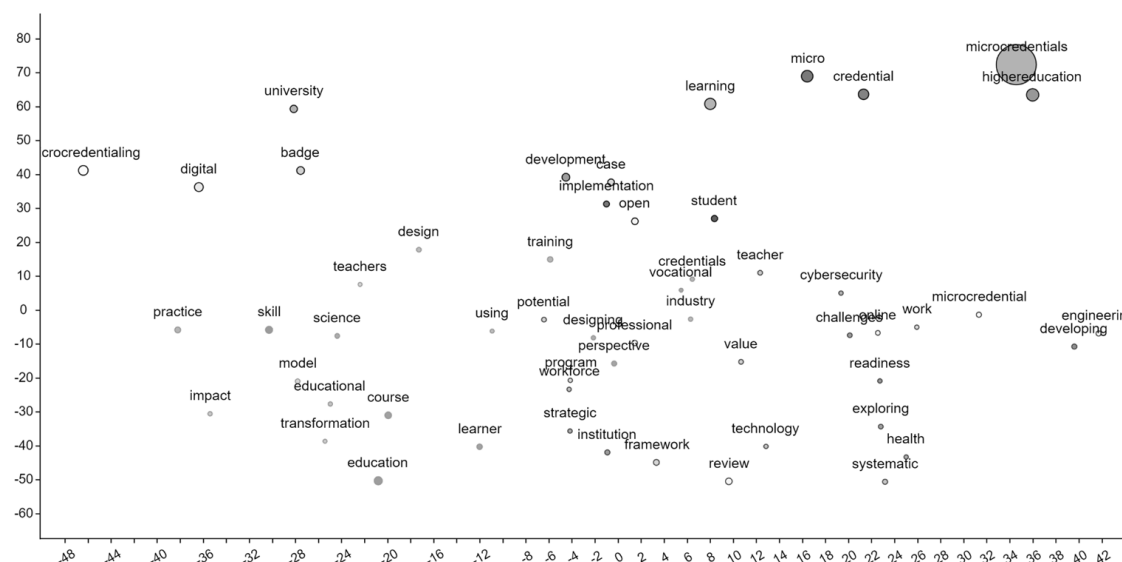
**Figure 3***Annual Number of Publications****Research Themes***

Within each investigation, the meta-components encompassing titles, abstracts, and keywords serve as an optimal representation of the articles at a granular but representational level. These elements encapsulate the fundamental essence of the articles, providing key insights in a succinct, concise, and well-structured manner. As a result, this segment meticulously examines the titles and abstracts of the studies using t-SNE analysis (Figure 4) a text-mining methodology, which evaluates the lexical associations to uncover evolving themes (Figure 5). Furthermore, this analysis delves into keywords to complement the text-mining examination (Figure 6), aiming to attain a clearer understanding and identify research patterns.



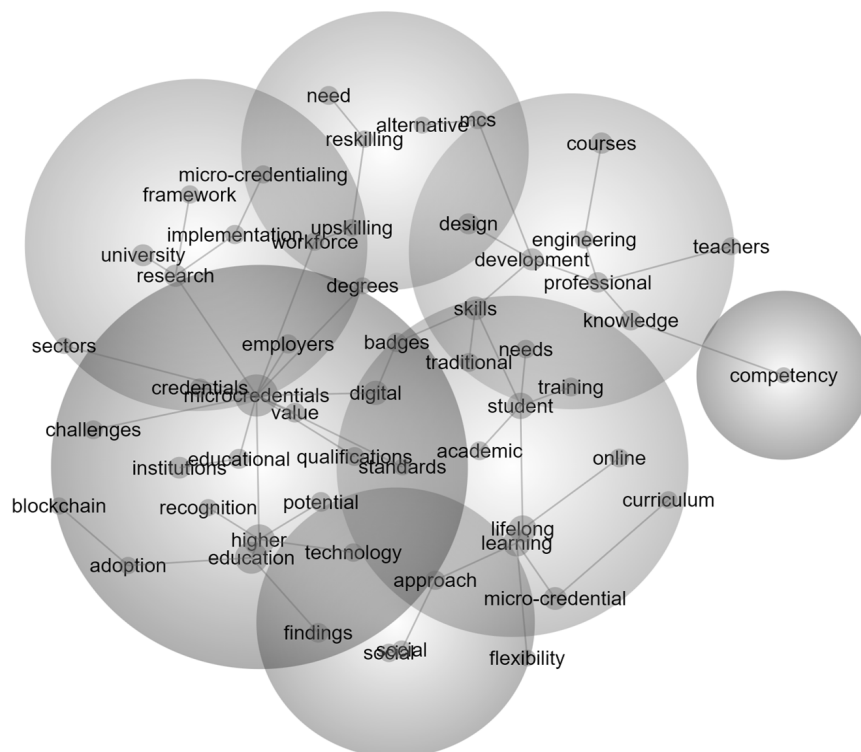
### Figure 4

### Analysis of the Titles Through t-SNE



### Figure 5

### *Analysis of the Abstracts Through Text-Mining*





institutions can offer students, learners, and teachers' pathways that emphasize personalized learning, skill acquisition, and, more importantly, the agility to adapt to changing job market demands. These credentials can serve as critical nodes connecting higher education with lifelong learning, highlighting their potential to transform both pedagogy and curriculum design. This strategic approach not only enhances the training and educational experience but also aligns with the broader goal of fostering a culture of continuous learning and adaptation in an ever-evolving global landscape.

The abovementioned theme is also echoed in the related literature. Accordingly, micro-credentials, which have grown to be an increasingly popular subject, have been acknowledged to promote lifelong learning by bridging the gap between industry and higher education (Pawilen et al., 2024). The unbundling of educational practices and higher education itself may be impacted by micro-credentials, which are considered a possible alternative to higher education (Ehlers, 2018). Leading higher education institutions are required to create micro-credential programs and more open, accessible learning environments for learners in order to become qualified in this field provided their potential long-term impact (McGreal et al., 2022) and higher education institutions are anticipated to incorporate these innovations into the curriculum they offer. In their research of the relationship between micro-credentials and employability and lifelong learning, Brown et al. (2021) presented the argument that within the next five years, a well-established and advanced system of micro-credentials practices will have developed. Bayly-Castaneda et al. (2024) emphasize the necessity of adapting learning experiences to meet the evolving demands of the workforce, highlighting the importance of continuous skill acquisition through micro-credentials. This adaptability is essential in addressing the rapid changes in job markets and the skills required for future employment.

As reported in a Delphi study on the potential for micro-credential adoption in higher education, strategies, and policies need to be developed at the national and international levels, there is no one approach that is effective for all stakeholders, and the eventual outcome of this process is unpredictable (Pirkkalainen et al., 2023). Likewise, a study conducted for higher education administrators addressed whether micro-credentials are appropriate for the institution, potential challenges, and strategies that can be developed, and suggested that all stakeholders should come together on an agreement that minimizes risks and shares expenses associated with the easy implementation of micro-credential programs (McGreal & Olcott, 2022). Building collaborations with such stakeholders and promoting university-industry collaboration will provide an acceleration to learners' lifelong educational pathways (Fitzgerald & Huijser, 2021). According to this study, the use of micro-credentials in higher education proposes disruptive advantages in learning environments and provides alternative opportunities for both learners and the workforce demanding improvement in skills in lifelong learning processes.

### ***Flexible Curriculum Solutions for Reskilling and Upskilling Requests from the Sector***

This theme addresses the use of micro-credentials to provide flexible curriculum solutions essential for reskilling and upskilling the workforce, thereby meeting the needs of employers and various sectors. The theme is supported by the following insights from the following analysis:

- Figure 4 (t-SNE of Titles): Strategic nodes include micro-credentials, higher education, work, workforce, vocational, and skill.
- Figure 5 (Text-Mining of Abstracts): Connected paths link micro-credentials, employers, sector, workforce, upskilling, reskilling, need, and design, development, professional, knowledge, competency.
- Figure 6 (SNA of Keywords): Connected nodes show 21st-century skills, workforce development, employment, industry, and professional development.

This theme implies that flexible curriculum solutions involving micro-credentials are increasingly recognized as essential for reskilling and upskilling within the workforce, responding directly to the needs of employers and various sectors. These solutions bridge the gap between higher education and the workforce by aligning educational offerings with vocational skills and competencies that are in high demand. By focusing on the development of 21st-century skills, micro-credentials offer a tailored approach to professional development, allowing for the workforce to adapt to rapid changes in industry requirements and technological advancements. This strategic alignment between micro-credentials, employers, and higher education institutions ensures that the curriculum is not only responsive to the immediate needs of the sector but also encourages a culture of lifelong learning and continuous professional growth.

These ideas are also supported by the relevant literature. Accordingly, employers are able to use micro-credentials as a benchmark for shaping the upcoming workforce (Kohler et al., 2021) and assist currently employed workers in improving their abilities (Selvaratnam & Sankey, 2021). Employers' struggle to hire adequately qualified employees with the expertise they require, as well as fresh graduates' challenges to find jobs after graduating from the traditional education system, are driving up the demand for micro-credentialing (Olcott Jr., 2022) and fostering competitive rivalry. In addition, micro-credentials, which are available online, are considered by employers as a practical and flexible alternative to improve the soft skills of those already working in the sector (Bruguera et al., 2024).

The idea of lifelong learning should be supported by higher education institutions, and they need to evolve by facilitating the reskilling and upskilling processes and leading the way in the micro-credentialing process (Romero Llop et al., 2022). Furthermore, to serve as an advantageous resource for upskilling employees (Calonge & Shah, 2016), MOOC platforms give organizations straightforward scalable solutions to refresh and improve workforce-specific skills and offer credentials that result in formal certifications (Calonge et al., 2019). Micro-credentials as a career path are anticipated to be documented, and the industry will recognize and encourage the skills gained. Nevertheless, learners may not comprehend how to accomplish this (Healy, 2021), which could have perplexing effects in unstructured processes (Gauthier, 2020). Che Ahmat et al. (2021), who advise higher education and employers regarding how to strengthen graduate employability, suggest that the portability and independent verification of obtained credentials and micro-credentials are directly related to their international competitiveness. Government support for skill transformation processes in institutions and planning of micro-credentials according to workforce needs can contribute to developing different collaborations (Pachler, 2023).

### ***Micro-Credentials and Digital Proofs for Skills, Qualifications, and Competencies***

This theme explores how micro-credentials, along with digital badges and blockchain technology, are revolutionizing the way skills, qualifications, and competencies are recognized and verified in the digital age. The theme is supported by the following insights from the following analysis:

- Figure 4 (t-SNE of Titles): Strategic nodes include micro-credentials, micro-credentialing, digital, credentials, and badge.
- Figure 5 (Text-Mining of Abstracts): Connected paths link blockchain, adoption, higher education, technology, and micro-credentials, digital, badges, skills.
- Figure 6 (SNA of Keywords): Connected nodes highlight micro-credentials, badge, digital badge, competence, and blockchain.

According to this theme, micro-credentials, along with digital badges and blockchain technology, are revolutionizing the way skills, qualifications, and competencies are recognized and verified in the digital age. These digital proofs offer a granular, flexible, and transparent method of credentialing that aligns closely with the evolving needs of both individuals and organizations. The adoption of blockchain technology in the issuance and verification of micro-credentials ensures the security, portability, and authenticity of these digital badges, facilitating their acceptance across various sectors. By enabling learners to accumulate and showcase a portfolio of verified competencies, micro-credentials, and digital badges empowers individuals with the tools to navigate the complex landscape of 21st-century employment.

The ideas supporting this emerging theme were also discussed in the related literature. For example, Clements et al. (2020) explored the reasons for the growing acceptance of alternative credentials, blaming changes in the educational, demographic, and economic spheres. They highlighted open badges as a practical way to recognize a wide range of learning and achievements, highlighting how open badges may connect formal and informal learning contexts and meet the demands of the workforce in real-time. Kayyali et al. (2023), similarly, highlight that micro-credentials are seen as valuable for acquiring skills and competencies, with students motivated by both intrinsic and extrinsic factors. Likewise, Gregg et al. (2022) find that engineering students are motivated to participate in micro-credential program offerings due to both intrinsic interest in the topic and the professional value attributed to the digital badge. This suggests that while students see the inherent value in the learning process, the tangible outcomes (in the form of digital badges) also play a significant role in their decision to engage with micro-credentials.

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both intrinsic interest in the topic and the professional value attributed to the digital badge. This suggests that while students see the inherent value in the learning process, the tangible outcomes (in the form of digital badges) also play a significant role in their decision to engage with micro-credentials.

From the technological infrastructure perspective, Alsobhi et al. (2023), shed light on how micro-credential systems with blockchain can become more reliable and easier to verify. They point out that blockchain technology, known for its secure and unchangeable record-keeping, can be used to safely store academic records. This means that employers and academic institutions can quickly check someone's qualifications without having to go through a middleman. This approach doesn't just make the verification process smoother; it also makes it harder for people to fake their qualifications (Hölbl et al., 2018). Moreover, Shanmughan et al. (2024) explore how artificial intelligence (AI) can facilitate personalized learning paths, thereby enhancing the relevance and applicability of micro-credentials in diverse educational contexts. AI may play a crucial role in the development and personalization of micro-credentials. Even with these encouraging advancements, it is anticipated that AI will not be enough to fully evaluate complicated competencies, particularly in micro-credentials assessment procedures (Galindo et al., 2024). While AI can be an effective tool to increase efficiency in many operational processes, it may be limited in comprehensive competency assessment and credentialing.

### ***Designing, Development, Adaptation, and Implementation of Micro-Credentials***

(See strategic nodes in Figure 4: micro-credentials, readiness, design, development, implementation; see connected paths in Figure 5: micro-credentials, micro-credentialing, research, implementation, framework; see connected nodes in Figure 6: accreditation, design, development, implementation, credentials adoption.) This theme suggests that the design, development, adaptation, and implementation of micro-credentials involve a comprehensive approach that encompasses readiness assessment, research-based framework development, and strategic implementation processes. Such an approach ensures that micro-credentials are not only designed to meet the specific needs of learners and industries but are also developed with a clear framework that considers accreditation standards and the broader ecosystem of credential adoption. The integration of research into the micro-credentialing process is crucial for the formulation of effective and adaptable frameworks that support the seamless implementation and recognition of these credentials. Through careful design and development, followed by thoughtful adaptation to changing educational and workforce demands, the implementation of micro-credentials can significantly enhance the value and relevance of educational offerings, promoting a more agile and responsive accreditation and learning landscape.

Similar ideas were also articulated in the related literature. For instance, it is argued that micro-credentials can attest to online course completions and apply in face-to-face or blended formats. They are validated by a range of authorities, including universities, colleges, professional associations, and companies, and can be aligned or mapped to existing qualifications and/or standards frameworks. Types of micro-credentials include certificates, certifications, MOOCs, apprenticeships, coding boot camps, badges, MicroMasters, and Nano-degrees, each certifying learning or skill attainments or competencies based on some form of accepted assessment (McGreal & Olcott Jr., 2022). On the other hand, Clements et al. (2020)

and Mashford-Pringle et al. (2023) both underline the need for a clear framework for the accreditation of micro-credentials, ensuring that they are valued and recognized as legitimate evidence of professional development and competency. Platforms for issuing, viewing, and storing these digital credentials have proliferated, but there's still a gap in understanding their features and benefits fully (Kiiskilä et al., 2022).

### ***Critiques and Challenges of Implementation and Adaptation of Micro-credentials***

(See strategic nodes in Figure 4: micro-credentials, challenges; see connected paths in Figure 5: micro-credentials, challenges, value, qualifications, standards; see connected nodes in Figure 6: micro-credentials, accreditation.) According to the final theme focusing on issues to pay attention and suggesting being proactive, the implementation and adaptation of micro-credentials face several critiques and challenges, central to which are concerns about value, qualifications, and standards. A primary critique is the varying standards and definitions of micro-credentials, which can lead to confusion about their value and how they compare to traditional qualifications. This inconsistency poses challenges for accreditation bodies tasked with ensuring that these new forms of credentials meet rigorous educational standards. Furthermore, the adaptation of micro-credentials into existing educational and professional ecosystems necessitates a re-evaluation of how achievements and competencies are recognized and validated. Addressing these challenges requires collaborative efforts among educators, industry leaders, and accreditation organizations to establish clear guidelines and frameworks that uphold the integrity and value of micro-credentials.

In line with the scope of the aforementioned theme, Wheelahan and Moodie (2022) highlight the complexities of integrating micro-credentials into the education system and labor market. While micro-credentials offer potential benefits in terms of flexibility and responsiveness to changing skill demands, their implementation must be carefully considered to ensure they complement rather than undermine comprehensive educational experiences and support equitable access to meaningful employment opportunities. Likewise, McGreal and Olcott Jr. (2022) caution that micro-credentials should not be viewed as a panacea for institutional challenges or as a major revenue source, but rather as part of a broader strategic approach to education and training. The development of accreditation and quality standards may be a further challenge for microcredentials. In their research on quality assurance in the OECD countries, Brown and Duarte (2024) voiced concerns about the quality processes of micro-credentials, characterizing them as largely invisible and relatively immature. In the North American context—particularly in the U.S. and Canada—the lack of a unified national qualifications framework poses challenges for the consistent design, assessment, and policy alignment of micro-credentials. This variability across institutions and jurisdictions can influence both the development process and the level of trust and recognition afforded to these credentials by learners and employers.

## **Conclusions, Implications, and Suggestions**

As a consequence of an expanding skills gap in the labor market, micro-credentials programs are becoming more and more common, and they have begun to establish a partnership between industry and higher education. A variety of organizations in this field have taken action in reaction to the increasing interest and demand for micro-credentials, opening up possibilities

for efforts and projects involving micro-credential recognition, verification, stackability, and the development of different uses. This study aimed to explore the evolving role of micro-credentials in education, summarize how they are currently perceived by major stakeholders, and outline potential future directions grounded in current research. Studies from the Web of Science and Scopus databases have been included in the study for this purpose, and the PRISMA protocol was employed to carry out a systematic analysis. The research findings were divided into five predominant impact areas. These are: the strategies in higher education and lifelong learning, sector-specific upskilling and reskilling programs, micro-credentials that provide digital proof of competency, challenges in designing and implementing micro-credentials, and critiques are among the most noteworthy characteristics in these areas.

Based on the findings of this study and insights gained through the reviewed papers, this study has some suggestions and implications for future research directions. Since the subject of micro-credentials is constantly evolving and dynamic, higher education institutions need to carefully figure out the way they will differentiate themselves. Higher education institutions should enact the necessary regulations, and the curriculum may need to adopt a skill-focused instructional design for this process to move forward in a flexible and all-inclusive approach.

Future studies may concentrate more specifically on one or more of the five impacts, which are based on the five significant impact areas outlined in the research's findings. The sector's skill in research and development can be evaluated through current programs across various dimensions or settings, particularly those driven by blockchain technology, which will verify and disseminate. Another crucial issue is that future research may investigate at the phases of creating policies and procedures that hasten the recognition of micro-credentials on a national or international level. Institutions aiming to adopt micro-credentialing systems should consider integrating them with existing LMS platforms to ensure smoother learner experience and recognition. Additionally, clear frameworks for skill validation and alignment with workforce needs are essential for increasing stakeholder trust. While the study focuses on peer-reviewed academic literature, it is important to note that practical implementations of micro-credentials by corporations and intergovernmental organizations (e.g., Microsoft, Boeing, NATO) may offer further insights. However, such industry-level data typically exists in grey literature and case-based reports, which were beyond the scope of this academic synthesis.

Looking ahead, the adoption of micro-credentials may catalyze a structural transformation in higher education. As traditional degrees face scrutiny regarding their labor market value, universities could increasingly adopt hybrid credentialing models—potentially balancing degree programs with modular, skill-focused micro-credentials. This shift could enable more flexible learning pathways, responsive curriculum design, and stronger alignment with lifelong learning and workforce development priorities. However, such transformation would require active engagement from faculty, accreditation bodies, and policy-making agencies to ensure coherence, quality assurance, and recognition across sectors.

### ***Data Availability Statement***

To enhance transparency and replicability, the full list of the 205 publications included in this systematic review, along with the processed dataset and analysis workflow, has been



made publicly available via the Open Science Framework (OSF). The data can be accessed using the following Digital Object Identifier (DOI): <https://doi.org/10.17605/OSF.IO/B9PQT>

### ***Competing Interests***

The authors have no competing interests to declare.

## References

- Ahsan, K., Akbar, S., Kam, B., & Abdulrahman, M. D.-A. (2023). Implementation of micro-credentials in higher education: A systematic literature review. *Education and Information Technologies*, 28(10), 13505–13540. <https://doi.org/10.1007/s10639-023-11739-z>
- Alsobhi, H. A., Alakhtar, R. A., Ubaid, A., Hussain, O. K., & Hussain, F. K. (2023). Blockchain-based micro-credentialing system in higher education institutions: Systematic literature review. *Knowledge-Based Systems*, 265, 110238. <https://doi.org/10.1016/j.knosys.2022.110238>
- Bayly-Castaneda K, Ramirez-Montoya M-S and Morita-Alexander A (2024) Crafting personalized learning paths with AI for lifelong learning: a systematic literature review. *Frontiers in Education*, 9, 1424386. <https://doi.org/10.3389/feduc.2024.1424386>
- Bozkurt, A., & Brown, M. (2022). *Microcredentials: Stackable, combinable, or transferable qualifications*. EdTechnica: The Open Encyclopedia of Educational Technology. <https://dx.doi.org/10.59668/371.8264>
- Brown, M., & Duarte, J. M. (2024). Exploring gaps in the quality assurance of micro-credentials: A global mapping review of current practices. *Journal of Open, Distance, and Digital Education*, 1(1), 1–16. <https://doi.org/10.25619/2bwhvw68>
- Brown, M., McGreal, R., & Peters, M. (2023). A strategic institutional response to micro-credentials: Key questions for educational leaders. *Journal of Interactive Media in Education*, 2023(1). <https://doi.org/10.5334/jime.801>
- Brown, M., Nic Giolla Mhichíl, M., Beirne, E., & Mac Lochlainn, C. (2021). the global micro-credential landscape: Charting a new credential ecology for lifelong learning. *Journal of Learning for Development*, 8(2), 228–254. <https://doi.org/10.56059/jl4d.v8i2.525>
- Bruguera, C., Pagés, C., Peters, M., & Fitó, À. (2024). Micro-credentials and soft skills in online education: The employers' perspective. *Distance Education*, 1–21. <https://doi.org/10.1080/01587919.2024.2435645>
- Calonge, D. S., & Shah, M. A. (2016). MOOCs, graduate skills gaps, and employability: A qualitative systematic review of the literature. *The International Review of Research in Open and Distributed Learning*, 17(5). <https://doi.org/10.19173/irrodl.v17i5.2675>
- Calonge, D. S., Aman Shah, M., Riggs, K., & Connor, M. (2019). MOOCs and upskilling in Australia: A qualitative literature study. *Cogent Education*, 6(1), 1687392. <https://doi.org/10.1080/2331186x.2019.1687392>
- Che Ahmat, N. H., Bashir, M. A. A., Razali, A. R., & Kasolang, S. (2021). Micro-credentials in higher education institutions: Challenges and opportunities. *Asian Journal of University Education*, 17(3), 281–290. <https://doi.org/10.24191/ajue.v17i3.14505>

- Clements, K., West, R. E., & Hunsaker, E. (2020). Getting started with open badges and open microcredentials. *The International Review of Research in Open and Distributed Learning*, 21(1), 154–172. <https://doi.org/10.19173/irrodl.v21i1.4529>
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- Ehlers, U. D. (2018). Higher credutation-degree or education? The rise of microcredentials and its consequences for the university of the future. In *European Distance and E-Learning Network (EDEN) Conference Proceedings* (No. 1, pp. 456–465). European Distance and E-Learning Network.
- European Commission. (2021). *Proposal for a council recommendation on a European approach to micro-credentials for lifelong learning and employability* (Document 52021DC0770). The European Union. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0770>
- Fayyad, U., Grinstein, G. G., & Wierse, A. (Eds.). (2002). *Information visualization in data mining and knowledge discovery*. Morgan Kaufmann.
- Feldman, R., & Sanger, J. (2007). *The text mining handbook: Advanced approaches in analyzing unstructured data*. Cambridge University Press. <https://doi.org/10.1017/cbo9780511546914>
- Fitzgerald, R., & Huijser, H. (2021). Exploring industry-university partnerships in the creation of short courses and micro-credentials. In S. Gregory, S. Warburton, & M. Schier (Eds.), *Back to the Future—ASCILITE '21: Proceedings ASCILITE 2021* (pp. 340–344). Australasian Society for Computers in Learning in Tertiary Education. <https://doi.org/10.14742/ascilite2021.0149>
- Galindo, M., Fennelly-Atkinson, R., Franklin, K., & Luna, C. (2024). *The role of micro-credentials in lifelong learning and development: Empowering learners, empowering organizations*. Digital Promise. <https://doi.org/10.51388/20.500.12265/225>
- Gauthier, T. (2020). The value of microcredentials: The employer’s perspective. *Competency-based Education*, 5(2), 1–6. <https://doi.org/10.1002/cbe2.1209>
- Gough, D., Oliver, S., & Thomas, J. (2012). *An introduction to systematic reviews*. Sage.
- Gregg, A., Park, J., Fenton, C., Lang, D., & Handley, M. (2022, October). Exploring the “why” of micro-credentials and digital badges: Engineering students’ motivations for and perceived utility of learning outside of class. In *2022 IEEE Frontiers in Education Conference (FIE)* (pp. 1–7). IEEE. <https://doi.org/10.1109/fie56618.2022.9962376>
- Hansen, D., Shneiderman, B., & Smith, M. A. (2010). *Analyzing social media networks with NodeXL: Insights from a connected world*. Morgan Kaufmann.

- Healy, M. (2021). Microcredential learners need quality careers and employability support. *Journal of Teaching and Learning for Graduate Employability*, 12(1). <https://doi.org/10.21153/jtlge2021vol12no1art1071>
- Hölbl, M., Kamisalić, A., Turkanović, M., Kompara, M., Podgorelec, B., & Herićo, M. (2018, September). EduCTX: An ecosystem for managing digital micro-credentials. In *2018 28th EAEEIE Annual Conference (EAEEIE)* (pp. 1–9). IEEE. <https://doi.org/10.1109/eaeeie.2018.8534284>
- Kayyali, M., Müller, C. C., McKie, M. H., Kali, M. B., Strong, A. C., & ElZomor, M. (2023, October). Micro-credential digital badges in engineering and computing at an MSI: The student's perspective (work in progress). In *2023 IEEE Frontiers in Education Conference (FIE)* (pp. 1–5). IEEE. <https://doi.org/10.1109/fie58773.2023.10343353>
- Kır, Ş., Yıldırım, H., & Bozkurt, A. (2025). Exploring the Potential and Future Directions of Micro-Credentials Through the Scenario Archetypes Method. In G. Durak & S. Çankaya (Eds.), *Integrating Micro-Credentials With AI in Open Education* (pp. 115-132). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-5488-9.ch006>
- Kiiskilä, P., Hanafy, A., & Pirkkalainen, H. (2022). Features of micro-credential platforms in higher education. In *Proceedings of the 14th International Conference on Computer Supported Education* (pp. 81–91). SciTePress. <https://doi.org/10.5220/0011030600003182>
- Kohler, M., Gamrat, C., Raish, V., & Gross, E. (2021). Microlearning and micro-credentials in higher education. In J. R. Corbeil, B. H. Khan, & M. E. Corbeil (Eds.), *Microlearning in the digital age: The design and delivery of learning in snippets* (pp. 109–128). Routledge. <https://doi.org/10.4324/9780367821623-10>
- Mashford-Pringle, A., Tan, S., Stutz, S., & Tjong, G. (2023). Designing accountability measures for health professionals: results from a community-based micro-credential: case study on Indigenous cultural safety. *BMC public health*, 23(1), 879. <https://doi.org/10.1186/s12889-023-15721-9>
- McGreal, R., & Olcott Jr., D. (2022). A strategic reset: Micro-credentials for higher education leaders. *Smart Learning Environments*, 9(1), 9. <https://doi.org/10.1186/s40561-022-00190-1>
- McGreal, R., Mackintosh, W., Cox, G., & Olcott, Jr., D. (2022). Bridging the gap: Micro-credentials for development: UNESCO chairs policy brief form—Under the III World Higher Education Conference (WHEC 2021) Type: Collective X. *The International Review of Research in Open and Distributed Learning*, 23(3), 288–302. <https://doi.org/10.19173/irrodl.v23i3.6696>
- Mhichíl, M. N. G., Oliver, B., Lochlainn, C. M., & Brown, M. (2023). A snapshot in time: The next new normal and micro-credentials. *International Journal of Education and Technology in Higher Education*, 20(44), 1–5. <https://doi.org/10.1186/s41239-023-00409-2>

- Mischewski, B., & Christie, A. (2018). Understanding the feasibility of micro-credentials in engineering education. In Proceedings of the *Australasian Association for Engineering Education Conference* (pp. 758–765).
- Olcott Jr., D. (2022). Micro-credentials: A catalyst for strategic reset and change in U.S. higher education. *American Journal of Distance Education*, 36(1), 19–35.  
<https://doi.org/10.1080/08923647.2021.1997537>
- Oliver, B. (2019). *Making micro-credentials work for learners, employers and providers*. DTeach. <http://dteach.deakin.edu.au/microcredentials/>
- Pachler, N. (2023). Unbundling and aggregation: Adapting higher education for lifelong learning to the new skills agenda and to digital transformation. In K. Evans, W. O. Lee, J. Markowitsch, M. Zukas (Eds.), *Third international handbook of lifelong learning*. Springer International Handbooks of Education. Springer. [https://doi.org/10.1007/978-3-031-19592-1\\_36](https://doi.org/10.1007/978-3-031-19592-1_36)
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hrobjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ*, 372(1).  
<https://doi.org/10.1136/bmj.n71>
- Pawilen, G. T., Tomida, E., & Eugenio, D. O. (2024). Quality assurance framework for micro-credentials in Japan and in the Philippines. *International Journal of Curriculum and Instruction*, 16(2), 401–421. <https://ijci.globets.org/index.php/IJCI/article/view/1456>
- Pelletier, K., Brown, M., Brooks, D. C., McCormack, M., Reeves, J., Arbino, N., Bozkurt, A., Crawford, S., Czerniewicz, L., Gibson, R., Linder, K., Mason, J., & Mondelli, V. (2021). *2021 EDUCAUSE horizon report teaching and learning edition*. EDUCAUSE.  
<https://www.learntechlib.org/p/219489/>
- Pichette, J., Brumwell, S., Rizk, J., & Han, S. (2021). *Making sense of microcredentials*. Higher Education Quality Council of Ontario. <https://heqco.ca/pub/making-sense-of-microcredentials/>
- Pirkkalainen, H., Sood, I., Padron Napoles, C., Kukkonen, A., & Camilleri, A. (2023). How might micro-credentials influence institutions and empower learners in higher education? *Educational Research*, 65(1), 40–63.  
<https://doi.org/10.1080/00131881.2022.2157302>
- Ralston, S. J. (2021). Higher education's microcredentialing craze: A postdigital-Deweyan critique. *Postdigital Science and Education*, 3(1), 83–101.  
<https://doi.org/10.1007/s42438-020-00121-8>

- Resei, C., Friedl, C., Staubitz, T., & Rohloff, T. (2019). *Micro-credentials in EU and global. Corship Corporate Edupreneurship*. [https://www.corship.eu/wp-content/uploads/2019/07/Corship-R1.1c\\_micro-credentials.pdf](https://www.corship.eu/wp-content/uploads/2019/07/Corship-R1.1c_micro-credentials.pdf)
- Romero-Llop, R., Castro-Jiménez, J. M., Fitó-Beltran, À., Valero-García, V., & Martín-Aragón, S. (2022). Higher education micro-credentials: A European university perspective. *European Journal of University Lifelong Learning*, 6(2), 53–59. <https://doi.org/10.53807/0602pl0x>
- Selvaratnam, R. M., & Sankey, M. D. (2021). An integrative literature review of the implementation of micro-credentials in higher education: Implications for practice in Australasia. *Journal of Teaching and Learning for Graduate Employability*, 12(1), 1–17. <https://doi.org/10.21153/jtlge2021vol12no1art942>
- Shanmughan, P., Joseph, J., S, B. N., SM, A., CS, A., & Jose, J. (2024) The AI revolution in micro-credentialing: personalized learning paths. *Frontiers in Education*, 9, 1445654. <https://doi.org/10.3389/feduc.2024.1445654>
- Smith, A. E., & Humphreys, M. S. (2006). Evaluation of unsupervised semantic mapping of natural language with Leximancer concept mapping. *Behavior Research Methods*, 38(2), 262–279. <https://doi.org/10.3758/BF03192778>
- Şenocak, D., & Kır, Ş. (2022). Micro-credentials: An interview with George Ubachs. *E-Learn*, 2022(2). <https://doi.org/10.1145/3516493.3510464>
- Tamoliune, G., Greenspon, R., Tereseviciene, M., Volungeviciene, A., Trepule, E., & Dauksiene, E. (2023). Exploring the potential of micro-credentials: A systematic literature review. *Frontiers in Education*, 7, 1–15. <https://doi.org/10.3389/feduc.2022.1006811>
- Thi Ngoc Ha, N., Spittle, M., Watt, A., & Van Dyke, N. (2023). A systematic literature review of micro-credentials in higher education: A non-zero-sum game. *Higher Education Research & Development*, 42(6), 1527–1548. <https://doi.org/10.1080/07294360.2022.2146061>
- Thurmond, V. A. (2001). The point of triangulation. *Journal of Nursing Scholarship*, 33(3), 253–258. <https://doi.org/10.1111/j.1547-5069.2001.00253.x>
- UNESCO. (2018). *Digital credentialing: Implications for the recognition of learning across borders*. UNESCO Education Sector. <https://unesdoc.unesco.org/ark:/48223/pf0000264428>
- UNESCO. (2022). *Towards a common definition of micro-credentials*. <https://unesdoc.unesco.org/ark:/48223/pf0000381668>
- Van der Maaten, L., & Hinton, G. (2008). Visualizing data using t-SNE. *Journal of Machine Learning Research*, 9(11).

- Varadarajan, S., Koh, J. H. L., & Daniel, B. K. (2023). A systematic review of the opportunities and challenges of micro-credentials for multiple stakeholders: Learners, employers, higher education institutions and government. *International Journal of Educational Technology in Higher Education* 20(1), 1–24. <https://doi.org/10.1186/s41239-023-00381-x>
- Ward, R., Grant, S., Larsen, M. W., & Giovacchini, K. (2024). The universal micro-credential framework: The role of badges, micro-credentials, skills profiling, and design patterns in developing interdisciplinary learning and assessment paths for computing education. *IEEE Transactions on Education*, 67(6), 897–906. <https://doi.org/10.1109/te.2024.3486016>
- Wheelahan, L., & Moodie, G. (2022). Gig qualifications for the gig economy: Micro-credentials and the ‘hungry mile.’ *Higher Education*, 83(6), 1279–1295. <https://doi.org/10.1007/s10734-021-00742-3>
- Wolz, E., Gottlieb, M., & Pongratz, H. (2021). Digital credentials in higher education institutions: A literature review. In F. Ahlemann, R. Schütte, & S. Stieglitz (Eds.), *Innovation through information systems. WI 2021. Lecture notes in information systems and organisation* (Vol. 48, pp. 125-140). Springer. [https://doi.org/10.1007/978-3-030-86800-0\\_9](https://doi.org/10.1007/978-3-030-86800-0_9)
- Young, D., West, R. E., & Nylin, T. A. (2019). Value of open microcredentials to earners and issuers: A case study of national instruments open badges. *The International Review of Research in Open and Distributed Learning*, 20(5), 104–121. <https://doi.org/10.19173/irrodl.v20i5.4345>

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# Unraveling Factors Affecting Engineering Students' Acceptance of Artificial Intelligence in the Context of a Blended Learning Environment

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## Abstract

The rapid advancement of artificial intelligence (AI) has significantly transformed various educational domains, including engineering education. Despite AI's growing prevalence, limited research has explored the determinants influencing engineering students' acceptance of AI. This study investigates the factors shaping AI acceptance among engineering students in Indonesia. Using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach, data were collected from 158 engineering students across multiple universities. The research model incorporates six constructs: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), Facilitating Conditions (FC), Self-Efficacy (SE), and Perceived Risks (PR), each operationalized through seven measurement indicators. The results indicate that PU, PEOU, SI, and SE have significant positive effects on AI acceptance, while PR exerts a significant negative influence. Conversely, FC does not demonstrate a significant impact. These findings offer theoretical and practical implications for fostering AI adoption in engineering



education, including strategies for educators, policymakers, and developers of AI-based tools to enhance user acceptance. This study extends the literature on technology acceptance in educational settings, providing actionable insights for improving the integration of AI in higher education.

*Keywords:* Artificial intelligence; Blended learning environment; Engineering student; SEM PLS

Hakmah, M., Retnawati, H., Muthmainah, M., Hakiki, M., Hamid, M., Hasruddin, H., Dahlan, M., Ramadhan, M., Nurtanto, M., & Mutiara, I. (2025). Unraveling factors affecting engineering students' acceptance of artificial intelligence in the context of a blended learning environment. *Online Learning* 29(4), 560-594.  
<https://doi.org.10.24059/olj.v29i4.4890>

## Introduction

Artificial Intelligence (AI) is rapidly transforming various sectors, including healthcare, finance, manufacturing, and education (Desmira, Bakar, et al., 2022; Desmira, Hamid, et al., 2022; Verganti et al., 2020). In the field of engineering, AI technologies have demonstrated significant potential to enhance problem-solving capabilities, optimize design processes, and drive innovation (Garbuio & Lin, 2021; Velezmoro-Abanto et al., 2024). As such, the integration of AI into engineering education is becoming increasingly important to prepare students for the demands of the modern workforce (Dwivedi et al., 2021). However, the successful adoption of AI tools and systems among engineering students remains contingent on several factors, including their perceptions of the technology, trust in its capabilities, and the support provided by their educational institutions (Rahim et al., 2022; Samala et al., 2024).

Previous studies have shown that technology acceptance is a complex process influenced by various psychological, social, and environmental factors (Alzubaidi et al., 2023; Chang et al., 2022; Chen et al., 2023; Hwang et al., 2022; Kuleto et al., 2021; Luan et al., 2020; Marangunić & Granić, 2015; Nallaperuma et al., 2019; Samala et al., 2024; Wu et al., 2022). The Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) have been widely used to investigate the acceptance of emerging technologies across various contexts (Ammenwerth, 2019; Antonietti et al., 2022; Chatterjee & Bhattacharjee, 2020; Dwivedi et al., 2019; Hwang & Lee, 2018; Xue et al., 2024). In line with the research (Yao et al., 2023), these models highlight the roles of Supporting Conditions (SC), Perceived Ease of Use (PEOU), Trust (TR), Perceived Usefulness (PU), Self-Efficacy (SE), and Social Influence (SI) as crucial due to the unique characteristics of AI systems.

Despite the growing body of research on AI in education, there remains a gap in understanding the specific factors that influence engineering students' acceptance of AI (Chatterjee & Bhattacharjee, 2020; Eslit, 2023; Kasneci et al., 2023; Kuleto et al., 2021; Luan et al., 2020; Roshanaei, 2023; Swindell, 2024; Tlili et al., 2023). Engineering students, as future technology innovators and adopters, require a unique focus due to their specialized skill set and their role in driving AI advancements in industry and academia (Ahmad, 2020). This study aims to fill this gap by exploring the key determinants of AI acceptance among engineering students in Indonesia, a developing country where AI adoption is still emerging. The findings of this research are expected to provide insights that will inform educators, policymakers, and AI developers in enhancing the effective integration of AI into engineering education; this is in line with the results of research (Bhimdiwala et al., 2022; Menekse, 2023).

AI improves personalized learning in blended environments by facilitating the creation of customized educational materials, interactive instruction, and the integration of classroom and online learning (Aleksandra & Tatiana, 2024; Alshahrani, 2023a, 2023b; Xiang & Ma, 2023; Zheng, 2020). AI facilitates the development of a cutting-edge intelligence program designed to enhance instructional methodologies inside certain courses, allowing teachers as well as students to benefit from improved educational experiences (Karataş & Yüce, 2024; Ounejjar et al., 2024). The integration of AI in blended learning fosters innovative educational methodologies, including blended teaching, which enhances the quality of both teaching and learning (Aleksandra & Tatiana, 2024; Xie, 2019; X. Zhao & Yang, 2021; Zheng, 2020).

The integration of AI in blended learning settings poses several challenges. These include a notable disjunction between offline and online instructional elements, inadequate

emotional engagement between students and their teachers, and the restricted utilization of AI-enhanced teaching methods (Wang & Rao, 2024). Contemporary AI solutions in blended learning mostly provide asynchronous online individual learning, with little integration of online activities and classroom-based offline interactions (Park, 2024). Moreover, technical inequalities, data security concerns, and user acceptance challenges provide further impediments to the efficient use of AI in improving blended learning settings (Ou, 2024; Ounejjar et al., 2024). Confronting these problems is essential for optimizing the capabilities of AI in developing integrated and efficient blended learning experiences.

This study employs Structural Equation Modeling using the Partial Least Squares (SEM-PLS) method to investigate the relationships among key variables influencing engineering students' acceptance of artificial intelligence (AI) technology. The variables examined include Supporting Conditions (SC) (Huang et al., 2022; Wang et al., 2022; Wu et al., 2019), Perceived Ease of Use (PEOU) (Abdullah et al., 2016; Amin et al., 2014; Gefen et al., 2000; Ma & Liu, 2005, 2006, 2008; Mishra et al., 2023), Trust (TR) (Glikson & Woolley, 2020; Habbal et al., 2024; Hua et al., 2021; Kivijärvi et al., 2013; Lankton et al., 2015; Sabetzadeh & Chen, 2023), Perceived Usefulness (PU) (Amin et al., 2014; Ebadi & Raygan, 2023; Fuchs, 2022; Salim et al., 2021; Wang et al., 2022), Self-Efficacy (SE) (Findik-Coşkunçay et al., 2018; Galos & Aldridge, 2021; Kulviwat et al., 2014; Li et al., 2019; Ma & Liu, 2005), and Social Influence (SI) (Bayaga & du Plessis, 2024; Brown et al., 2010; Kurdi et al., 2020). By analyzing these factors, the study aims to provide a comprehensive understanding of the determinants, challenges, and opportunities associated with AI adoption in engineering education, contributing valuable insights to the development of effective strategies for integrating AI in this domain.

This study is interesting due to its thorough analysis of the variables affecting engineering students' acceptance of Artificial Intelligence (AI) in Indonesian higher education, particularly in a developing nation where AI deployment is nascent. This research distinguishes itself from prior studies by concentrating on engineering education and integrating a distinctive combination of variables: Supporting Conditions (SC), Perceived Ease of Use (PEOU), Trust (TR), Perceived Usefulness (PU), Self-Efficacy (SE), and Social Influence (SI) to evaluate their collective impact on AI acceptance. This work uses Structural Equation Modeling (SEM) and Partial Least Squares (PLS) to comprehensively analyze the dynamic interactions among these components, particularly focusing on trust, an often-overlooked element in AI adoption. Furthermore, the geographical emphasis on Indonesia provides context-specific insights that may serve as a model for AI integration in other developing nations, enhancing the global dialogue on AI use in education. The results enhance both theoretical and practical implementations of AI in engineering education, providing novel techniques to promote AI adoption in developing countries.

This study seeks to address the following research questions to explore the factors influencing engineering students' acceptance of Artificial Intelligence (AI):

- How do Supporting Conditions (SC) influence engineering students' acceptance of Artificial Intelligence in educational settings?
- What is the effect of Perceived Ease of Use (PEOU) on the adoption of Artificial Intelligence among engineering students?

- To what extent does Trust (TR) in AI systems impact students' intention to accept and use Artificial Intelligence technologies?
- How does Perceived Usefulness (PU) of Artificial Intelligence affect students' willingness to adopt AI in their academic learning processes?
- What role does Self-Efficacy (SE) play in influencing engineering students' acceptance of Artificial Intelligence?
- How does Social Influence (SI) from peers and educators shape students' attitudes toward adopting AI technologies in engineering education?
- What is the combined effect of SC, PEOU, TR, PU, SE, and SI on the overall acceptance of Artificial Intelligence among engineering students?

## **Literature Review**

### ***Supporting Conditions (SC)***

Supporting Conditions (SC) include the necessary resources, infrastructure, and institutional backing essential for the effective adoption and use of technology (Ghobakhloo et al., 2012; D. Wu et al., 2019). In educational contexts, SC encompasses access to necessary hardware, software, technical support, and training programs that facilitate the effective integration of technology into learning environments (Bingimlas, 2009; Brata & Amalia, 2018). Supporting conditions have been demonstrated to improve technology acceptance by diminishing perceived barriers and promoting favorable attitudes toward technology use (Kanwal & Rehman, 2017). For engineering students, SC is essential, as access to advanced AI tools, computational resources, and expert technical guidance significantly influences their capacity to integrate AI into their educational experiences. Adequate institutional support facilitates the development of AI-related competencies and promotes sustained engagement and confidence in using AI technologies, thereby reinforcing its adoption in engineering education. Based on the theoretical framework and literature review, we have formulated the hypotheses related to supporting conditions:

- How do Supporting Conditions (SC), including access to necessary resources, infrastructure, and institutional support, positively and significantly influence engineering students' acceptance of Artificial Intelligence?

### ***Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)***

Perceived Usefulness (PU) refers to the extent to which an individual believes that utilizing a particular system will improve their job or learning performance (Findik-Coşkunçay et al., 2018; Gefen et al., 2000; Rubiyanti et al., 2023; Wang et al., 2022). Empirical evidence highlights perceived usefulness as a key factor in technology acceptance, affecting users' attitudes and behavioral intentions. In the field of business intelligence systems, perceived usefulness (PU) is influenced by factors including the perceived quality of system outputs,

system adaptability, and task relevance (Hu, 2022; Peres et al., 2020). In online learning environments, perceived usefulness significantly influences students' intentions to adopt and engage with learning management systems (Hwang et al., 2022; J. S. Hwang & Lee, 2018; Tang et al., 2021). Studies show that students are more inclined to embrace technology when they recognize its utility in attaining their academic objectives.

Perceived Ease of Use (PEOU) refers to the extent to which individuals view a system as requiring minimal effort. User satisfaction and technology adoption intentions are significantly influenced by this factor (Abdullah et al., 2016; Amin et al., 2014; Brown et al., 2010; Davis, 1989; Gefen et al., 2000). In mobile applications, perceived ease of use (PEOU) positively impacts user satisfaction, retention, and intentions for continued usage, as users prefer systems that reduce cognitive and operational effort (AlNawafleh et al., 2023; Chen et al., 2023; Rafique et al., 2020). Furthermore, perceived ease of use (PEOU) is affected by factors including technological self-efficacy, computer anxiety, and the presence of organizational support, which collectively diminish perceived obstacles to technology utilization (Antonietti et al., 2022; Chatterjee et al., 2020, 2021; Ebadi & Raygan, 2023; Kanwal & Rehman, 2017; Kashive et al., 2021; Yao et al., 2023). The findings underscore the importance of user-friendly design and training in improving perceptions of ease of use.

PU and PEOU collectively influence users' attitudes toward technology, subsequently affecting their behavioral intentions. Extensions of the Technology Acceptance Model (TAM) have incorporated additional constructs, including perceived enjoyment, trust, and guidance from professional associations, to elucidate technology acceptance in particular contexts, such as e-learning and professional development tools (Ali et al., 2024; Baki et al., 2018; Šumak et al., 2011; Zhao et al., 2021). The extensions highlight the complex nature of technology acceptance, underscoring the significance of perceived usefulness (PU) and perceived ease of use (PEOU) in shaping attitudes and behavioral outcomes across diverse domains. These two variables have consistently been shown to be strong predictors of technology acceptance (Amin et al., 2014). In the context of AI, students are more likely to accept and use AI-driven tools if they perceive them as useful and easy to use. Studies have demonstrated that both PU and PEOU significantly impact students' intentions to adopt educational technologies, including AI-based systems (Abdullah et al., 2016). In engineering education, where complex problem-solving and critical thinking are essential, PU and PEOU are particularly relevant in determining students' willingness to embrace AI technologies. Based on the theoretical framework and literature review, we have formulated the following hypotheses:

- How does Perceived Ease of Use (PEOU) positively and significantly influence their acceptance of Artificial Intelligence?
- How does Perceived Usefulness (PU) positively and significantly affect their acceptance of Artificial Intelligence?

### ***Trust (TR) in AI***

Trust is a crucial factor in the integration of AI in education, especially since students may have concerns over dependence on automated systems. It includes faith in the technology and in the organizations or persons overseeing the management and deployment of AI systems (Glikson & Woolley, 2020). In educational contexts, trust is defined as the degree to which

students see AI systems as dependable, precise, and proficient in facilitating their learning processes (Harrison & Luna-Reyes, 2020). This is particularly vital in situations when AI technologies provide suggestions or conduct evaluations that directly influence academic results (Lankton et al., 2015). Studies have repeatedly shown that trust profoundly affects technology adoption, moderating the connection between perceived hazards and consumers' intents to embrace AI systems (Habbal et al., 2024). Engineering students' trust in AI is influenced by their views on the technology's dependability, openness, and fairness in decision-making, underscoring the need of creating ethical and transparent AI systems to cultivate confidence and adoption.

Trust in AI strongly impacts user acceptance and adoption, with transparency, accuracy, clarity, and predictability serving as critical elements. Establishing confidence in AI systems through transparency and explainability is crucial, and the ethical consequences of trust in AI and its influence on decision-making need more investigation (Balasubramaniam et al., 2022; Batut et al., 2024; Benk et al., 2024; A Duenser & Douglas, 2023; Haresamudram et al., 2023; C. Lee & Cha, 2024; Mylrea & Robinson, 2023). It is essential to recognize that, while the abstracts provide significant insights, there may exist supplementary study beyond the confines of the offered abstracts that might further augment our comprehension of these subjects. Based on the theoretical framework and literature review, we have formulated the following hypothesis:

- How does Trust (TR) in AI systems, encompassing factors such as reliability, transparency, and fairness, positively and significantly influence engineering students' acceptance of Artificial Intelligence in their academic environment?

### ***Self-Efficacy (SE) on AI in Blended Learning***

Self-Efficacy (SE) defines an individual's belief in their ability to successfully carry out activities using a certain technology (Kulviwat et al., 2014). Within the framework of AI adoption, self-efficacy indicates students' confidence in their capacity to use AI technologies proficiently. Numerous research have recognized self-efficacy as a crucial predictor of technology adoption, especially in educational contexts (Pan, 2020; Q. Wang & Rao, 2024). Students who see themselves as proficient in using AI technologies are more inclined to interact with and incorporate them into their educational pursuits (Huffman et al., 2013). Engineering students, often engaged with intricate systems and technologies, may demonstrate enhanced self-efficacy when acquainted with AI ideas and applications, hence promoting the integration of AI within their academic milieu.

The influence of self-efficacy on artificial intelligence in blended learning is substantial, with several aspects affecting students' academic self-efficacy. Assessing self-efficacy in this context may be accomplished using questionnaires and theoretical frameworks. Challenges in fostering self-efficacy include managing academic stress and strengthening learning behaviors, while optimal practices entail bolstering self-efficacy, community support, and the cultivation of critical thinking among educators and students (Chen et al., 2024; Lian, 2019; Nuhoğlu et al., 2024; Rayyan et al., 2024; Wilson & Narayan, 2016; Yang et al., 2024; Yokoyama, 2024). Based on the theoretical framework and literature review, we have formulated the following hypothesis:

- How does Self-Efficacy (SE) positively and significantly influence their acceptance of Artificial Intelligence in blended learning environments?

### ***Social Influence (SI)***

Social Influence (SI) serves as a significant factor in technology acceptance, indicating the degree to which individuals believe that key figures, including peers, instructors, or societal norms, anticipate their use of a specific technology (Brown et al., 2010; Tondeur et al., 2017). In educational contexts, the technology adoption behaviors of students are frequently influenced by their peers, educators, and institutional policies. Empirical studies indicate that social influence directly affects technology acceptance, especially when the adoption of technology corresponds with normative expectations or social pressure (Brata & Amalia, 2018; Dwivedi et al., 2021; Hsu & Lin, 2008; Rehman et al., 2024). Engineering students may encounter SI from knowledgeable peers in AI, faculty promoting its integration into the curriculum, or industry benchmarks highlighting AI-related skills as crucial for future career advancement. The impact of these social factors highlights the necessity of establishing supportive learning environments and cultivating communities that enhance favorable perceptions of AI adoption. Based on the theoretical framework and literature review, we have formulated the following hypothesis:

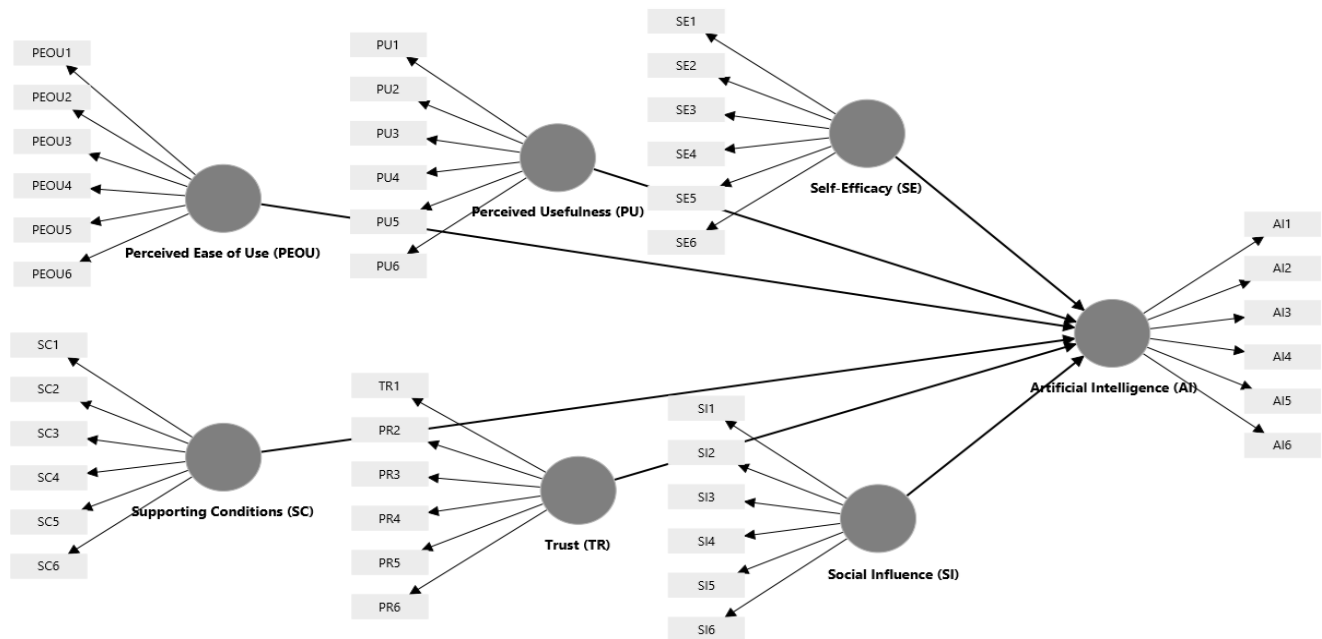
- How does Social Influence (SI), including the impact of peers, educators, and societal expectations, positively and significantly affect engineering students' acceptance of Artificial Intelligence in their academic and professional pursuits?

Despite the growing research on AI's role in education, a notable gap remains in understanding the specific factors influencing engineering students' adoption of AI, particularly in developing countries like Indonesia. While research has broadly explored AI in education, there has been insufficient focus on engineering students, whose distinct skill sets and contributions to AI advancements necessitate targeted investigation (Ahmad, 2020). This research examines the factors influencing AI acceptance among engineering students in Indonesia, a developing nation where AI adoption remains in its early phases.

## **Method**

### ***Research Design***

This study used a quantitative method with cross-sectional research design to investigate the factors affecting engineering students' acceptance of Artificial Intelligence (AI) in educational contexts. Structural Equation Modelling (SEM) utilizing Partial Least Squares (PLS) was employed for data analysis, a method appropriate for investigating intricate models involving multiple variables and their interrelations (Kholifah et al., 2024; Lowry & Gaskin, 2014; Sarstedt et al., 2014). The research framework utilizes the Technology Acceptance Model (TAM) and includes six essential variables: Supporting Conditions (SC), Perceived Ease of Use (PEOU), Trust (TR), Perceived Usefulness (PU), Self-Efficacy (SE), and Social Influence (SI). The constructs were chosen due to their recognized significance in research on technology adoption, especially within educational settings. This study investigates the direct and indirect relationships among these variables to enhance understanding of their influence on engineering students' acceptance of AI. Figure 1 presents the theoretical framework that supports the study.

**Figure 1***Theoretical Framework**Participants and Data Collection*

The study was conducted among undergraduate engineering students from various universities across Indonesia. A total of 158 respondents were selected using purposive sampling (random sampling within a purposeful subgroup), ensuring that participants had prior exposure to AI technologies in their education (Westland, 2010). The selection criteria focused on engineering students at various year of study, actively using technology in their academic activities, and engaged in blended learning environments, allowing for informed perspectives on AI adoption (George & Wooden, 2023; Nagaraj et al., 2023). Twenty-eight students had no significant prior exposure to AI; however, they possessed some low-intensity experience with the technology. By targeting students with prior AI experience, the study enhances the validity of responses, as familiarity with AI influences perceptions of usability, usefulness, and institutional support (Al-Gerafi et al., 2023; Hazaimah & Al-Ansi, 2024). Including respondents from both state and private universities further strengthens the analysis by capturing institutional variations in resources, faculty support, and infrastructure (Almenara et al., 2024; Nagaraj et al., 2023). This diversity provides a comprehensive understanding of how different academic settings shape students' acceptance and engagement with AI in engineering education (George & Wooden, 2023; Ofosu-ampong et al., 2023). The sample size was determined based on the minimum requirements for SEM-PLS analysis, which suggests that sample sizes of over 100 are sufficient for reliable results (Willaby et al., 2015).



**Table 1***Demographic of the Participants (N= 158)*

| Characteristic                    | Category                             | Frequency (n) | Percentage (%) |
|-----------------------------------|--------------------------------------|---------------|----------------|
| Gender                            | Male                                 | 95            | 60.1%          |
|                                   | Female                               | 63            | 39.9%          |
| Age                               | 18 – 22 years                        | 110           | 69.6%          |
|                                   | 23 – 27 years                        | 42            | 26.6%          |
|                                   | 28 years and above                   | 6             | 3.8%           |
| Year of study                     | First year                           | 45            | 28.5%          |
|                                   | Second year                          | 40            | 25.3%          |
|                                   | Third year                           | 45            | 28.5%          |
|                                   | Fourth year                          | 28            | 17.7%          |
| University type                   | Public university                    | 120           | 75.9%          |
|                                   | Private university                   | 38            | 24.1%          |
| Prior exposure to AI              | Yes                                  | 130           | 82.3%          |
|                                   | No                                   | 28            | 17.7%          |
| Previous experience with AI tools | High                                 | 50            | 31.6%          |
|                                   | Moderate                             | 62            | 39.2%          |
|                                   | Low                                  | 46            | 29.1%          |
| Academic major                    | Electrical Engineering               | 40            | 25.3%          |
|                                   | Computer and Informatics Engineering | 40            | 25.3%          |
|                                   | Civil Engineering                    | 35            | 22.2%          |
|                                   | Mechanical Engineering               | 38            | 24.1%          |
|                                   | Others                               | 5             | 3.2%           |
|                                   | Daily                                | 75            | 47.5%          |
|                                   | Several times a week                 | 50            | 31.6%          |
| Technology usage frequency        | Weekly                               | 25            | 15.8%          |
|                                   | Rarely                               | 8             | 5.1%           |

Data were collected using an online questionnaire, which was distributed via email and social media platforms. The questionnaire consisted of two main sections: demographic information and questions related to the six research variables. The questions were adapted from validated scales used in previous studies (W. Ahmed, 2023) to ensure reliability and validity. Each item was measured using a 5-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (5). The questionnaire was pre-tested with a small group of 20 engineering students to ensure clarity and comprehensibility of the questions. Based on the feedback, minor revisions were made before the final distribution. Data collection took place over a two-month period.

### ***Instrumentation and Data Analysis***

The survey instrument was developed based on established measures from the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and related frameworks (Yildiz Durak, 2019). Each item was rated on a 5-point Likert scale, ranging from “strongly disagree” to “strongly agree.” Prior to data collection, the questionnaire was subjected to a pilot test with a small group of engineering students to assess its clarity, reliability, and validity. Cronbach’s alpha coefficients were calculated for each construct, with values above 0.70 indicating acceptable internal consistency. Samples of the instrument items utilized in this investigation are available in the supplementary material through online instrument links.

The collected data were analyzed using the SEM-PLS approach using the SmartPLS software. SEM-PLS was chosen because it allows for the analysis of complex relationships between latent constructs and is robust with small to medium sample sizes. The analysis proceeded in two stages: a) Measurement Model Assessment: The reliability and validity of the constructs were assessed through Cronbach’s alpha, composite reliability, and average variance extracted (AVE). Discriminant validity was checked using the Fornell-Larcker criterion, and all constructs met the threshold values of 0.70 for reliability and 0.50 for AVE; b) Structural Model Assessment: Hypotheses were tested to examine the direct and indirect effects of the variables on AI acceptance. Path coefficients were calculated to determine the strength and significance of each relationship. The model’s predictive accuracy was assessed using the  $R^2$  value for the dependent variable (AI acceptance) were used to evaluate the magnitude of each predictor.

### ***Ethical Considerations***

All participants provided informed consent and voluntarily agreed to participate in the study (Adley et al., 2024; H. Ahmed, 2024). Approval was secured from all institutions participating in the study for data collection and the comprehensive research process. Participant identity data remains anonymous. Prior approval for the study was obtained from both the supervisor and the ethics committee at Yogyakarta State University prior to the commencement of fieldwork. All collected data, including participant identities, are maintained in a confidential manner and utilized solely for research purposes to safeguard against any potential impact on participants' future research (Adley et al., 2024; H. Ahmed, 2024; Kholifah et al., 2025).

## **Results and Discussion**

This research provides a comprehensive analysis of the factors that influence engineering students' acceptance of Artificial Intelligence (AI) across Indonesia. Using a Structural Equation Modeling (SEM) approach with the Partial Least Squares (PLS) method, this study assesses the relationships between six key variables: Supporting Conditions (SC), Perceived Ease of Use (PEOU), Trust (TR), Perceived Usefulness (PU), Self-Efficacy (SE), and Social Influence (SI). The analytical model of this study is presented in Figure 2.

### ***Measurement Model Assessment***

To ensure the reliability and validity of the constructs used in this study, a thorough assessment was conducted using Cronbach’s alpha, Composite Reliability ( $\rho_a$ , and  $\rho_c$ ),

and Average Variance Extracted (AVE). These methods are important to confirm the internal consistency and convergent validity of the measurement model. Table 2 presents the results of the reliability and validity analysis.

**Table 2**

*Reliability and Validity Metrics*

| Construct                    | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------------------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| Artificial Intelligence (AI) | 0.886            | 0.891                         | 0.914                         | 0.639                            |
| Supporting Conditions (SC)   | 0.867            | 0.870                         | 0.901                         | 0.602                            |
| Perceived Ease of Use (PEOU) | 0.906            | 0.911                         | 0.928                         | 0.682                            |
| Trust (TR)                   | 0.857            | 0.865                         | 0.893                         | 0.583                            |
| Perceived Usefulness (PU)    | 0.871            | 0.874                         | 0.903                         | 0.608                            |
| Self-Efficacy (SE)           | 0.849            | 0.854                         | 0.888                         | 0.571                            |
| Social Influence (SI)        | 0.850            | 0.853                         | 0.889                         | 0.572                            |

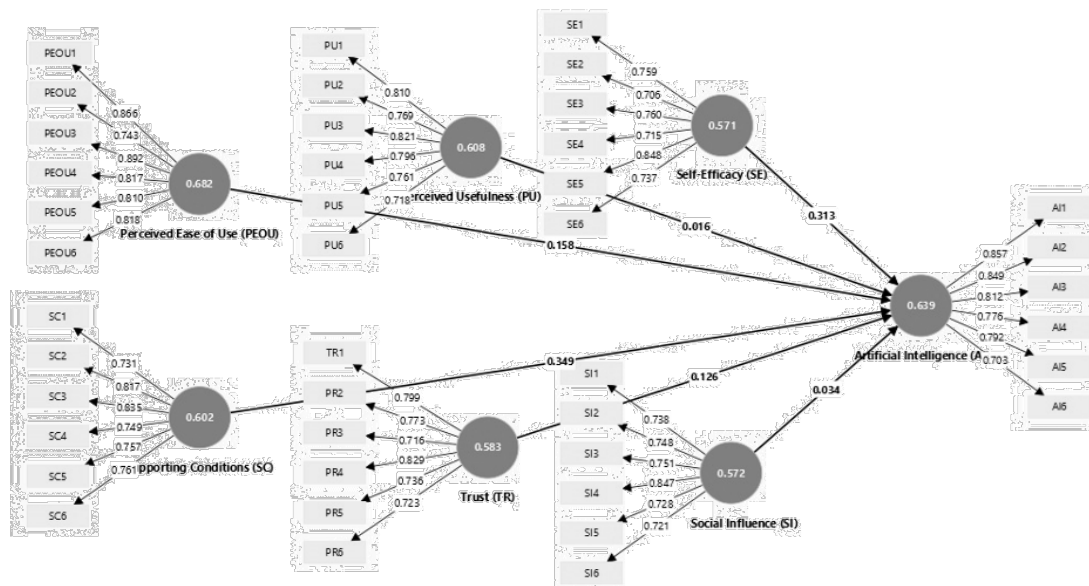
This study rigorously evaluated the reliability and validity of the measurement model to confirm the robustness of the constructs and the quality of the data. Cronbach's alpha values for all constructs surpassed the accepted threshold of 0.70, demonstrating strong internal consistency among the variables. The values for each construct were as follows: Artificial Intelligence (AI) at 0.886, Supporting Conditions (SC) at 0.867, Perceived Ease of Use (PEOU) at 0.906, Trust (TR) at 0.857, Perceived Usefulness (PU) at 0.871, Self-Efficacy (SE) at 0.849, and Social Influence (SI) at 0.850. The values indicate that the items within each construct reliably measure the intended dimensions, demonstrating a high level of internal consistency among the constructs. Alongside Cronbach's alpha, Composite Reliability (CR) values, specifically rho\_a and rho\_c, have been calculated to enhance the evaluation of construct reliability. The rho\_c values for all constructs surpassed the recommended threshold of 0.70, yielding the following results: AI at 0.914, SC at 0.901, PEOU at 0.928, TR at 0.893, PU at 0.903, SE at 0.888, and SI at 0.889. The values affirm the reliability of the constructs, demonstrating that the indicators within each construct are consistent and dependable.

The Average Variance Extracted (AVE) values were calculated to evaluate the convergent validity of the constructs. The AVE values for all constructs surpassed the 0.50 threshold, indicating that over 50% of the variance in the indicators is accounted for by the corresponding latent variables. The AVE values for AI (0.639), SC (0.602), PEOU (0.682), TR (0.583), PU (0.608), SE (0.571), and SI (0.572) demonstrate sufficient convergent validity, thereby affirming that the constructs effectively represent the intended underlying dimensions of AI acceptance. The results from the reliability and validity assessments demonstrate that the measurement model employed in this study is reliable and valid. The elevated Cronbach's alpha values, substantial

Composite Reliability, and adequate AVE values collectively affirm the robustness of the measurement model, confirming that the constructs are accurately assessed and suitable for subsequent structural analysis. The findings affirm the measurement model's reliability in capturing the key factors that influence engineering students' acceptance of AI, establishing a robust basis for further analysis and interpretation of the study's results.

**Figure 2**

*Analytical Model*



### ***Discriminant Validity***

The discriminant validity analysis presented in Table 3 indicates several high correlations, which may imply concerns regarding the distinctiveness of the constructs. AI demonstrates significant correlations with SC (1.030), PEOU (1.000), TR (0.983), PU (0.963), SE (1.025), and SI (0.982). The values indicate considerable overlap between AI and other constructs, particularly concerning PEOU and PU, which are conceptually associated with user perceptions and ease of use. Additionally, SC exhibits a strong correlation with PEOU (1.006) and PU (1.002), suggesting that supporting conditions may not be sufficiently differentiated from perceived ease of use and usefulness. The high correlation values suggest a potential conceptual similarity between constructs, indicating that they may not be measuring distinct dimensions. This requires additional analysis and refinement of the constructs to ensure that each one accurately represents a distinct aspect of the theoretical model.

**Table 3***Discriminant Validity*

| Variables                    | AI    | SC    | PEOU  | RP    | PU    | SE    | SI |
|------------------------------|-------|-------|-------|-------|-------|-------|----|
| Artificial Intelligence (AI) | -     | -     | -     | -     | -     | -     | -  |
| Supporting Conditions (SC)   | 1,030 | -     | -     | -     | -     | -     | -  |
| Perceived Ease of Use (PEOU) | 1,000 | 1,006 | -     | -     | -     | -     | -  |
| Trust (TR)                   | 0,983 | 0,956 | 1,000 | -     | -     | -     | -  |
| Perceived Usefulness (PU)    | 0,963 | 1,002 | 0,976 | 0,992 | -     | -     | -  |
| Self-Efficacy (SE)           | 1,025 | 0,978 | 0,999 | 0,952 | 0,976 | -     | -  |
| Social Influence (SI)        | 0,982 | 1,004 | 0,986 | 0,990 | 0,964 | 0,981 | -  |

*Structural Model Assessment*

The assessment of the structural model regarding AI acceptance among engineering students indicates significant relationships among the latent variables, as illustrated in Table 4. All hypotheses concerning the impact of different constructs on AI acceptance are validated, exhibiting significant path coefficients and p-values.

**Table 4***Correlation Hypotheses*

| Hypotheses                                                                                     | Path coefficient | P-value | Results   |
|------------------------------------------------------------------------------------------------|------------------|---------|-----------|
| H1: Supporting Conditions (SC) positively influence engineering students' acceptance of AI.    | 0,349            | 0,000   | Supported |
| H2: Perceived Ease of Use (PEOU) positively influences engineering students' acceptance of AI. | 0,158            | 0,000   | Supported |
| H3: Trust (TR) positively influence engineering students' acceptance of AI.                    | 0,126            | 0,000   | Supported |
| H4: Perceived Usefulness (PU) positively influences engineering students' acceptance of AI.    | 0,016            | 0,000   | Supported |
| H5: Self-Efficacy (SE) positively influences engineering students' acceptance of AI.           | 0,313            | 0,000   | Supported |
| H6: Social Influence (SI) positively influences engineering students' acceptance of AI.        | 0,034            | 0,000   | Supported |

### ***Supporting Conditions (SC)***

The path coefficient of 0.349, accompanied by a p-value of 0.000, demonstrates a robust and statistically significant positive correlation between supporting conditions and AI acceptance. Supporting conditions include infrastructure, resources, and institutional support, which directly affect students' ability to adopt and engage with AI technologies. The path coefficient indicates that establishing an enabling environment, including access to technology, adequate training, and organizational support, significantly increases students' willingness to accept AI. This finding is consistent with the literature, which identifies adequate resources and institutional frameworks as essential factors for technology adoption (Brown et al., 2010; D. Wu et al., 2019). This highlights the necessity of aligning educational settings with technological progress to enable more effective AI integration.

### ***Perceived Ease of Use (PEOU)***

The path coefficient of 0.158 (p-value 0.000) for perceived ease of use indicates a significant positive effect on artificial intelligence acceptance, though this effect is less pronounced than that of supporting conditions. PEOU denotes the perception regarding the ease of use associated with AI technologies. The positive correlation indicates that students are more inclined to embrace AI when they view it as user-friendly and uncomplicated. Nonetheless, the comparatively lower path coefficient in relation to SC indicates that ease of use, although significant, may not be as crucial as the presence of supportive conditions. This finding supports (Antonietti et al., 2022; Davis, 1989; Gefen et al., 2000; Joo et al., 2018) Technology Acceptance Model (TAM), which asserts that perceived ease of use is an important factor, although not necessarily the most significant, in the context of technology adoption.

### ***Trust (TR)***

The path coefficient for Trust is 0.126 (p-value 0.000), indicating a positive and statistically significant correlation with AI acceptance. Trust in AI include perceptions on the dependability, security, and clarity of AI systems. This conclusion aligns with studies highlighting trust as a crucial determinant of technological acceptance (Habbal et al., 2024; Lankton et al., 2015; Mishra et al., 2023; K. Wu et al., 2011). Engineering students that possess trust in technology are more likely to accept and interact with it, especially in areas such as AI, where apprehensions over privacy, security, and autonomy are widespread. Although the influence of trust is less significant than that of supportive circumstances or usability, it is crucial in promoting acceptance, particularly given the intricate and sometimes ambiguous characteristics of AI systems.

### ***Perceived Usefulness (PU)***

The path coefficient for Perceived Usefulness is 0.016 (p-value 0.000); however, the effect size is relatively small in comparison to the other constructs. This weak but notable relationship indicates that, while students acknowledge the potential advantages of AI in their academic or professional endeavors, the direct influence of perceived usefulness on their acceptance remains constrained. This may indicate that, although AI is recognized as beneficial, students might not yet fully understand or value its long-term advantages or uses. The weak correlation with perceived usefulness may suggest that students prioritize immediate usability and external factors, such as support, over long-term utility in their considerations of AI adoption. This finding warrants additional exploration of the

psychological and contextual factors influencing perceptions of usefulness within an academic context (Antonietti et al., 2022; Chatterjee et al., 2020; Davis, 1989; Ebadi & Raygan, 2023).

### ***Self-Efficacy (SE)***

The path coefficient of 0.313 (p-value 0.000) for self-efficacy demonstrates a strong and statistically significant relationship with AI acceptance. Self-Efficacy refers to students' belief in their ability to successfully use AI technologies. This result highlights the importance of fostering confidence among students regarding their technical capabilities. When students believe they can effectively use AI tools, they are more likely to embrace the technology. This aligns with (Bandura, 1985, 2014) work on self-efficacy, which posits that individuals' beliefs about their abilities significantly influence their behavior. For AI adoption in education, increasing students' self-efficacy could be a key strategy in encouraging greater acceptance (Chang et al., 2022; Y Chen et al., 2024; Jaipal-Jamani, 2017).

### ***Social Influence (SI)***

The path coefficient for Social Influence is 0.034 (p-value 0.000), suggesting a positive yet weak impact on AI acceptance. Social influence indicates the extent to which students are impacted by the views and actions of peers, faculty, and social networks in their decision-making regarding the adoption of AI. Despite being statistically significant, the low path coefficient indicates that social pressure and peer influence are less impactful compared to other factors such as supporting conditions or self-efficacy. The specialized nature of AI in engineering education may lead to adoption being influenced primarily by individual perceptions of usefulness and ease of use rather than by social factors. Social influence is an important, though secondary, factor, particularly in group settings or collaborative environments (Brown et al., 2010; Kurdi et al., 2020; W. Wu et al., 2022).

### ***Model Fit and Predictive Power***

The structural model's fit and predictive power were systematically evaluated to confirm that the model accurately depicts the relationships among key variables and effectively forecasts AI acceptance among engineering students. The Standardized Root Mean Square Residual (SRMR) is a commonly utilized index for assessing model fit, producing a value of 0.045, significantly lower than the 0.08 threshold, thereby suggesting a favorable fit of the model to the data. This indicates that the differences between the observed and predicted correlations are minimal, and the model effectively captures the underlying data structure. The Normed Fit Index (NFI) of 0.912 exceeds the benchmark of 0.90, indicating the adequacy of the model fit and demonstrating that the proposed relationships between variables significantly outperform a null model. Table 4 presents the results of the model fit and predictive power analysis.

The model's  $R^2$  value for AI acceptance was 0.888, indicating that approximately 88.8% of the variance in AI acceptance is accounted for by the independent variables in the model. The model demonstrates significant explanatory power in identifying the primary factors influencing AI acceptance among engineering students. The Adjusted  $R^2$  value of 0.884, which accounts for the number of predictors, demonstrates a high degree of explanatory power, indicating the model's robustness and reliability despite adjustments for complexity. The findings demonstrate the model's robust alignment with the data and its

predictive efficacy, affirming its significance and applicability in comprehending AI acceptance within educational contexts.

**Table 4**

*Correlation Hypotheses Model Fit and Predictive Power*

| Fit Index                    | Value | Threshold | Interpretation |
|------------------------------|-------|-----------|----------------|
| SRMR                         | 0.045 | < 0.08    | Good fit       |
| NFI                          | 0.912 | > 0.90    | Acceptable fit |
| R <sup>2</sup> (AI)          | 0.888 | -         | Substantial    |
| Adjusted R <sup>2</sup> (AI) | 0.884 | -         | Substantial    |

## Discussion

This research examines the factors that affect engineering students' acceptance of Artificial Intelligence (AI), focusing on variables including Supporting Conditions (SC), Perceived Ease of Use (PEOU), Trust (TR), Perceived Usefulness (PU), Self-Efficacy (SE), and Social Influence (SI). The findings offer significant insights into the factors influencing AI adoption among engineering students, highlighting both theoretical and practical implications. The results indicate that Perceived Ease of Use (PEOU) has a significant impact on engineering students' acceptance of AI (H1 supported), as evidenced by a positive path coefficient. This finding is consistent with the Technology Acceptance Model (TAM) as proposed by Gefen et al. (2000); Taherdoost (2018), which emphasizes the significance of ease of use in the adoption of technology. The integration of AI into academic and professional tasks for engineering students diminishes cognitive barriers, resulting in increased acceptance rates. Given the complexity of AI technologies, ensuring their usability is essential for promoting acceptance in educational contexts.

Perceived Usefulness (PU) significantly influences students' acceptance of AI, supporting Hypothesis 2 and aligning with the Technology Acceptance Model's assertion that perceived utility drives technology adoption. Research indicates that engineering students are inclined to adopt AI when they recognize its advantages for academic performance, skill enhancement, or career opportunities (Chatterjee & Bhattacharjee, 2020; Chen et al., 2023). The findings highlight the necessity of showcasing the practical advantages of AI to students (Johnson et al., 2024; S. S. Lee & Moore, 2024; Salhab, 2024), especially in relation to productivity, problem-solving, and innovation, which are essential in engineering fields. Trust (TR) is identified as a crucial determinant of AI acceptance (H3 supported), especially in scenarios involving decision making or the management of sensitive information. According to research findings (Alzubaidi et al., 2023; Batut et al., 2024; Glikson & Woolley, 2020; Habbal et al., 2024; Mylrea & Robinson, 2023), the role of AI in critical engineering systems necessitates that students trust the reliability, fairness, and transparency of these AI systems. The positive path coefficient suggests that fostering trust in AI systems enhances engineering students' willingness to utilize AI tools, particularly in automation, predictive analytics, and machine learning.

Self-Efficacy (SE) significantly influences AI acceptance, as evidenced by a high path coefficient, supporting hypothesis H4. This finding aligns with the theory of self-efficacy proposed by Chang et al. (2022); Gist & Mitchell (1992); Joo et al. (2018); Li et al. (2019); Pan (2020), which highlights the importance of individuals' beliefs in their own abilities to



perform tasks. Engineering students who possess greater self-confidence in their proficiency with AI tools are more inclined to adopt the technology. Educational institutions must prioritize the provision of sufficient training and resources to enhance students' competence and confidence in utilizing AI technologies.

Engineering students who trust in technology are more likely to accept and engage with it, particularly in domains such as artificial intelligence (AI), where concerns related to privacy, security, and autonomy are prevalent. This finding aligns with research emphasizing trust as a key determinant of technology acceptance (Habbal et al., 2024; Lankton et al., 2015; Mishra et al., 2023; K. Wu et al., 2011). While the influence of trust may be less significant than that of supportive circumstances or perceived usefulness, it remains crucial in promoting acceptance, especially given the complex and often ambiguous nature of AI systems. Additional studies have shown that trust in AI (Glikson & Woolley, 2020) is shaped by a combination of technology-related factors (e.g., functionality and reliability (Becker & Fischer, 2024; Qin et al., 2020)), transparency and clarity (Andreas Duenser & Douglas, 2023; Tucci et al., 2022), security and privacy (Becker & Fischer, 2024; Emaminejad et al., 2024)), context-related factors (e.g., organizational trust (Becker & Fischer, 2024; Qin et al., 2020)), regulatory and ethical considerations (Omrani et al., 2022; Paliszkievicz & Gołuchowski, 2024; Qin et al., 2020)), individual-related factors (e.g., user perceptions and propensity to trust (Fine & Marsh, 2024; Lalot & Bertram, 2024; Qin et al., 2020)), and anthropomorphism (Lalot & Bertram, 2024; Omrani et al., 2022)). Addressing these factors through transparency, security, ethical practices, and continuous improvement can enhance trust and promote the broader adoption of AI technologies.

Social Influence (SI) exerts a modest yet notable impact on the acceptance of AI (H5 supported). This result is consistent with the findings of Ali et al. (2024); Bayaga & du Plessis (2024); Chatterjee & Bhattacharjee (2020); Khechine et al. (2020) regarding the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which posits that social influence from peers, instructors, and professional networks affects technology adoption. In engineering, collaborative work is prevalent; thus, endorsements from influential figures or peers may motivate students to embrace AI. Nonetheless, the comparatively lower path coefficient indicates that, although social influence is significant, factors such as self-efficacy and perceived usefulness exert a more substantial impact. The availability of infrastructure, resources, and training, referred to as Supporting Conditions (SC), significantly influences AI acceptance among engineering students (H6 supported). The significant path coefficient suggests that access to essential tools, resources, and a supportive learning environment enhances student engagement with AI technologies. This finding is consistent with previous studies highlighting the significance of facilitating conditions in technology adoption (Queiroz & Fosso Wamba, 2019; Straub, 2009; Wu et al., 2019). Universities and educational institutions must ensure the provision of adequate technological infrastructure, training, and support systems to facilitate AI adoption.

Social pressure and social influence exert less of an impact compared to other determinants, including supportive conditions and self-efficacy. In engineering education, the adoption of AI is primarily determined by individual perceptions regarding its usefulness and ease of use, rather than by social influences. Social influence is significant, particularly in collaborative settings (Brown et al., 2010; Kurdi et al., 2020; W. Wu et al., 2022), and non-human agents, including AI, can serve as credible sources of social influence (Riva et al., 2022; Y. Wu et al., 2022). Kandoth's research (2022) indicates that social influence has a positive effect on intentions to use AI applications (Changalima et al., 2024). Similarly, Velli

(2024) discovered that social influence, in conjunction with personal innovation, affects the acceptance of educational AI tools. While not a primary predictor, social influence plays a significant role in shaping teachers' attitudes toward AI technology. Hispanic/LatinX users exhibit a higher level of trust in AI chatbots compared to other ethnic groups (black, indigenous and other people of color), highlighting the significance of trust and social influence in the adoption of generative AI technologies (Stewart et al., 2024). Cultural factors, including long-term orientation, power distance, social influence, and trust, significantly influence the acceptance of AI in Indonesia (Hamid et al., 2024; Kasri & Sosianti, 2023; Neyazi et al., 2023; Sriwindono & Yahya, 2012; Surdjono et al., 2025). Comprehending these cultural dimensions aids in the design and implementation of AI technologies that are more likely to gain acceptance among Indonesian users.

This study theoretically enhances the literature by combining elements from the Technology Acceptance Model (TAM), UTAUT, and Self-Efficacy Theory to create a comprehensive model for analyzing AI acceptance in education (W. Wu et al., 2022). The findings highlight self-efficacy and supporting conditions as significant predictors of AI adoption, with trust, perceived usefulness, and perceived risk also playing essential roles. This analysis enhances our comprehension of the complex factors influencing technology acceptance among engineering students, especially regarding AI, which presents unique challenges and opportunities relative to other technologies. The study provides practical insights for educational institutions, policymakers, and AI developers. Universities should prioritize enhancing students' self-efficacy by offering targeted training programs that equip them with the necessary skills to use AI tools confidently. Institutions should also invest in supporting infrastructure, such as labs equipped with AI tools and software, and provide students with access to online resources and tutorials. Additionally, fostering a culture of trust around AI by addressing ethical concerns and mitigating perceived risks will further encourage students to adopt AI technologies in their academic and future professional pursuits. Furthermore, attention must be given to ethical issues associated with the integration of AI into the educational process (Adley et al., 2024; Balasubramaniam et al., 2022; Yu Chen et al., 2023; Choung et al., 2023; A Duenser & Douglas, 2023; Fine & Marsh, 2024; Habbal et al., 2024; Kumar et al., 2024; Tlili et al., 2023). This study has several limitations. First, the cross-sectional design limits the ability to assess changes in AI acceptance over time. Longitudinal studies would provide deeper insights into how students' attitudes towards AI evolve as they gain more exposure to the technology. Second, the study is geographically limited to engineering students in Indonesia, which may affect the generalizability of the findings. Future research could explore AI acceptance among students from other disciplines and cultural contexts to broaden the scope of understanding. Additionally, future studies could investigate the role of additional variables, such as cultural differences, ethical perceptions, or AI literacy, in influencing AI acceptance.

## Conclusion

This study provides valuable insights into the factors influencing engineering students' acceptance of Artificial Intelligence (AI) in academic and professional settings. By employing the Structural Equation Modeling (SEM) approach with the Partial Least Squares (PLS) method, we identified that Supporting Conditions (SC), Perceived Ease of Use (PEOU), Trust (TR), Perceived Usefulness (PU), Self-Efficacy (SE), and Social Influence (SI) significantly contribute to AI acceptance among engineering students in Indonesia. Among these factors, Self-Efficacy (SE) and Supporting Conditions (SC) emerged as the most influential predictors, highlighting the importance of confidence in students' ability to use AI tools and the necessity

of adequate resources and infrastructure for AI adoption. Perceived Usefulness (PU) and Trust (TR) were also substantial determinants, confirming that engineering students are more likely to adopt AI when they see its practical benefits and trust its reliability. The findings also align with established theories such as the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Self-Efficacy Theory, contributing to the theoretical understanding of AI acceptance in an educational context. These insights are particularly relevant for educators, policymakers, and AI developers aiming to promote the effective use of AI technologies in engineering education. In conclusion, this study underscores the necessity for educational institutions to focus on building students' self-efficacy and providing sufficient supporting conditions for AI adoption. By addressing trust and perceived risk, as well as demonstrating the tangible benefits of AI, institutions can foster a more conducive environment for integrating AI into engineering education. Future research should extend these findings by exploring longitudinal effects, cross-cultural perspectives, and additional variables such as AI literacy and ethical perceptions to develop a more comprehensive understanding of AI acceptance in diverse educational contexts.

### ***Acknowledgement***

The authors extend their gratitude to all parties who have contributed to this research. We express our appreciation to the reviewers for their valuable insights and suggestions, which have greatly enhanced this article.

Additionally, we thank the Education Financing Service Center (Puslapdik), the Center for Higher Education Funding and Assessment (PPAPT), the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia, Indonesian Education Scholarship (BPI) and the Endowment Fund for Education Agency (LPDP) for their financial support which enabled the successful completion of this research with grant number: 00093/BPPT/BPI.06/9/2023.

### ***Conflict of Interest***

The authors declare that there is no conflict of interests regarding the publication of the paper.

## References

- Abdullah, F., Ward, R., & Ahmed, E. (2016). Investigating the influence of the most commonly used external variables of TAM on students' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of e-portfolios. *Computers in Human Behavior*, 63, 75–90. <https://doi.org/10.1016/j.chb.2016.05.014>
- Adley, M., Alderson, H., Jackson, K., McGovern, W., Spencer, L., Addison, M., & O'Donnell, A. (2024). Ethical and practical considerations for including marginalised groups in quantitative survey research. *International Journal of Social Research Methodology*, 27(5), 559–574. <https://doi.org/10.1080/13645579.2023.2228600>
- Ahmad, T. (2020). Scenario based approach to re-imagining future of higher education which prepares students for the future of work. *Higher Education, Skills and Work-Based Learning*, 10(1), 217–238. <https://doi.org/10.1108/HESWBL-12-2018-0136/FULL/XML>
- Ahmed, H. (2024). Institutional integration of artificial intelligence in higher education: The moderation effect of ethical consideration. *International Journal of Educational Reform*. Advance online publication. <https://doi.org/10.1177/10567879241247551>
- Ahmed, W. (2023). Understanding self-directed learning behavior towards digital competence among business research students: SEM-neural analysis. *Education and Information Technologies*, 28(4), 4173–4202. <https://doi.org/10.1007/S10639-022-11384-Y/METRICS>
- Al-Gerafi, M. A., Zhou, Y., Alfadda, H., & Wijaya, T. T. (2023). Understanding the factors influencing higher education students' intention to adopt artificial intelligence-based robots. *IEEE Access*, 11, 99752–99764. <https://doi.org/10.1109/access.2023.3314499>
- Aleksandra, K., & Tatiana, B. (2024). Students' intention to learn and academic performance in the blended learning environment: The role of artificial intelligence chatbots. *International Journal of Information and Education Technology*, 14(6), 807–813. <https://doi.org/10.18178/ijiet.2024.14.6.2105>
- Ali, I., Warraich, N. F., & Butt, K. (2024). Acceptance and use of artificial intelligence and AI-based applications in education: A meta-analysis and future direction. *Information Development*. Advance online publication. <https://doi.org/10.1177/02666669241257206>
- Almenara, J. C., Palacios-Rodríguez, A., Aguirre, M. I. L., & Rivas-Manzano, M. del R. de. (2024). Acceptance of educational artificial intelligence by teachers and its relationship with some variables and pedagogical beliefs. *Education Sciences*, 14(7), 740. <https://doi.org/10.3390/educsci14070740>
- AlNawafleh, E. A. T., Alsheikh, G. A. A., Al-Gharaibeh, S. M., Alhyasat, K. M. K., & Hamdan, K. B. (2023). Extension of intentions to use booking mobile apps with service quality and customer satisfaction: Insights from Jordanian hotels. *International Journal of EBusiness and EGovernment Studies*, 15(1), 47–67. <https://doi.org/10.34109/ijebe.2023150103>

- Alshahrani, A. (2023a). The impact of ChatGPT on blended learning: Current trends and future research directions. *International Journal of Data and Network Science*, 7(4), 2029–2040. <https://doi.org/10.5267/j.ijdns.2023.6.010>
- Alshahrani, A. (2023b). Revolutionizing blended learning: Exploring current trends and future research directions in the era of ChatGPT. *7th International Conference on Business and Information Management, ICBIM 2023*, 41–47. <https://doi.org/10.1109/ICBIM59872.2023.10303267>
- Alzubaidi, L., Al-Sabaawi, A., Bai, J., Dukhan, A., Alkenani, A. H., Al-Asadi, A., Alwzwy, H. A., Manoufali, M., Fadhel, M. A., Albahri, A. S., Moreira, C., Ouyang, C., Zhang, J., Santamaría, J., Salhi, A., Hollman, F., Gupta, A., Duan, Y., Rabczuk, T., ... Gu, Y. (2023). Towards risk-free trustworthy artificial intelligence: Significance and requirements. *International Journal of Intelligent Systems*, 2023, Article 4459198. <https://doi.org/10.1155/2023/4459198>
- Amin, M., Rezaei, S., & Abolghasemi, M. (2014). User satisfaction with mobile websites: the impact of perceived usefulness (PU), perceived ease of use (PEOU) and trust. *Nankai Business Review International*, 5(3), 258–274. <https://doi.org/10.1108/NBRI-01-2014-0005/FULL/XML>
- Ammenwerth, E. (2019). Technology acceptance models in health informatics: TAM and UTAUT. In P. Scott, N. de Keizer, A. Georgiou (Eds.), *Applied interdisciplinary theory in health informatics, studies in health technology and informatics*, 263, 64–71. IOS Press. <https://doi.org/10.3233/SHTI190111>
- Antonietti, C., Cattaneo, A., & Amenduni, F. (2022). Can teachers' digital competence influence technology acceptance in vocational education? *Computers in Human Behavior*, 132, Article 107266. <https://doi.org/10.1016/j.chb.2022.107266>
- Baki, R., Birgoren, B., & Aktepe, A. (2018). A meta analysis of factors affecting perceived usefulness and perceived ease of use in the adoption of e-learning systems. *Turkish Online Journal of Distance Education*, 19(4), 4–42. <https://doi.org/10.17718/TOJDE.471649>
- Balasubramaniam, N., Kauppinen, M., Hiekkänen, K., & Kujala, S. (2022). Transparency and explainability of AI systems: Ethical guidelines in practice. In V. Gervasi, A. Vogelsang (Eds.), *Lecture notes in computer science (including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics): Vol. 13216. Requirements engineering: foundation for software quality* (pp. 3–18). Springer. [https://doi.org/10.1007/978-3-030-98464-9\\_1](https://doi.org/10.1007/978-3-030-98464-9_1)
- Bandura, A. (1985). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall, Inc. <https://psycnet.apa.org/record/1985-98423-000>.
- Bandura, A. (2014). Exercise of personal agency through the self-efficacy mechanism. In R. Schwarzer. (Ed.). *Self-Efficacy: Thought Control Of Action* (pp. 3–38). Taylor & Francis. <https://doi.org/10.4324/9781315800820>

- Batut, A., Prudhomme, L., van Sambeek, M., & Chen, W. (2024). Do you trust AI? Examining AI trustworthiness perceptions among the general public. In H. Degen, S. Ntoa (Eds.), *Lecture notes in computer science (including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics): Vol. 14735. Artificial Intelligence in HCI* (pp. 15–26). Springer. [https://doi.org/10.1007/978-3-031-60611-3\\_2](https://doi.org/10.1007/978-3-031-60611-3_2)
- Bayaga, A., & du Plessis, A. (2024). Ramifications of the Unified Theory of Acceptance and Use of Technology (UTAUT) among developing countries' higher education staffs. *Education and Information Technologies*, 29(8), 9689–9714. <https://doi.org/10.1007/S10639-023-12194-6>
- Becker, C., & Fischer, M. (2024). Factors of trust building in conversational ai systems: a literature review. In H. Degen, S. Ntoa (Eds.), *Lecture notes in computer science (including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics): Vol. 14735. Artificial Intelligence in HCI* (pp. 27–44). Springer. [https://doi.org/10.1007/978-3-031-60611-3\\_3](https://doi.org/10.1007/978-3-031-60611-3_3)
- Benk, M., Kerstan, S., von Wangenheim, F., & Ferrario, A. (2024). Twenty-four years of empirical research on trust in AI: a bibliometric review of trends, overlooked issues, and future directions. *AI and Society*. Advance online publication. <https://doi.org/10.1007/s00146-024-02059-y>
- Bhimdiwala, A., Neri, R. C., & Gomez, L. M. (2022). Advancing the design and implementation of artificial intelligence in education through continuous improvement. *International Journal of Artificial Intelligence in Education*, 32(3), 756–782. <https://doi.org/10.1007/S40593-021-00278-8>
- Bingimlas, K. A. (2009). Barriers to the successful integration of ict in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science and Technology Education*, 5(3), 235–245. <https://doi.org/10.12973/EJMSTE/75275>
- Brata, A. H., & Amalia, F. (2018). Impact analysis of social influence factor on using free blogs as learning media for driving teaching motivational factor. *ACM International Conference Proceeding Series*, 29–33. <https://doi.org/10.1145/3233347.3233360>
- Brown, S., Dennis, A., & Venkatesh, V. (2010). Predicting collaboration technology use: integrating technology adoption and collaboration research. *Journal of Management Information Systems*, 27(2), 9–54. <https://doi.org/10.2753/MIS0742-1222270201>
- Chang, C. Y., Hwang, G. J., & Gau, M. L. (2022). Promoting students' learning achievement and self-efficacy: A mobile chatbot approach for nursing training. *British Journal of Educational Technology*, 53(1), 171–188. <https://doi.org/10.1111/BJET.13158>
- Changalima, I. A., Amani, D., & Ismail, I. J. (2024). Social influence and information quality on Generative AI use among business students. *The International Journal of Management Education*, 22(3), 101063. <https://doi.org/10.1016/J.IJME.2024.101063>
- Chatterjee, S., & Bhattacharjee, K. K. (2020). Adoption of artificial intelligence in higher education: a quantitative analysis using structural equation modelling. *Education and*

- Information Technologies*, 25(5), 3443–3463. <https://doi.org/10.1007/S10639-020-10159-7>
- Chatterjee, S., Nguyen, B., Ghosh, S. K., Bhattacharjee, K. K., & Chaudhuri, S. (2020). Adoption of artificial intelligence integrated CRM system: an empirical study of Indian organizations. *Bottom Line*, 33(4), 359–375. <https://doi.org/10.1108/BL-08-2020-0057>
- Chatterjee, S., Rana, N. P., Dwivedi, Y. K., & Baabdullah, A. M. (2021). Understanding AI adoption in manufacturing and production firms using an integrated TAM-TOE model. *Technological Forecasting and Social Change*, 170, Article 120880. <https://doi.org/10.1016/J.TECHFORE.2021.120880>
- Chen, C.-C., Liu, C.-C., Chiu, T.-H., Lee, Y.-W., & Wu, K.-C. (2023). Role of perceived ease of use for augmented reality app designed to help children navigate smart libraries. *International Journal of Human-Computer Interaction*, 39(13), 2606–2623. <https://doi.org/10.1080/10447318.2022.2082017>
- Chen, Y., Li, C., Cao, L., & Liu, S. (2024). The effects of self-efficacy, academic stress, and learning behaviors on self-regulated learning in blended learning among middle school students. *Education and Information Technologies*, 29, 24087–24110. <https://doi.org/10.1007/s10639-024-12821-w>
- Chen, Yu, Jensen, S., Albert, L. J., Gupta, S., & Lee, T. (2023). Artificial Intelligence (AI) student assistants in the classroom: Designing chatbots to support student success. *Information Systems Frontiers*, 25(1), 161–182. <https://doi.org/10.1007/S10796-022-10291-4>
- Choung, H., David, P., & Ross, A. (2023). Trust and ethics in AI. *AI and Society*, 38(2), 733–745. <https://doi.org/10.1007/S00146-022-01473-4>
- Christopher Westland, J. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications*, 9(6), 476–487. <https://doi.org/10.1016/J.ELERAP.2010.07.003>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, 13(3), 319–339. <https://doi.org/10.2307/249008>
- Desmira, Bakar, N. A., Hashim, M. R., Wiryadinata, R., & Hamid, M. A. (2022). Laboratory prediction energy control system based on artificial intelligence network. *Bulletin of Electrical Engineering and Informatics*, 11(3), 1280–1288. <https://doi.org/10.11591/EEI.V11I3.1821>
- Desmira, D., Hamid, M. A., Bakar, N. A., Nurtanto, M., & Sunardi, S. (2022). A smart traffic light using a microcontroller based on the fuzzy logic. *IAES International Journal of Artificial Intelligence*, 11(3), 809–818. <https://doi.org/10.11591/ijai.v11.i3>

- Duenser, A., & Douglas, D. M. (2023). Whom to trust, how and why: Untangling artificial intelligence ethics principles, trustworthiness, and trust. *IEEE Intelligent Systems*, 38(6), 19–26. <https://doi.org/10.1109/MIS.2023.3322586>
- Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J., Eirug, A., Galanos, V., Ilavarasan, P. V., Janssen, M., Jones, P., Kar, A. K., Kizgin, H., Kronemann, B., Lal, B., Lucini, B., ... Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, Article 101994. <https://doi.org/10.1016/J.IJINFOMGT.2019.08.002>
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, 21(3), 719–734. <https://doi.org/10.1007/S10796-017-9774-Y>
- Ebadi, S., & Raygan, A. (2023). Investigating the facilitating conditions, perceived ease of use and usefulness of mobile-assisted language learning. *Smart Learning Environments*, 10(1), 1–15. <https://doi.org/10.1186/S40561-023-00250-0>
- El-Sofany, H.F. & El-Haggar, N. (2020). The effectiveness of using mobile learning techniques to improve learning outcomes in higher education. *International Journal of Interactive Mobile Technologies*, 14(8), 4-18. <https://doi.org/10.3991/ijim.v14i08.13125>
- Emaminejad, N., Kath, L., & Akhavan, R. (2024). Assessing trust in construction AI-powered collaborative robots using structural equation modeling. *Journal of Computing in Civil Engineering*, 38(3), Article 04024011. <https://doi.org/10.1061/JCCEE5.CPENG-5660>
- Eslit, E. R. (2023). Blending boundaries in the new normal: Leveraging technology, AI and global perspectives in modern education. *Journal of Learning and Educational Policy*, 4(1), 8–18. <https://doi.org/10.55529/jlep.41.8.18>
- Findik-Coşkunçay, D., Alkiş, N., & Özkan-Yildirim, S. (2018). A structural model for students' adoption of learning management systems: An empirical investigation in the higher education context. *Educational Technology & Society*, 21(2), 13–27. <https://drive.google.com/file/d/1-KuZ-RQy9nmiN2tGYZc7r23K853GjQOR/view>
- Fine, A., & Marsh, S. (2024). Judicial leadership matters (yet again): The association between judge and public trust for artificial intelligence in courts. *Discover Artificial Intelligence*, 4, Article 44. <https://doi.org/10.1007/S44163-024-00142-3>
- Fuchs, K. (2022). An interview study to explore the perceived usefulness of in-house training programs in tourism and hospitality education. *Heliyon*, 8(12), Article e12547. <https://doi.org/10.1016/j.heliyon.2022.e12547>



- Galos, S., & Aldridge, J. M. (2021). Relationships between learning environments and self-efficacy in primary schools and differing perceptions of at-risk students. *Learning Environments Research*, 24(2), 253–268. <https://doi.org/10.1007/s10984-020-09323-0>
- Garbuio, M., & Lin, N. (2021). Innovative idea generation in problem finding: Abductive reasoning, cognitive impediments, and the promise of artificial intelligence. *Journal of Product Innovation Management*, 38(6), 701–725. <https://doi.org/10.1111/JPIM.12602>
- Gefen, D., Straub, D. W., & Straub Mack Robinson, D. J. (2000). The relative importance of perceived ease of use in IS adoption: A study of e-commerce adoption. *Journal of the Association for Information Systems*, 1(1), Article 8. <https://doi.org/10.17705/1jais.00008>
- George, B., & Wooden, O. S. (2023). Managing the strategic transformation of higher education through artificial intelligence. *Administrative Sciences*, 13(9), Article 196. <https://doi.org/10.3390/admsci13090196>
- Ghobakhloo, M., Hong, T. S., Sabouri, M. S., & Zulkifli, N. (2012). Strategies for successful information technology adoption in small and medium-sized enterprises. *Information*, 3(1), 36–67. <https://doi.org/10.3390/INFO3010036>
- Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *The Academy of Management Review*, 17(2), 183–211. <https://doi.org/10.2307/258770>
- Glikson, E., & Woolley, A. W. (2020). Human trust in artificial intelligence: Review of empirical research. *Academy of Management Annals*, 14(2), 627–660. <https://doi.org/10.5465/ANNALS.2018.0057>
- Habbal, A., Ali, M. K., & Abuzaraida, M. A. (2024). Artificial Intelligence Trust, Risk and Security Management (AI TRiSM): Frameworks, applications, challenges and future research directions. *Expert Systems with Applications*, 240, Article 122442. <https://doi.org/10.1016/J.ESWA.2023.122442>
- Hamid, M. A., Nurtanto, M., Desmira, D., Setiawan, D., Hakiki, M., & Fadli, R. (2024). Technological support to foster students' learning experience in electrical measurement class: A mobile learning-based hypermedia approach. 2024 *International Conference on TVET Excellence and Development, ICTeD 2024*, 177–182. <https://doi.org/10.1109/ICTED62334.2024.10844631>
- Haresamudram, K., Larsson, S., & Heintz, F. (2023). Three levels of AI transparency. *Computer*, 56(2), 93–100. <https://doi.org/10.1109/MC.2022.3213181>
- Harrison, T. M., & Luna-Reyes, L. F. (2020). Cultivating trustworthy artificial intelligence in digital government. *Social Science Computer Review*, 40(2), 494–511. <https://doi.org/10.1177/0894439320980122>

- Hazaimah, M., & Al-Ansi, A. M. (2024). Model of AI acceptance in higher education: Arguing teaching staff and students perspectives. *International Journal of Information and Learning Technology*, 41(4), 371–393. <https://doi.org/10.1108/ijilt-01-2024-0005>
- Hsu, C. L., & Lin, J. C. C. (2008). Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation. *Information & Management*, 45(1), 65–74. <https://doi.org/10.1016/J.IM.2007.11.001>
- Hu, Y. (2022). Application of artificial intelligence technology and blockchain technology in vocational education. *ICBDE '22: Proceedings of the 5th International Conference on Big Data and Education*, 15–21. <https://doi.org/10.1145/3524383.3524400>
- Hua, C., Cole, S., & Xu, N. (2021). Rethinking trust in tourism apps: the moderating effect of age. *Journal of Hospitality and Tourism Technology*, 12(3), 548–562. <https://doi.org/10.1108/JHTT-01-2020-0013>
- Huang, F., Teo, T., & Scherer, R. (2022). Investigating the antecedents of university students' perceived ease of using the Internet for learning. *Interactive Learning Environments*, 30(6), 1060–1076. <https://doi.org/10.1080/10494820.2019.1710540>
- Huffman, A. H., Whetten, J., & Huffman, W. H. (2013). Using technology in higher education: The influence of gender roles on technology self-efficacy. *Computers in Human Behavior*, 29(4), 1779–1786. <https://doi.org/10.1016/J.CHB.2013.02.012>
- Hwang, G. J., Tu, Y. F., & Tang, K. Y. (2022). AI in online-learning research: Visualizing and interpreting the journal publications from 1997 to 2019. *International Review of Research in Open and Distance Learning*, 23(1), 104–130. <https://doi.org/10.19173/IRRODL.V23I1.6319>
- Hwang, J. S., & Lee, H. J. (2018). A meta-analysis of advanced UTAUT variables in the ICT industry: An analysis of published papers in Korean journals. *International Journal of Innovative Computing, Information and Control*, 14(2), 757–766. <http://www.ijicic.org/ijicic-140227.pdf>
- Jaipal-Jamani, K. (2017). Effect of robotics on elementary preservice teachers' self-efficacy, science learning, and computational thinking. *Journal of Science Education and Technology*, 26(2), 175–192. <https://doi.org/10.1007/s10956-016-9663-z>
- Johnson, N., Seaman, J., & Seaman, J. (2024). The anticipated impact of artificial intelligence on US higher education: A national study. *Online Learning*, 28(3), 9–33. <https://doi.org/10.24059/OLJ.V28I3.4646>
- Joo, Y. J., Park, S., & Lim, E. (2018). Factors influencing preservice teachers' intention to use technology: TPACK, teacher self-efficacy, and technology acceptance model. *Educational Technology and Society*, 21(3), 48–59. [https://drive.google.com/file/d/1eJTooAILhS\\_Dafxktrxjo9wu6Gk48ILP/view](https://drive.google.com/file/d/1eJTooAILhS_Dafxktrxjo9wu6Gk48ILP/view)
- Kandoth, S., & Shekhar, S. K. (2022). Social influence and intention to use AI: The role of personal innovativeness and perceived trust using the parallel mediation model.

*Forum Scientiae Oeconomia*, 10(3), 131-150.  
[https://doi.org/10.23762/FSO\\_VOL10\\_NO3\\_7](https://doi.org/10.23762/FSO_VOL10_NO3_7)

- Kanwal, F., & Rehman, M. (2017). Factors affecting e-learning adoption in developing countries-empirical evidence from Pakistan's higher education sector. *IEEE Access*, 5, 10968–10978. <https://doi.org/10.1109/ACCESS.2017.2714379>
- Karataş, F., & Yüce, E. (2024). AI and the future of teaching: Preservice teachers' reflections on the use of artificial intelligence in open and distributed learning. *International Review of Research in Open and Distributed Learning*, 25(3 Special Issue), 304–325. <https://doi.org/10.19173/irrodl.v25i3.7785>
- Kashive, N., Powale, L., & Kashive, K. (2021). Understanding user perception toward artificial intelligence (AI) enabled e-learning. *International Journal of Information and Learning Technology*, 38(1), 1–19. <https://doi.org/10.1108/IJILT-05-2020-0090>
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103. Article 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kasri, R. A., & Sosiati, M. W. (2023). Determinants of the intention to pay zakat online: the case of Indonesia. *Journal of Islamic Monetary Economics and Finance*, 9(2), 275–294. <https://doi.org/10.21098/JIMF.V9I2.1664>
- Khechine, H., Raymond, B., & Augier, M. (2020). The adoption of a social learning system: Intrinsic value in the UTAUT model. *British Journal of Educational Technology*, 51(6), 2306–2325. <https://doi.org/10.1111/BJET.12905>
- Kholifah, N., Nurtanto, M., Kassymova, G. K., Subakti, H., & Hamid, M. A. (2024). Evidence of positive influence: soft skills competence and organizational culture on innovative work behavior. *Journal of Education and Learning (EduLearn)*, 18(4), 1158–1165. <https://doi.org/10.11591/EDULEARN.V18I4.21018>
- Kholifah, N., Nurtanto, M., Mutohhari, F., Hamid, M. A., Mutiara, I., Setiawan, D., & Saputro, I. N. (2025). Factors influencing student career choice in vocational education in Indonesia: A mediating effect of self-efficacy. *Social Sciences & Humanities Open*, 11, Article 101369. <https://doi.org/10.1016/J.SSAHO.2025.101369>
- Kivijärvi, H., Leppänen, A., & Hallikainen, P. (2013). Technology trust: From antecedents to perceived performance effects. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 4586–4595. <https://doi.org/10.1109/HICSS.2013.510>
- Kuleto, V., Ilić, M., Dumangiu, M., Ranković, M., Martins, O. M. D., Păun, D., & Mihoreanu, L. (2021). Exploring opportunities and challenges of artificial intelligence and machine learning in higher education institutions. *Sustainability*, 13(18), Article 10424. <https://doi.org/10.3390/SU131810424>

- Kulviwat, S., Bruner, G. C., & Neelankavil, J. P. (2014). Self-efficacy as an antecedent of cognition and affect in technology acceptance. *Journal of Consumer Marketing*, 31(3), 190–199. <https://doi.org/10.1108/JCM-10-2013-0727>
- Kumar, S., Gunn, A., Rose, R., Pollard, R., Johnson, M., & Ritzhaupt, A. D. (2024). The role of instructional designers in the integration of generative artificial intelligence in online and blended learning in higher education. *Online Learning*, 28(3), 207–231. <https://doi.org/10.24059/OLJ.V28I3.4501>
- Lalot, F., & Bertram, A. M. (2024). When the bot walks the talk: investigating the foundations of trust in an Artificial Intelligence (AI) Chatbot. *Journal of Experimental Psychology: General*, 154(2), 533–551. <https://doi.org/10.1037/XGE0001696>
- Lankton, N. K., Harrison Mcknight, D., & Tripp, J. (2015). Technology, humanness, and trust: Rethinking trust in technology. *Journal of the Association for Information Systems*, 16(10), Article 1. <https://doi.org/10.17705/1jais.00411>
- Lee, C., & Cha, K. (2024). Toward the dynamic relationship between AI transparency and trust in AI: A case study on ChatGPT. *International Journal of Human-Computer Interaction*, 1-18. <https://doi.org/10.1080/10447318.2024.2405266>
- Lee, S. S., & Moore, R. L. (2024). Harnessing Generative AI (GenAI) for automated feedback in higher education: A systematic review. *Online Learning*, 28(3), 82–104. <https://doi.org/10.24059/OLJ.V28I3.4593>
- Li, Y., Garza, V., Keicher, A., & Popov, V. (2019). Predicting high school teacher use of technology: Pedagogical beliefs, technological beliefs and attitudes, and teacher training. *Technology, Knowledge and Learning*, 24(3), 501–518. <https://doi.org/10.1007/s10758-018-9355-2>
- Lian, J. (2019). Investigating Chinese university EFL learners' self-efficacy in a blended learning environment. *International Conference on Computers in Education*, 650–655. <https://doi.org/10.58459/icce.2019.639>
- Lowry, P. B., & Gaskin, J. (2014). Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE Transactions on Professional Communication*, 57(2), 123–146. <https://doi.org/10.1109/TPC.2014.2312452>
- Luan, H., Geczy, P., Lai, H., Gobert, J., Yang, S. J. H., Ogata, H., Baltes, J., Guerra, R., Li, P., & Tsai, C. C. (2020). Challenges and future directions of big data and artificial intelligence in education. *Frontiers in Psychology*, 11, Article 580820. <https://doi.org/10.3389/FPSYG.2020.580820>
- Ma, Q., & Liu, L. (2005). The role of internet self-efficacy in the acceptance of web-based electronic medical records. *Journal of Organizational and End User Computing*, 17(1), 38–57. <https://doi.org/10.4018/joeuc.2005010103>

- Marangunić, N., & Granić, A. (2015). Technology acceptance model: A literature review from 1986 to 2013. *Universal Access in the Information Society*, 14(1), 81–95. <https://doi.org/10.1007/S10209-014-0348-1>
- Menekse, M. (2023). Envisioning the future of learning and teaching engineering in the artificial intelligence era: Opportunities and challenges. *Journal of Engineering Education*, 112(3), 578. <https://doi.org/10.1002/JEE.20539>
- Mishra, A., Shukla, A., Rana, N. P., Currie, W. L., & Dwivedi, Y. K. (2023). Re-examining post-acceptance model of information systems continuance: A revised theoretical model using MASEM approach. *International Journal of Information Management*, 68, Article 102571. <https://doi.org/10.1016/J.IJINFOMGT.2022.102571>
- Mohd Rahim, N. I., A. Iahad, N., Yusof, A. F., & A. Al-Sharafī, M. (2022). AI-based chatbots adoption model for higher-education institutions: A hybrid PLS-SEM-neural network modelling approach. *Sustainability*, 14(19), Article 12726. <https://doi.org/10.3390/SU141912726>
- Mylrea, M., & Robinson, N. (2023). Artificial Intelligence (AI) trust framework and maturity model: Applying an entropy lens to improve security, privacy, and ethical AI. *Entropy*, 25(10), Article 1429. <https://doi.org/10.3390/e25101429>
- Nagaraj, B. K., Kalaivani, A., Begum, R. S., Akila, S., Sachdev, H. K., & Kumar, N. S. (2023). The emerging role of artificial intelligence in STEM higher education: A critical review. *International Research Journal of Multidisciplinary Technovation*, 5(5), 1–19. <https://doi.org/10.54392/irjmt2351>
- Nallaperuma, D., Nawaratne, R., Bandaragoda, T., Adikari, A., Nguyen, S., Kempitiya, T., De Silva, D., Alahakoon, D., & Pothuhera, D. (2019). Online incremental machine learning platform for big data-driven smart traffic management. *IEEE Transactions on Intelligent Transportation Systems*, 20(12), 4679–4690. <https://doi.org/10.1109/TITS.2019.2924883>
- Neyazi, T. A., Khai Ee, T., Nadaf, A., & Schroeder, R. (2023). The effect of information seeking behaviour on trust in AI in Asia: The moderating role of misinformation concern. *New Media and Society*, 27(4), 2414–2433. <https://doi.org/10.1177/14614448231212804>
- Nuhoğlu, H., Şahin Sarkin, D. B., & Aşıroğlu, S. (2024). Digital transformation in science education: Teachers' self-efficacy of distance learning and blended learning experiences. *Participatory Educational Research*, 11(3), 126–145. <https://doi.org/10.17275/per.24.38.11.3>
- Ofosu-ampong, K., Acheampong, B., & Kevor, M. (2023). Acceptance of artificial intelligence (ChatGPT) in education: Trust, innovativeness and psychological need of students. *Information and Knowledge Management*, 13(4), 37–47. <https://doi.org/10.7176/ikm/13-4-03>
- Omrani, N., Rivieccio, G., Fiore, U., Schiavone, F., & Agreda, S. G. (2022). To trust or not to trust? An assessment of trust in AI-based systems: Concerns, ethics and contexts.

- Technological Forecasting and Social Change*, 181, Article 121763.  
<https://doi.org/10.1016/J.TECHFORE.2022.121763>
- Ou, Y. (2024). Strategies for applying BOPPPS model supported by intelligent algorithms in blended teaching of college English. *Applied Mathematics and Nonlinear Sciences*, 9(1), 1-18. <https://doi.org/10.2478/amns-2024-1719>
- Ounejjar, L. A., Lachgar, M., Ouhayou, O., Laanaoui, M. D., Refki, E., Makaoui, R., & Saoud, A. (2024). SmartBlendEd: Enhancing blended learning through AI-optimized scheduling and user-centric design. *SoftwareX*, 27.  
<https://doi.org/10.1016/j.softx.2024.101891>
- Paliszkievicz, J., & Gołuchowski, J. (Eds.). (2024). *Trust and artificial intelligence: Development and application of AI technology*. Routledge.  
<https://doi.org/10.4324/9781032627236>
- Pan, X. (2020). Technology acceptance, technological self-efficacy, and attitude toward technology-based self-directed learning: Learning motivation as a mediator. *Frontiers in Psychology*, 11, Article 564294. <https://doi.org/10.3389/FPSYG.2020.564294>
- Park, Y. (2024). Role of AI in blended learning: A systematic literature review. *The International Review of Research in Open and Distributed Learning*, 25(1), 164–196.  
<https://doi.org/10.19173/irrodl.v25i1.7566>
- Peres, R. S., Jia, X., Lee, J., Sun, K., Colombo, A. W., & Barata, J. (2020). Industrial artificial intelligence in industry 4.0 - Systematic review, challenges and outlook. *IEEE Access*, 8, 220121–220139. <https://doi.org/10.1109/ACCESS.2020.3042874>
- Qin, F., Li, K., & Yan, J. (2020). Understanding user trust in artificial intelligence-based educational systems: Evidence from China. *British Journal of Educational Technology*, 51(5), 1693–1710. <https://doi.org/10.1111/BJET.12994>
- Queiroz, M. M., & Fosso Wamba, S. (2019). Blockchain adoption challenges in supply chain: An empirical investigation of the main drivers in India and the USA. *International Journal of Information Management*, 46, 70–82.  
<https://doi.org/10.1016/J.IJINFOMGT.2018.11.021>
- Rafique, H., Almagrabi, A. O., Shamim, A., Anwar, F., & Bashir, A. K. (2020). Investigating the acceptance of mobile library applications with an Extended Technology Acceptance Model (TAM). *Computers & Education*, 145, Article 103732.  
<https://doi.org/10.1016/J.COMPEDU.2019.103732>
- Rayyan, M., Abusalim, N., Alshanmy, S., Awwad, F. M. A., & Alghazo, S. (2024). Enhancing academic performance through blended learning: A study on the relationship between self-efficacy and student success. *International Journal of Interactive Mobile Technologies*, 18(19), 52–67.  
<https://doi.org/10.3991/ijim.v18i19.49835>
- Rehman, N., Huang, X., Sarwar, U., Fatima, H., & Maqbool, S. (2024). Exploring the impact of family, school and society on the perception and reputation of vocational training

- in Pakistan: A statistical analysis. *Education and Training*. Advance online publication. <https://doi.org/10.1108/ET-09-2023-0375>
- Riva, P., Aureli, N., & Silvestrini, F. (2022). Social influences in the digital era: When do people conform more to a human being or an artificial intelligence? *Acta Psychologica*, 229, Article 103681. <https://doi.org/10.1016/J.ACTPSY.2022.103681>
- Roshanaei, M. (2023). Harnessing AI to foster equity in education: Opportunities, challenges, and emerging strategies. *Journal of Intelligent Learning Systems and Applications*, 15(4), 123–143. <https://doi.org/10.4236/jilsa.2023.154009>
- Rubiyanti, N., Abu Sujak, A. F., Madiawati, P. N., Nurutami, F., & Bt Raja Razali, R. R. (2023). Perceived usefulness: A bibliometric visualization. *2023 International Conference on Digital Business and Technology Management (ICONDBTM)*, 1-6. <https://doi.org/10.1109/ICONDBTM59210.2023.10327098>
- Sabetzadeh, F., & Chen, Y. (2023). An investigation of the impact of interpersonal and institutional trust on knowledge sharing in companies: Invisible hands for knowledge sharing. *VINE Journal of Information and Knowledge Management Systems*, 55(2), 327-350. <https://doi.org/10.1108/VJIKMS-06-2022-0206>
- Salhab, R. (2024). AI literacy across curriculum design: Investigating college instructor's perspectives. *Online Learning*, 28(2), 22–47. <https://doi.org/10.24059/OLJ.V28I2.4426>
- Salim, M., Alfansi, L., Anggarawati, S., Saputra, F. E., & Afandy, C. (2021). The role of perceived usefulness in moderating the relationship between the Delone and Mclean model and user satisfaction. *Uncertain Supply Chain Management*, 9(3), 755–766. <https://doi.org/10.5267/j.uscm.2021.4.002>
- Samala, A. D., Zhai, X., Aoki, K., Bojic, L., & Zikic, S. (2024). An in-depth review of ChatGPT's pros and cons for learning and teaching in education. *International Journal of Interactive Mobile Technologies*, 18(2), 96–117. <https://doi.org/10.3991/IJIM.V18I02.46509>
- Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 5(1), 105–115. <https://doi.org/10.1016/J.JFBS.2014.01.002>
- Sriwindono, H., & Yahya, S. (2012). The effects of cultural dimension on MIS acceptance. *IEEE 6th International Conference on Management of Innovation and Technology (ICMIT)*, 424–429. <https://doi.org/10.1109/ICMIT.2012.6225843>
- Stewart, B. J., Park, S., & Ju, B. (2024). Social influence, trust and future usage: A study of BIPOC Users of ChatGPT and other AI chatbots. *Proceedings of the Association for Information Science and Technology*, 61(1), 1083–1085. <https://doi.org/10.1002/PRA2.1192>

- Straub, E. T. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research*, 79(2), 625–649. <https://doi.org/10.3102/0034654308325896>
- Šumak, B., Heričko, M., & Pušnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in Human Behavior*, 27(6), 2067–2077. <https://doi.org/10.1016/J.CHB.2011.08.005>
- Surdjono, H. D., Fadli, R., Sari, R. C., Eliza, F., Yassin, A., Kulanthaivel, G., Ramadhan, M. A., Mukhaiyar, R., Hamid, M. A., Ridwan, M. R., Purnomo, S., & Asnimawati. (2025). Effectiveness of cybersecurity awareness program based on mobile learning to improve cyber hygiene. *International Journal of Information and Education Technology*, 15(2), 220–229. <https://doi.org/10.18178/IJiet.2025.15.2.2235>
- Swindell, A. (2024). Against artificial education: Towards an ethical framework for generative Artificial Intelligence (AI) use in education. *Online Learning*, 28(2). <https://doi.org/10.24059/olj.v28i2.4438>
- Taherdoost, H. (2018). Development of an adoption model to assess user acceptance of e-service technology: E-Service Technology Acceptance Model. *Behaviour & Information Technology*, 37(2), 173–197. <https://doi.org/10.1080/0144929X.2018.1427793>
- Tang, K. Y., Chang, C. Y., & Hwang, G. J. (2021). Trends in artificial intelligence-supported e-learning: A systematic review and co-citation network analysis (1998–2019). *Interactive Learning Environments*, 31(4), 2134–2152. <https://doi.org/10.1080/10494820.2021.1875001>
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10, Article 15. <https://doi.org/10.1186/s40561-023-00237-x>
- Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence. *Educational Technology Research and Development*, 65(3), 555–575. <https://doi.org/10.1007/S11423-016-9481-2>
- Tucci, V., Saary, J., & Doyle, T. E. (2022). Factors influencing trust in medical artificial intelligence for healthcare professionals: A narrative review. *Journal of Medical Artificial Intelligence*, 5, Article 4. <https://doi.org/10.21037/JMAI-21-25>
- Velezmoro-Abanto, L., Cuba-Lagos, R., Taico-Valverde, B., Iparraguirre-Villanueva, O., & Cabanillas-Carbonell, M. (2024). Lean construction strategies supported by artificial intelligence techniques for construction project management—A review. *International Journal of Online and Biomedical Engineering*, 20(3), 99–114. <https://doi.org/10.3991/IJOE.V20I03.46769>



- Velli, K., & Zafiroopoulos, K. (2024). Factors that affect the acceptance of educational AI tools by Greek Teachers—A structural equation modelling study. *European Journal of Investigation in Health, Psychology and Education*, 14(9), 2560–2579. <https://doi.org/10.3390/EJIHPE14090169>
- Verganti, R., Vendraminelli, L., & Iansiti, M. (2020). Innovation and design in the age of artificial intelligence. *Journal of Product Innovation Management*, 37(3), 212–227. <https://doi.org/10.1111/JPIM.12523>
- Wang, Q., & Rao, Y. (2024). Research on the enhancement of digital capabilities in AI-based blended teaching processes. *ICCMT '24: Proceedings of the 2024 International Conference on Computer and Multimedia Technology*, 330–336. <https://doi.org/10.1145/3675249.3675308>
- Wang, X., Lu, A., Lin, T., Liu, S., Song, T., Huang, X., & Jiang, L. (2022). Perceived usefulness predicts second language learners' continuance intention toward language learning applications: A serial multiple mediation model of integrative motivation and flow. *Education and Information Technologies*, 27(4), 5033–5049. <https://doi.org/10.1007/s10639-021-10822-7>
- Willaby, H. W., Costa, D. S. J., Burns, B. D., MacCann, C., & Roberts, R. D. (2015). Testing complex models with small sample sizes: A historical overview and empirical demonstration of what Partial Least Squares (PLS) can offer differential psychology. *Personality and Individual Differences*, 84, 73–78. <https://doi.org/10.1016/J.PAID.2014.09.008>
- Wilson, K., & Narayan, A. (2016). Relationships among individual task self-efficacy, self-regulated learning strategy use and academic performance in a computer-supported collaborative learning environment. *Educational Psychology*, 36(2), 236–253. <https://doi.org/10.1080/01443410.2014.926312>
- Wu, D., Li, C.-C., Zhou, W.-T., Tsai, C.-C., & Lu, C. (2019). Relationship between ICT supporting conditions and ICT application in Chinese urban and rural basic education. *Asia Pacific Education Review*, 20(1), 147–157. <https://doi.org/10.1007/s12564-018-9568-z>
- Wu, K., Zhao, Y., Zhu, Q., Tan, X., & Zheng, H. (2011). A meta-analysis of the impact of trust on technology acceptance model: Investigation of moderating influence of subject and context type. *International Journal of Information Management*, 31(6), 572–581. <https://doi.org/10.1016/J.IJINFOMGT.2011.03.004>
- Wu, W., Zhang, B., Li, S., & Liu, H. (2022). Exploring factors of the willingness to accept AI-assisted learning environments: An empirical investigation based on the UTAUT Model and perceived risk theory. *Frontiers in Psychology*, 13, Article 870777. <https://doi.org/10.3389/FPSYG.2022.870777>
- Wu, Y., Kim, K. J., & Mou, Y. (2022). Minority social influence and moral decision-making in human–AI interaction: The effects of identity and specialization cues. *New Media and Society*, 26(10), 5619–5637. <https://doi.org/10.1177/14614448221138072>

- Xiang, J., & Ma, C. (2023). Modeling the effectiveness of blended learning promotion with artificial intelligence adaptive learning system. *Journal of Logistics, Informatics and Service Science*, 10(3), 88–97. <https://doi.org/10.33168/JLISS.2023.0307>
- Xie, Z. (2019). Bridging MOOC education and information sciences: Empirical studies. *IEEE Access*, 7, 74206–74216. <https://doi.org/10.1109/ACCESS.2019.2921009>
- Xue, L., Rashid, A. M., & Ouyang, S. (2024). The Unified Theory of Acceptance and Use of Technology (UTAUT) in higher education: A systematic review. *SAGE Open*, 14(1). <https://doi.org/10.1177/21582440241229570>
- Yang, Y.-F., Tseng, C. C., & Lai, S.-C. (2024). Enhancing teachers' self-efficacy beliefs in AI-based technology integration into English speaking teaching through a professional development program. *Teaching and Teacher Education*, 144, Article 104582. <https://doi.org/10.1016/j.tate.2024.104582>
- Yao, S., Xie, L., Chen, Y., Zhang, Y., Chen, Y., & Gao, M. (2023). Influence of perceived safety in the technology acceptance model. *Transportation Research Part F: Traffic Psychology and Behaviour*, 99, 36–51. <https://doi.org/10.1016/J.TRF.2023.10.010>
- Yildiz Durak, H. (2019). Examining the acceptance and use of online social networks by preservice teachers within the context of unified theory of acceptance and use of technology model. *Journal of Computing in Higher Education*, 31(1), 173–209. <https://doi.org/10.1007/S12528-018-9200-6>
- Yokoyama, S. (2024). Impact of academic self-efficacy on online learning outcomes: A recent literature review. *EXCLI Journal*, 23, 960–966. <https://doi.org/10.17179/excli2024-7502>
- Zahidi, S. (2023). *Future of Jobs Report 2023*. World Economic Forum. [https://www3.weforum.org/docs/WEF\\_Future\\_of\\_Jobs\\_2023.pdf](https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf)
- Zhao, X., & Yang, Y. (2021). A study on the application of blended teaching to English Reading Course under the background of artificial intelligence. *IOP Conference Series: Earth and Environmental Science*, 693(1), Article 012019. <https://doi.org/10.1088/1755-1315/693/1/012019>
- Zhao, Y., Wang, N., Li, Y., Zhou, R., & Li, S. (2021). Do cultural differences affect users' e-learning adoption? A meta-analysis. *British Journal of Educational Technology*, 52(1), 20–41. <https://doi.org/10.1111/BJET.13002>
- Zheng, G. (2020). The optimization and application of blended teaching based on artificial intelligence. *Proceedings 2020 3rd International Conference on Advanced Electronic Materials, Computers and Software Engineering (AEMCSE)*, 71–74. <https://doi.org/10.1109/AEMCSE50948.2020.00023>

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# Bichronous Learning in Practice: How Immigrant Students Learn Swedish Online

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## Abstract

As online education becomes increasingly common in language learning, there is a pressing need to understand how students experience bichronous (synchronous and asynchronous) teaching formats in second language learning contexts. Drawing on qualitative group interviews with participants enrolled in an SFI (Swedish for Immigrants) program, the study identifies key benefits and challenges associated with this blended format. Thematic analysis was used to analyse the data, revealing insights into the advantages and limitations of online sessions for language skills development. The findings indicate that bichronous online teaching supports language skills development, feedback practices, structured participation, flexibility, and autonomy. However, the students reported challenges to self-paced learning, peer interaction, and digital competence. Teacher presence, feedback, and session design emerges as crucial for students' engagement and participation. These insights suggested an enhanced approach to online teaching, combining synchronous and asynchronous methods for second language learning. Recommendations for optimising online second language teaching were discussed, emphasising the importance of adaptive pedagogical strategies, technological support, and individualised approaches to meet diverse learner needs.

**Keywords:** Bichronous learning; Online language education; Second language learning; Adult migrant students; Student engagement; Swedish for immigrants (SFI)

Al Massalmeh, R., Nilsson, P., Sjöberg, J., & Utterberg Modén, M. (2025). Bichronous learning in practice: How immigrant students learn Swedish online, *Online Learning*, 29(4), 595-617. <https://doi.10.24059/olj.v29i4.4613>

## Introduction

Globally, migrant and refugee students face complex challenges in accessing online education. While online learning has the potential to increase access to education for displaced and marginalised students, its effectiveness is often limited by barriers such as low digital literacy, lack of devices, and insufficient institutional support (Halkic & Arnold, 2019; Lwin et al., 2022). Teachers also frequently lack the training, confidence, and pedagogical strategies needed to adapt digital instruction to the specific needs of migrant learners (Bradley et al., 2025). Furthermore, although many migrants are familiar with mobile technologies through social media, they often struggle with more formal digital tasks such as navigating online platforms, using computers, filling out digital forms, or interpreting formal online content (Bradley et al., 2025). These difficulties are further compounded by personal and contextual challenges, including unstable housing, trauma, and social isolation. As Witthaus (2023) emphasises, effective online engagement for refugees depends on inclusive design, emotional support, and flexible learning environments that account for learners' lived realities.

In this global context, Sweden offers a unique case through its Swedish for Immigrants (SFI) program, a state-funded initiative designed to support adult migrants' integration via language education. The SFI programme provides free language instruction to adult migrants and international students, aiming to facilitate their participation in the labour market and local communities. There are large employment gaps between native-born and immigrant residents (Calmfors & Gassen, 2019), and there is a need to ensure their effective integration into social networks and local communities (Reichenberg & Berhanu, 2019). Learning the language of the host country is frequently identified as a key element in the integration of immigrants into a new society (Fejes & Dahlstedt, 2017). Yet, limited language skills remain one of the most significant challenges for newcomers in the country, hindering their successful integration into both society and the labour market (Carlsson et al., 2023). Participating in language classes is a widely recognised method to achieve this goal (Reichenberg & Berhanu, 2018). Adult education in Sweden "has historically been one of the most important tools for adult migrants' initial language learning" (Fejes & Dahlstedt, 2017, p. 215). Moreover, it has been identified that easy access to and availability of language learning classes are important for sustaining attendance (Foged & Van Der Werf, 2023).

However, the shift to remote teaching within the SFI context has generated concern and academic interest regarding the effectiveness of online modalities for teaching Swedish as a second language (SSL) to newcomers (Alvarez, 2021; Elwan & Mehmeti, 2021). Prior research on emergency remote teaching within the SFI context has primarily explored teachers' experiences with synchronous and asynchronous instructions (Alvarez, 2021; Elwan & Mehmeti, 2021; Kollberg, 2021; Öllsjö & Söderlund, 2020). While these modes offer increased flexibility, accessibility, and personalised learning pathways, several challenges remain. These are reduced opportunities for language practice, students' limited digital literacy, inadequate access to digital resources, and difficulties in replicating the social interaction that is inherent in traditional classroom settings (Kollberg, 2021; Öllsjö & Söderlund, 2020). The transition to remote teaching has also increased the risk of student isolation, with negative consequences for the social interaction of newcomers (Elwan & Mehmeti, 2021).

Despite the emerging body of research on remote language teaching within the SFI context, most existing studies have primarily focused on teachers' experiences with

emergency remote teaching during the COVID-19 pandemic (Alvarez, 2021; Elwan & Mehmeti, 2021; Kollberg, 2021). However, less attention has been paid to how students themselves experience online teaching, particularly in SFI courses that intentionally blend online synchronous and asynchronous elements, a model referred to as bichronous online learning by Martin, Polly, and Ritzhaupt (2020). Moreover, as online teaching shifts from a temporary response to a more permanent feature in SFI programmes, it is important to move beyond emergency contexts and explore how students engage with online learning under more planned conditions. This study contributes to the field by addressing these gaps and aims to explore the perceived benefits and challenges of online language teaching from the learner's perspective, something that has been underexplored in previous work. Understanding how factors play out in specific contexts, such as SFI courses, is essential for designing language teaching that meets the evolving digital and linguistic needs of adult migrants. The following research question was framed:

How do immigrant students' experience the adoption of bichronous online teaching sessions on their learning of Swedish as a second language (SSL)?

### ***Bichronous Conceptual Framework: Blended Synchronous and Asynchronous Modalities for Online Teaching***

Over the past few decades, digital technologies have become increasingly integrated into everyday classrooms. In the context of second language learning, online education has long presented both opportunities and challenges for teaching and learning (Tao & Gao, 2022). The specific challenges of learning a new language as an adult are often associated with various parameters such as cognitive, social, and emotional factors (Moustakas & Kiakou, 2020; Steber & Rossi, 2021). Doing this remotely—where there is often limited interaction with both teachers and peers—can add further difficulties (Rathert & Ağçam, 2022). In an American case study conducted by Truhlar et al. (2018), focusing on the student perspective on online learning in relation to group work and social presence, the findings suggested that structured roles and group reflections in synchronous online sessions could promote deeper engagement. That, in turn, could be applicable to the language learning context since the identification of strategies to enhance social presence would be important for language learners in both synchronous and asynchronous (bichronous) settings. This aligns with Mays and Ross (2022), who investigated students' perceptions of developing a sense of community (SoC) in synchronous and asynchronous online courses.

However, online teaching can also have advantages, as the format can offer flexibility in terms of both time and space (Tai, 2024; Mays & Ross, 2022; Presley et al., 2023). In formal school settings, students can engage remotely in a variety of ways, utilising asynchronous, synchronous, and blended modalities to enhance their second language proficiency (Utomo & Ahsanah, 2022). Even prior to the pandemic, the use of distance teaching modalities has ushered in a new era of flexibility and adaptability for second language education (Perveen, 2016). Students can participate synchronously in live discussions, video conferencing, and immediate feedback, mimicking traditional classroom environments. Additionally, students can access resources, complete assignments, and review materials asynchronously, accommodating diverse schedules and learning preferences (Martin et al., 2020; Truhlar et al., 2018).

Yet, learning a second language remotely is influenced by the learners' basic technical skills, persistence, effective time-management skills, and overall communication skills. In a study conducted by Villaver and Justiniane (2023), the results showed that

students' greatest challenges with learning a second language remotely were maintaining motivation, attention, and time management, yet increased their self-directed learning skills. The researchers further identified factors that should be considered when using online teaching such as student engagement and interaction with their teachers and peers (Hollister et al., 2022). These findings were also both relevant and applicable to the context of remote language teaching as students' lack of interaction with their peers and teachers affected their language learning and reduced their learning opportunities.

Bichronous online learning is an instructional model that integrates both synchronous and asynchronous communication modes within a single course (Martin et al., 2020) (see Figure 1). While synchronous communication occurs in real-time, allowing for immediate interaction between teachers and students (Kohnke & Moorhouse, 2022; Lowenthal et al., 2021; Truhlar et al., 2018), asynchronous communication provides flexibility by enabling students to access resources and complete assignments at their own pace (Bailey et al., 2021). This blended format has been described as offering "the best of both worlds" (Martin et al., 2024), as it enhances student engagement, improves access to teachers, supports community building, and fosters communication and collaboration skills (Martin et al., 2024). Nevertheless, the bichronous approach also presents challenges, including the complexity of content design, increased planning demands, and the need to clearly communicate the course structure and expectations to learners (Martin et al., 2024). Previous studies conducted before, during, and after the COVID-19 pandemic, reveal both positive and negative perceptions of integrating both communication modes in language learning courses (Bond, 2021; Murphy et al., 2011).

Moallem (2015), for example, conducted a case study examining how different communication methods impact critical factors in online learning, including self-regulation, social presence, immediacy, intimacy, collaboration, and learning outcomes. The study highlighted that combined methods promoted the highest levels of social presence and immediacy, which contributed to students' sense of cognitive and emotional support. However, Moallem's findings suggested that communication methods alone may not be the determining factor for learner self-regulation, with other elements such as instructional design and learner characteristics playing a potentially more influential role.

Recent research has moved beyond the context of emergency remote teaching to examine how different online modalities function under more stable and intentional conditions. For example, Viriya (2022) investigated how synchronous, asynchronous, and bichronous online learning modes influence students' self-regulated learning and perceived English language development in a university setting. The study revealed that the learning environment when thoughtfully designed can either support or hinder learners' ability to self-regulate (Viriya, 2022). In particular, the asynchronous mode allowed for autonomy and self-paced learning, while the bichronous model offered the potential for deeper engagement but required more advanced self-management skills, which not all learners possessed. These findings emphasised that the effectiveness of online learning depends not only on the modality itself but also on how it aligns with learners' digital readiness, autonomy, and experience levels.

Another study by Zuhriyah and Fajarina (2022) has demonstrated how structured bichronous learning environments can enhance students' engagement, comprehension, and confidence, particularly in language learning contexts. They implemented a blended approach in a reading comprehension course where asynchronous sessions using Google Classroom alternated with synchronous meetings via Google Meet. The asynchronous format allowed

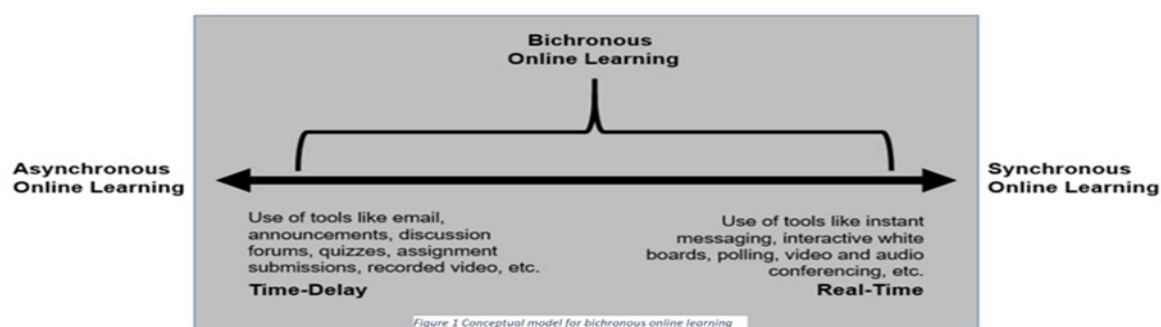
students to engage deeply with reading texts, reflecting on questions, and posting their answers without the pressure of real-time interaction. These sessions were complemented by synchronous meetings that enabled real-time clarification of difficult vocabulary, peer-supported responses, and immediate teacher feedback (Zuhriyah & Fajarina, 2022). Their findings confirm that combining both modalities can improve motivation, comprehension, and interaction especially when designed to support learner autonomy and engagement.

Mohammadi (2023) also notes that bichronous learning supports active participation, improved learning outcomes, and a stronger sense of teaching and social presence. This is achieved by combining the immediacy and real-time interaction of synchronous sessions with the flexibility and reflection time of asynchronous learning. However, while these bichronous models offered benefits, challenges were evident. One major challenge is the increased demand for self-regulated learning skills, as learners must navigate shifting schedules, manage independent tasks, and remain motivated without constant instructor presence (Viriya, 2022). This mode may overwhelm students who lack digital competence, especially when the structure demands a high degree of autonomy and technological fluency. Similarly, Zuhriyah and Fajarina (2022) found that while blending modalities enhanced comprehension and engagement, students with lower digital skills or less confidence required more support to navigate these modes' demands.

As mature online teaching continues to evolve beyond emergency contexts, further research is needed to better understand how synchronous, asynchronous, and bichronous online formats impact students' second language learning and the pedagogical strategies that effectively support language development (Alqahtani, 2022). This study, therefore, investigates students' perspectives and experiences with a bichronous online teaching model to identify both the challenges and benefits associated with both modalities for online second language teaching.

## Figure 1

*Conceptual Framework for Bichronous Online Learning in Martin et al., (2020)*



## Method

### *Participants*

The study involved ten students learning SSL at a Swedish adult formal education institution offering Swedish for Immigrants (SFI) courses. These courses are designed to support the integration of newcomers in Sweden by developing their language skills. The students participated in a bichronous online learning format, which combined both

synchronous and asynchronous sessions. For synchronous interactions, Microsoft Teams was used as the collaborative platform to facilitate real-time teaching sessions. It enabled features such as live video, chat, file sharing, and breakout rooms to support interaction and feedback. For asynchronous learning, students used Lunis, a digital textbook developed for SSL learners, which allowed for self-paced study and practice. Participants were recruited through school administrators and class teachers. The researcher made several visits to the school to inform students about the study, distribute informed consent forms, and explain the voluntary nature of participation. The study's goals and procedures were communicated in English, Arabic, and Swedish to ensure clarity and inclusivity. In total, ten students from diverse backgrounds agreed to participate, forming three interview groups with 3, 3, and 4 participants respectively. (See Table 1 with participants profile below.)

### ***Instruments***

The primary instrument used for data collection was a semi-structured interview guide designed to explore students' experiences with bichronous language learning (A full list of interview questions can be found in Appendix A). The protocol consisted of open-ended questions aimed at exploring students' perceptions, motivations, participation, and attitudes toward bichronous online sessions. The questions also addressed the role of digital platforms, teachers, and communication modes in facilitating SSL learning. The interview questions were directed at all participants to ensure equal participation and to gather comprehensive insights. The semi-structured format allowed for flexibility in responses and enabled deeper exploration of the topics under discussion.

### ***Data Collection***

A qualitative research design using semi-structured group interviews was employed to provide an in-depth understanding of students' experiences with bichronous online learning. Group interviews were chosen as the main method of data collection due to their ability to foster interaction and generate rich insights through group dynamics (Cohen et al., 2007). Furthermore, these methods provided a natural platform for participants to engage in dialogue, exchange ideas, and build upon each other's responses (Frey & Fontana, 1991). Further, group interviews prompted participants to share experiences, opinions, and reflections that they might not express in an individual interview setting. They took advantage of the presence of peers to create a supportive atmosphere, encouraging participants to express themselves openly and candidly, ultimately enriching the depth and breadth of the data collected (Taber, 2013).

Yet group interviews can impose specific difficulties impacting the dynamic of interaction between members, thus affecting responses of participants. Group characteristics such as size can lead to a situation where only certain individuals' viewpoints are expressed (Cohen et al., 2007). In order to address these issues, group interviews were structured to reduce group size into small groups. The groups were kept small (3–4 students) and carefully composed to reflect diversity in gender, proficiency level, and experience. Small group interviews are more manageable for the researcher allowing for control over the ongoing discussions (Denscombe, 1995). This also enabled deeper discussions and more detailed responses compared to larger groups, where time constraints may limit individual contributions (Denscombe, 1995). Each group interview took place in a private room at the students' school, providing a familiar and comfortable setting. Interviews lasted between 1 to 2 hours, were audio-recorded, and supplemented with field notes. All recordings were transcribed verbatim for analysis.



**Table 1***Student Participant Profile*

| Group number | Participant code within each group | Age | Sex    | Level of schooling | Online experience | Language level | Duration of group interview |
|--------------|------------------------------------|-----|--------|--------------------|-------------------|----------------|-----------------------------|
| Group 1      | G1P1                               | 20  | Female | High school        | Low               | C              | 1 hour 50 min               |
|              | G1P2                               | 20  | Female | High school        | Low               | C              |                             |
|              | G1P3                               | 37  | Female | Middle school      | Low               | C              |                             |
|              | G1P4                               | 38  | Male   | High school        | Middle            | C              |                             |
| Group 2      | G2P1                               | 42  | Male   | High school        | Middle            | C              | 1 hour 30 min               |
|              | G2P2                               | 22  | Male   | University         | High              | D              |                             |
|              | G2P3                               | 27  | Female | University         | High              | D              |                             |
| Group 3      | G3P1                               | 34  | Female | University         | Low               | B              | 1 hour 20 min               |
|              | G3P2                               | 55  | Female | University         | Low               | B              |                             |
|              | G3P3                               | 39  | Female | University         | Low               | C              |                             |

***Data Analysis***

The interview data were analysed using thematic analysis, following the framework proposed by Braun and Clarke (2006). Thematic analysis was chosen for its flexibility in identifying patterns, themes, and meaning across the dataset. The process began with translating the interview transcripts from their original languages into English to ensure clarity and consistency during analysis. The transcripts were then read several times to become familiar with the content and to develop a comprehensive understanding of the participants' responses. Then, the analysis followed Braun and Clarke's (2006) six-step approach, involving transcribing; coding; collating codes into potential themes; reviewing themes; defining themes; and producing a scholarly report. Thus, data were coded systematically, highlighting recurring ideas, expressions, or concerns. Initial codes included topics such as the use of multimedia resources, structured opportunities for language practice, comfortable spaces for speaking, and challenges encountered by beginners. These codes were then carefully examined and grouped into broader themes that captured more abstract and meaningful patterns across the data. Examples of these themes include *enhanced listening skills*, *encouraging speaking*, and *challenges in real-time understanding*. As the themes were

refined, they were reviewed against the entire dataset to ensure coherence and relevance. This iterative process helped clarify the focus of each theme and its relationship to the research question. Throughout the analysis, illustrative quotes from participants were selected and incorporated to provide evidence and to convey the authenticity of the students' voices. A table summarising the themes and their associated codes is provided below in Table 2 to outline the structure and logic of the analytical process.

**Table 2**

*Summary of Codes and Themes from Participants Interviews*

| Recurring initial codes from participants interviews                                                                                                                                                                                                                                                                                 | Collating codes into potential themes                                                                                | Defined themes                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <ul style="list-style-type: none"> <li>• Use of multimedia resources (e.g., short films)</li> <li>• Focus on understanding teacher</li> <li>• Comfortable space for practice</li> <li>• Confidence building</li> <li>• Difficulties for beginners</li> <li>• Obstacles in practicing speaking during synchronous sessions</li> </ul> | Enhanced Listening Skills<br>Encouraging Speaking Practice<br>Challenges in Real-Time Understanding                  | Language Practice and Training         |
| <ul style="list-style-type: none"> <li>• One-on-one sessions on Teams</li> <li>• Detailed evaluation and progress discussion</li> <li>• Individual support sessions</li> <li>• Addressing learning difficulties</li> </ul>                                                                                                           | Direct Feedback from Teachers<br>Real-Time Clarification and Assistance<br>Digital Skills and Platform Functionality | Individualised Feedback and Support    |
| <ul style="list-style-type: none"> <li>• Individual attention from teachers</li> <li>• Structured participation systems</li> <li>• Reduced interaction with peers</li> <li>• Differences in classroom and remote session dynamics</li> <li>• Camera and microphone issues</li> <li>• Distractions affecting concentration</li> </ul> | Increased Teacher-Student Interaction<br>Peer Interaction Challenges<br>Technical Disruptions                        | Structure and Active Participation     |
| <ul style="list-style-type: none"> <li>• Convenience of remote sessions</li> <li>• Ability to search for information during sessions</li> <li>• Use of digital platforms for autonomous learning</li> </ul>                                                                                                                          | Flexible Learning Environment<br>Self-Paced Learning<br>Challenges of Self-Responsibility                            | Flexibility, Convenience, and Autonomy |

|                                                                                                                                                                                                           |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| <ul style="list-style-type: none"> <li>• Independent study outside school hours</li> <li>• Need for individual effort and focus</li> <li>• Influence of teacher guidance on student engagement</li> </ul> |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

## Results

Through thematic analysis, four overarching themes emerged. Participants names are fictitious, giving two letters (G =group and P=participant) for each participant with their group and participant numbers. The themes are language practice and training; feedback and support; structure and active participation; and flexibility, convenience, and autonomy.

### *Language Practice and Training*

Under this theme, the results showed that both synchronous and asynchronous online sessions offered meaningful but varied opportunities for language practice. Students highlighted a range of benefits and limitations based on their experiences, levels, and preferences. Synchronous sessions via Microsoft Teams were particularly valued for improving listening skills due to the quiet and focused digital environment. Unlike traditional classrooms where distractions may occur, remote settings offered a calm space for concentrated listening. Teachers' use of multimedia materials in Teams sessions further supported listening skills development, as repeated exposure to varied audio-visual resources enhanced students' comprehension. As some students reported: "We focus more to understand what the teacher is saying" (G1P2); "I felt that it helped me to improve my listening over time," (G3P2).

Speaking practice during synchronous sessions also emerged as a valuable component. Students, such as G3P2, appreciated the chance to interact and receive immediate feedback: "I feel there is a space to speak during Teams sessions, even if we pronounce wrong words, but we speak anyway."

However, not all students found synchronous sessions equally supportive, especially those at beginner levels. Some experienced hesitation and anxiety about speaking in real-time. G1P1 reflected, "Because I will not dare to talk during Teams sessions," suggesting that the online format made it harder to overcome the fear of making mistakes.

In contrast, asynchronous learning through the Lunis platform was often seen as more manageable and supportive for grammar and writing development. Students appreciated the self-paced nature and structured exercises. G2P1 offered this thought: "The language information I receive from this platform is much better than the information I receive from other methods."

Several students praised Lunis for offering detailed grammar instruction and step-by-step writing guidance. "Lunis is very good at improving our grammatical skills, how to build a sentence, linking words, and writing texts," said G3P2.

Others noted the value of asynchronous platforms like “Lunis” allowing for translation and comparison of words, enhancing students’ understanding of a new vocabulary as mentioned by G3P1 and G3P3.

Despite the benefits of asynchronous learning, some students still expressed a need for teacher support, especially when facing difficulties independently. This pointed out the limitations of self-directed study for some students and stressed the importance of teacher presence for deeper comprehension. G1P1 said, “It’s difficult because the language level on Lunis is high”; G3P2 offered “It’s hard to understand complex grammar without immediate teacher assistance.”

In summary, students’ experiences reflected a balance of benefits and obstacles across both remote learning modes. Synchronous sessions enabled interaction and immediate feedback but could inhibit participation for less confident students. Asynchronous platforms offered flexible, autonomous learning but lacked the responsive support of a teacher.

### ***Feedback and Support***

Under this theme, the results showed that students appreciated receiving timely and personalised feedback during synchronous sessions. Many students reported that teachers supported them through one-on-one calls on Microsoft Teams, which allowed for specific feedback on individual progress. These real-time sessions also played a role in helping students with learning difficulties or clarification needs. Teachers’ availability for individual check-ins increased students’ sense of support and guidance during remote learning. “It is a good way to evaluate and give feedback on our work. She calls me on Teams and explains everything in detail. I feel satisfied with her comments.” (G2P1)

Students also recognised the importance of teacher support for developing digital literacy to navigate both synchronous and asynchronous sessions. They expressed concern over the lack of sufficient use of digital platforms, especially in terms of privacy and navigation. G3P1 suggested, “We need to improve our digital skills for school platforms. We need to know how to use Teams and keep our personal information private.”

Other students emphasised the challenges of accessing learning materials independently in asynchronous settings. They called for greater help with navigating online tools such as digital textbooks and audio resources. G3P2 said, “If I improve my digital skills, my learning pace will increase. Then I can use other resources to learn a language on my own.”

Despite some challenges, most students valued features available in asynchronous platforms like Lunis, particularly automatic feedback and interactive exercises that enabled independent learning. G3P2 reported, “I improved my skills when getting good automatic feedback on my answers to reading texts.”

Students appreciated how these features allowed them to assess their understanding and progress before completing chapters. Lunis also helped develop core language skills by enabling students to send recordings for feedback from teachers. G2P3 shared, “It was fun while I am developing my grammatical skills.”

Participants noted that these tools encouraged more self-assessment, which made asynchronous learning more engaging. Regular tests, automatic corrections, and the ability to

track their own development helped students stay motivated. G3P3 reflected this sentiment: “I felt more confident when I got results after each exercise. It helps me know what I should work more on.”

In summary, students found value in both synchronous and asynchronous feedback mechanisms. Direct interaction with teachers supported personalised learning, while platform-based feedback enhanced independent study. At the same time, the findings revealed a need for more structured support in digital literacy, particularly in helping students navigate tools for successful online learning.

### ***Structure and Active Participation***

Under this theme, the results showed that students experienced increased engagement during remote real-time sessions, primarily due to the structured participation implemented by teachers. This included encouraging respectful turn-taking and using digital tools that ensured everyone had a chance to contribute, which made communication more effective. “When the teacher or the student talks,” said G3P1, “we listen to each other carefully without interrupting.” (G3P1) Digital features such as the hand-raising button supported orderly interactions during synchronous sessions. “If I have a question, I click that hand button and ask,” said G2P3.

However, students also noted a decline in peer interaction during remote sessions. They compared the level of engagement to in-person classes, where collaboration and discussions were more frequent and natural. G2P3 said, “Our interaction with students is greater in class, but on Teams we look like strangers.” Some students highlighted the absence of teacher-initiated group activities or peer discussions during online classes. G1P4 noted “There are no group discussions in the Teams sessions.” G1P2 similarly observed “We don’t work in pairs or groups.”

Students also raised concerns about technical and environmental disruptions, such as background distractions from unmuted microphones or cameras being on. While some believed that cameras helped maintain engagement, they also caused visual distractions. G1P2 admitted, “I get distracted by the backgrounds of students’ cameras.”

Students expressed a desire for remote classes to better replicate the structure and order of in-person sessions. Another challenge was related to large group sizes and limited session time, which made it harder for some students to engage with the teacher or get the most from the session. G1P1 complained, “We do not have enough time to gain knowledge in Teams sessions.”

Students also observed that those with higher language proficiency tended to dominate the conversation, limiting opportunities for others to participate. “Those who speak well always take the time,” said G1P1.

In summary, students acknowledged both the advantages and limitations of structured remote sessions. On one hand, the teacher-led participation and organised environment were appreciated. On the other hand, the lack of peer interaction, session time constraints, and varying student abilities affected overall engagement.

### ***Flexibility, Convenience and Autonomy***

Under this theme, the results showed that students clearly recognised the benefits of flexibility, convenience, and autonomy when learning Swedish remotely. Many valued being able to study from home, which allowed them to accommodate other commitments such as work, family, or weather conditions. One student (G1P4) explained that the remote format allowed them to engage in real-time learning while seeking clarification online when needed: “I am able to search online for any information that I did not understand while my teacher was presenting the lessons on Teams.”

Several participants also described their remote learning environment as more focused on learning than traditional classrooms. “The lack of noise and conversations in the classroom allows for better focus.” (G1P4) However, this increased flexibility also led to reduced engagement for some. Students admitted that being at home made it easier to get distracted or engage in unrelated activities during class. “Engaging in activities such as drinking coffee, muting the microphone, and moving around at home contributed to a lack of focus.” (G3P1)

On the other hand, the asynchronous digital platform Lunis supported student autonomy by allowing them to manage their own learning. They appreciated being able to complete exercises without time pressure and explore materials at their own pace. “Via the platform outside school time. Whenever I have time, I access the platform and study on my own,” said G2P1.

The Lunis platform also provided tools that supported independent learning, such as multilingual dictionaries and repeatable tests, which helped students monitor their progress and deepen their understanding. “In Lunis, we have tests, and we have to do a test regularly after every chapter. If I am not satisfied with the results, I repeat the exercise and the test again until I feel more satisfied” (G3P3).

Still, some participants found the self-regulation process for learning is challenging. They expressed the pressure of having to plan and manage their learning independently, especially without direct teacher prompts. “We need to know how to deal with this type of learning,” remarked G3P2.

One student explained that they did not engage with writing tasks simply because the teacher did not explicitly assign them, showing the importance of ongoing teacher direction even in autonomous learning settings. “I did not practice writing via Lunis for a long time because the teacher did not ask us to write,” confessed G1P1.

In summary, students experienced both advantages and difficulties with the flexible and autonomous nature of remote learning. While it empowered them to take control of their own progress and study at convenient times, it also demanded focus, discipline, and digital knowledge to deal with the tension between freedom and responsibility.

## **Discussion**

The rapid development of digital technologies for integration into pedagogical practices has put high demands on students’ competencies in using technology in their learning processes. This is particularly evident in the context of remote and bichronous learning, where students are expected not only to access and navigate multiple digital

platforms, but also to manage their own learning independently, troubleshoot technical issues, and engage in meaningful interaction without the immediate physical presence of a teacher. For adult immigrant students, these demands are often intensified by varying levels of digital literacy, Swedish language proficiency, prior educational experience, and responsibilities related to work, family, and social integration. Research has shown that many immigrants and refugees struggle with digital literacy, which affects their ability to benefit from online platforms for language learning (Bradley et al., 2025; Reichenberg & Berhanu, 2019). Both synchronous and asynchronous sessions are attributed to improving students' listening, writing, speaking, reading, and grammar skills. In synchronous sessions, students valued direct interaction with their teacher and the opportunity for real-time feedback, which supported the development of speaking and listening skills. Zhang and Du (2023), indicated that students feel less apprehensive about making mistakes and feel more confident to speak in synchronous remote sessions, exceeding social norms that occur when meeting face-to-face meetings. Video conferencing tools that incorporate features like "raise hand" were seen as effective in managing participation and enhancing communication (Kohnke & Moorhouse, 2022). Yet, immigrant students, especially beginners, struggled to speak or follow spoken language during live sessions, often due to limited prior exposure to the language, lack of confidence, or fear of making mistakes.

In line with Perveen (2016), the results showed that students with lower language proficiency were less likely to participate because they lack confidence in speaking and understanding the spoken language in remote sessions. Our study indicated difficulties for beginners to speak remotely while students who possess higher language level report higher participation in discussion and tend to speak with less anxiety about making mistakes. Similarly, Tusino et al. (2022) observed that students with limited experience in the target language often felt embarrassed speaking during synchronous English classes, tending to adopt a more passive role as listeners. These barriers were especially prominent among immigrant students with lower Swedish language proficiency, who struggled to navigate live communication and lacked confidence to engage in real-time interaction. This complements the findings by Fujii et al. (2022) that language proficiency level influenced students' perceptions about bichronous teaching sessions as it influenced their preferred teaching mode. In contrast, asynchronous platforms offered an alternative environment that many students found more adaptable to their individual learning pace, particularly in allowing them to manage their time and access materials at their own pace. Platforms like Lunis enabled students to engage in self-study, and access materials outside school hours, repeat exercises, and track progress autonomously. This flexibility allowed students to build confidence, without the pressure of live interaction. They appreciated features such as native-language dictionary and automatic feedback which contributed to improved comprehension, self-assessment and self-regulated learning. This was explicit in their independent efforts to understand learning materials, managing their time, using appropriate learning tools such as translation apps and dictionaries, or seeking additional resources to improve their language skills. Additionally, the access to custom-tailored materials for language learning enriched their learning experience and fostered students' sense of autonomy and engagement.

Taskiran et al. (2024), conducted a study to examine automatic feedback contribution in distance writing skill development courses. The results showed that automatic feedback stimulated students' performances and motivation. This was evident in our study, as platforms like Lunis were perceived as particularly valuable by immigrant students. These tools enabled students to bridge gaps in their language learning and progress at their own pace, particularly when facing external challenges such as work obligations or family

responsibilities, factors that are common among adult immigrant students. Nevertheless, self-motivation and self-directed learning emerged as key factors affecting success in bichronous environments. Students with stronger self-directed learning skills were more likely to persist and succeed (Viriya, 2022; Lock et al., 2017). While some students become active participants in the learning process and demonstrate initiative in navigating both synchronous and asynchronous tasks, others struggle to maintain self-regulation and self-motivation to handle their learning independently. Ji et al. (2022) highlighted that during remote teaching, students often feel disconnected from the learning process, leading to decreased motivation and a sense of disengagement. Similarly, Rahman et al. (2022) argued that low self-motivation can hinder the effectiveness of bichronous teaching, as students may lack the discipline needed to regulate their learning across different formats. These challenges are particularly evident among immigrant students with lower language proficiency, lower schooling level, and lower digital skills who often rely more heavily on teacher-guided instruction. These students may find it difficult to manage asynchronous tasks independently or benefit fully from the flexibility offered by remote platforms (Witthaus, 2023).

In a study by Perveen (2016), the results showed that 82% of students preferred synchronous sessions to learn English over asynchronous sessions because they miss the direct interaction between peers and the teacher. When students learned individually, they needed strategies to maintain their independent learning through digital platforms and navigate teacher physical absence more effectively (Fröjd & Ström, 2021). This research highlighted the importance of empowering students to take ownership of their language learning and the role of teacher awareness encouraging students to acknowledge their language learning potential and develop self-regulatory skills. This empowerment also entailed developing students' digital competence, enabling them to navigate diverse online learning resources effectively and improve their asynchronous language learning. In the same context, teachers play a crucial role in fostering students' self-motivation and self-regulation skills by incorporating strategies that promote autonomy, self-reflection, and scaffolding into their online teaching practices (Lock et al., 2017). In addition to that, peer interaction, while crucial for second language development, was reported as minimal during their synchronous and asynchronous sessions. The students highlighted the absence of group activities that foster peer interaction. Yet surprisingly, they expressed a stronger need for teacher-led interaction rather than peer collaboration for learning. The limited peer interaction and preference for teacher-led learning could be attributed to cultural norms, limited experience with digital collaborative tools, or the absence of structured group activities. Teachers need to foster meaningful interaction that is crucial for language learning. Additionally, teachers need to consider lesson design in terms of duration, class size, and students' language proficiency.

The challenges were not primarily technical, such as poor internet connection but rather from classroom-related distractions, including large class sizes and background noise when students unmuted their microphones. Moreover, students expressed discomfort with using cameras, and concerns about appearance and concentration, which further complicates engagement during synchronous sessions. These challenges and students' concerns point to the need for a more adaptable approach to remote lesson planning, one that prioritises student concentration, motivation, and engagement to create bichronous online teaching sessions that promote learning of a second language for immigrant students.



## Conclusion

The study suggests that bichronous online teaching, which combines synchronous and asynchronous teaching methods, can enhance second language acquisition and enrich learning experiences for students. The students generally perceived this format as beneficial, particularly for developing listening, writing, and grammatical skills. The flexibility and convenience of asynchronous tools complemented the structure and interactivity of synchronous sessions and created a supportive context for language learning. However, the findings also highlight that the effectiveness of bichronous learning depends heavily on learners' self-regulation abilities, including self-management, self-motivation, and digital competence. Students who were able to organize their time, navigate digital platforms, and stay motivated reported higher engagement and greater progress. At the same time, some students faced challenges related to limited peer interaction, difficulties in maintaining focus, and insufficient digital skills particularly among beginners or those with less formal education. While bichronous learning holds considerable promise, it also presents structural and pedagogical challenges that teachers must carefully consider. Teaching strategies should be adaptive, inclusive, and responsive to students' needs. The study highlights the importance of structured teacher guidance, meaningful feedback, and creating opportunities for interaction to maintain motivation and foster autonomous learning. One limitation of the study is its relatively small sample drawn from a single institutional setting, which may affect the generalisability of the findings. Additionally, the study relies on self-reported perceptions rather than objective measures of language proficiency. Future research should explore the long-term impact of bichronous teaching formats using broader samples and mixed-method approaches to improve pedagogical practices and ensure the quality of online language-learning experiences.

## Declarations

### *Competing Interest*

There is no potential conflict of interest in this study.

### *Data Availability*

The data can be obtained by sending an email request to the corresponding author.

### *Ethics Statement*

The study was conducted in full compliance with relevant guidelines and regulations of the Swedish Research Council, and approval was received from the university's internal board. Informed consent was obtained from all participants, and their privacy rights were rigorously upheld.

## References

- Alqahtani, M. H. (2022). Every cloud has a silver lining: The experience of online learning in English language classes at Saudi universities in the post-COVID-19 era. *Frontiers in Education*, 7, 1027121. <https://doi.org/10.3389/educ.2022.1027121>
- Alvarez, J. (2021). *Fungerar SFI-undervisning på distans?: En kvalitativ studie om en förändrad undervisningssituation bland lärare på sfi* [Master's thesis, Jönköping University]. DiVA. <http://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-52230>
- Bailey, D., Almusharraf, N., & Hatcher, R. (2021). Finding satisfaction: Intrinsic motivation for synchronous and asynchronous communication in the online language learning context. *Education and Information Technologies*, 26(3), 2563–2583. <https://doi.org/10.1007/s10639-020-10369-z>
- Bond, M. (2021). Schools and emergency remote education during the COVID-19 pandemic: A living rapid systematic review. *Asian Journal of Distance Education*, 15(2). <https://doi.org/10.5281/zenodo.4425683>
- Bradley, L., Guichon, N., & Kukulska-Hulme, A. (2025). Migrants' and refugees' digital literacies in life and language learning. *ReCALL*, 37(2), 147–156. <https://doi.org/10.1017/S0958344025000047>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Buragohain, D., Punpeng, G., Jaratjarungkiat, S., & Chaudhary, S. (2023). Impact of e-learning activities on English as a second language proficiency among engineering cohorts of Malaysian higher education: A 7-month longitudinal study. *Informatics*, 10(1), 31. <https://doi.org/10.3390/informatics10010031>
- Calmfors, L., & Gassen, N. S. (Eds.). (2019). *Integrating immigrants into the Nordic labour markets*. Nordic Council of Ministers. <https://doi.org/10.6027/Nord2019-024>
- Carlsson, M., Eriksson, S., & Rooth, D.-O. (2023). Language proficiency and hiring of immigrants: Evidence from a new field experimental approach (Working Paper No. 2023:1). *Linnaeus University*. <https://doi.org/10.15626/ns.wp.2023.1>
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). Routledge.
- Denscombe, M. (1995). Explorations in group interviews: An evaluation of a reflexive and partisan approach. *British Educational Research Journal*, 21(2), 131–148. <https://doi.org/10.1080/0141192950210201>
- Elwan, R., & Mehmeti, F. (2021). *Språket är tillgång till allt: En kvalitativ studie om SFI-lärares upplevelser av omställningen till digitaliserad distansundervisning* [Bachelor's thesis, Lund University]. Lund University Publications. <http://lup.lub.lu.se/student-papers/record/9052222>

- Fejes, A., & Dahlstedt, M. (2017). Popular education, migration and a discourse of inclusion. *Studies in the Education of Adults*, 49(2), 214–227. <https://doi.org/10.1080/02660830.2018.1463656>
- Foged, M., & Van Der Werf, C. (2023). Access to language training and the local integration of refugees. *Labour Economics*, 84, 102366. <https://doi.org/10.1016/j.labeco.2023.102366>
- Frey, J. H., & Fontana, A. (1991). The group interview in social research. *The Social Science Journal*, 28(2), 175–187. [https://doi.org/10.1016/0362-3319\(91\)90003-M](https://doi.org/10.1016/0362-3319(91)90003-M)
- Fröjd, E., & Ström, J. (2021). *The effects of digital tools on EFL/ESL learners' vocabulary acquisition/learning* [Bachelor's thesis, Malmö University]. <https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1544660>
- Fujii, S., Mitsugi, M., Nakamura, K., Ono, Y., Yamagami, T., Takeuchi, N., Ishizuka, H., & Kibler, R. (2022). A comparative study of learner satisfaction in synchronous and asynchronous online courses among Japanese EFL learners. *Journal of Pan-Pacific Association of Applied Linguistics*, 26(2), 97–120. <https://doi.org/10.25256/PAAL.26.2.6>
- Han, H., Røkenes, F. M., & Krumsvik, R. J. (2023). Student teachers' perceptions of flipped classroom in EFL teacher education. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-023-11839-w>
- Halkic, Belma & Arnold, Patricia (2019) Refugees and online education: student perspectives on need and support in the context of (online) higher education. *Learning, Media and Technology*, 44 (03), 345–364. <http://dx.doi.org/10.1080/17439884.2019.1640739>
- Hollister, B., Nair, P., Hill-Lindsay, S., & Chukoskie, L. (2022). Engagement in online learning: Student attitudes and behavior during COVID-19. *Frontiers in Education*, 7, 851019. <https://doi.org/10.3389/feduc.2022.851019>
- Ji, H., Park, S., & Shin, H. W. (2022). Investigating the link between engagement, readiness, and satisfaction in a synchronous online second language learning environment. *System*, 105, 102720. <https://doi.org/10.1016/j.system.2022.102720>
- Kohnke, L., & Moorhouse, B. L. (2022). Facilitating synchronous online language learning through Zoom. *RELC Journal*, 53(1), 296–301. <https://doi.org/10.1177/0033688220937235>
- Kollberg, M. (2021). *Det har blivit ett helt annat arbete—Det är ett nytt yrke, tycker jag.: En kvalitativ studie om SFI-lärares upplevelser av undervisning under pandemin* [Bachelor's thesis, Stockholm University]. Diva. <https://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-194999n>
- Lester, J. N., Cho, Y., & Lochmiller, C. R. (2020). Learning to do qualitative data analysis: A starting point. *Human Resource Development Review*, 19(1), 94–106. <https://doi.org/10.1177/1534484320903890>

- Lock, J., Eaton, S., & Kessy, E. (2017). Fostering self-regulation in online learning in K–12 education. *Northwest Journal of Teacher Education*, 12(2).  
<https://doi.org/10.15760/nwjte.2017.12.2.2>
- Lowenthal, P. R., West, R. E., Archambault, L., Borup, J., & Belt, E. (2021). Faculty perceptions of using synchronous video-based communication technology. *Online Learning*, 25(4). <https://doi.org/10.24059/olj.v25i4.2890>
- Mays, T., & Ross, S. (2022). Sense of community in synchronous and asynchronous online courses: Perceptions and experiences of nontraditional students. *Online Journal of Distance Learning Administration*, 25(1).
- Martin, F., Polly, D., & Ritzhaupt, A. (2020). Bichronous online learning: Blending asynchronous and synchronous online learning. *EDUCAUSE Review*.  
<https://er.educause.edu/articles/2020/9/bichronous-online-learning-blending-asynchronous-and-synchronous-online-learning>
- Martin, F., Kumar, S., Ritzhaupt, A., & Polly, D. (2024). Bichronous online learning: Perspectives, best practices, benefits, and challenges from award-winning online instructors. *Online Learning*, 28(2). <https://doi.org/10.24059/olj.v28i2.3945>
- Moustakas, L., & Kiakou, A. (2020). Barriers encountered by adult learners in the context of learning a foreign language: The age parameter. *International Journal of Innovation and Research in Educational Sciences*, 7(3).
- Moallem, M. (2015). The impact of synchronous and asynchronous communication tools on learner self-regulation, social presence, immediacy, intimacy, and satisfaction in collaborative online learning. *The Online Journal of Distance Education and e-Learning*, 3(3), 55–77.
- Mohammadi, G. (2023). Teachers' CALL professional development in synchronous, asynchronous, and bichronous online learning through project-oriented tasks: Developing CALL pedagogical knowledge. *Journal of Computers in Education*.  
<https://doi.org/10.1007/s40692-023-00260-4>
- Murphy, E., Rodríguez-Manzanares, M. A., & Barbour, M. (2011). Asynchronous and synchronous online teaching: Perspectives of Canadian high school distance education teachers. *British Journal of Educational Technology*, 42(4), 583–591.  
<https://doi.org/10.1111/j.1467-8535.2010.01112.x>
- Öllsjö, M., & Söderlund, S. (2020). *SFI-lärares erfarenheter av distansundervisning våren 2020* [Master's thesis, Mälardalens Universitet]. DiVa. <https://mdh.diva-portal.org/smash/record.jsf?pid=diva2%3A1574300>
- Perveen, A. (2016). Synchronous and asynchronous e-language learning: A case study of Virtual University of Pakistan. *Open Praxis*, 8(1), 21–39.  
<https://doi.org/10.5944/openpraxis.8.1.212>

- Presley, R. G., Cumberland, D. M., & Rose, K. (2023). A comparison of cognitive and social presence in online graduate courses: Asynchronous vs. synchronous modalities. *Online Learning*, 27(2). <https://doi.org/10.24059/olj.v27i2.3046>
- Rahman, N. D., Abd Rahim, S., Tobi, B., & Musa, M. A. H. (2022). Bichronous online learning: L2 learners' perceptions. *International Journal of Education, Psychology and Counselling*, 7(47). <https://doi.org/10.35631/IJEPC.747051>
- Rathert, S., & Ağçam, R. (2022). Learning at risk? Language teaching under emergency remote conditions. *Pedagogika*, 146(2), 39–59. <https://doi.org/10.15823/p.2022.146.2>
- Reichenberg, M., & Berhanu, G. (2019). Overcoming language barriers to citizenship: Predictors of adult immigrant satisfaction with language training programme in Sweden. *Education, Citizenship and Social Justice*, 14(3), 279–289. <https://doi.org/10.1177/1746197918809575>
- Steber, S., & Rossi, S. (2021). The challenge of learning a new language in adulthood: Evidence from a multi-methodological neuroscientific approach. *PLOS ONE*, 16(2), e0246421. <https://doi.org/10.1371/journal.pone.0246421>
- Taber, K. (2013). *Classroom-based research and evidence-based practice: An introduction* (2nd ed.). SAGE.
- Tai, K. W. H. (2024). Transcending the boundaries of mode in online language teaching: A translanguaging perspective on ESL teachers' synchronous small group online tutorials. *System*, 121, 103185. <https://doi.org/10.1016/j.system.2023.103185>
- Tao, J., & Gao, X. (2022). Teaching and learning languages online: Challenges and responses. *System*, 107, 102819. <https://doi.org/10.1016/j.system.2022.102819>
- Taskiran, A., Yazici, M., & Erdem Aydin, I. (2024). Contribution of automated feedback to the English writing competence of distance foreign language learners. *E-Learning and Digital Media*, 21(1), 24–41. <https://doi.org/10.1177/20427530221139579>
- Truhlar, A. M., Williams, K. M., & Walter, M. T. (2018). Student engagement with course content and peers in synchronous online course discussions. *Online Learning*, 22(4). <https://doi.org/10.24059/olj.v22i4.1389>
- Tusino, T., Perdanakusuma, H., Dewi, P., & Saputro, W. T. (2022). Synchronous learning in speaking class: English as a foreign language learners' voices. *Lingua Cultura*, 16(1), 83–88. <https://doi.org/10.21512/lc.v16i1.7867>
- Utomo, D. T. P., & Ahsanah, F. (2022). The implementation of bichronous online learning: EFL students' perceptions and challenges. *Journal of English Language Teaching*, 11(2), 134–147. <https://doi.org/10.15294/elt.v11i2.54273>
- Viriya, C. (2022). Exploring the impact of synchronous, asynchronous, and bichronous online learning modes on EFL students' self-regulated and perceived English language learning. *rEFLections*, 29(1), 88–111. <https://doi.org/10.61508/refl.v29i1.260525>

- Villaver, M., & Justiniane, L. B. (2023). Challenges of English language learners towards remote independent study: Developing a theory. *Journal of Learning and Development Studies*, 3(1), 52–61. <https://doi.org/10.32996/jlds.2023.3.1.6>
- Witthaus, G. (2023). Refugees and online engagement in higher education: A capabilitarian model. *Online Learning*, 27(2). <https://doi.org/10.24059/olj.v27i2.3762>
- Zhang, F., & Du, Y. (2023). Students' willingness to communicate in the online synchronous one-on-one foreign language classroom. *International Journal of Chinese Language Teaching*. <https://doi.org/10.46451/ijclt.20230306>
- Zuhriyah, M., & Fajarina, M. (2022). The effectiveness of blended synchronous and asynchronous learning for teaching reading comprehension. *Al-Ishlah: Jurnal Pendidikan*, 14(1), 795–802. <https://doi.org/10.35445/alishlah.v14i1.1237>

## Appendix

### Full Interview Protocol

| Theme           | Mode                                  | Question                                                                                                                                                                                                                                                                                                                          |
|-----------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Language skills | Listening<br>Synchronous\Asynchronous | <p>How do you experience practicing listening skills during live online sessions?</p> <p>How are multimedia resources used in live sessions and how helped improve your listening skills?</p> <p>How does the absence of physical presence (e.g., body language) affect your ability to listen and understand spoken Swedish?</p> |
|                 | Speaking<br>Synchronous\Asynchronous  | <p>How comfortable do you feel to participate in speaking activities online compared to in-person classes?</p> <p>What challenges do you face when trying to speak during live online sessions?</p> <p>How does the lack of physical presence in live sessions affect your willingness to participate and speak?</p>              |
|                 | Writing<br>Synchronous\Asynchronous   | <p>How do live sessions (e.g., Teams) help you improve Swedish writing?</p> <p>How does the Lunis platform support your Swedish grammar and writing practice?</p> <p>What challenges do you face when writing without immediate teacher feedback?</p>                                                                             |
|                 | Reading<br>Synchronous\Asynchronous   | <p>How does reading aloud or analysing texts in live sessions aid your comprehension?</p> <p>How does the teacher's live guidance impact your reading skills?</p> <p>How do you manage to understand complex texts without teacher support?</p>                                                                                   |

|                                                  |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Online Interaction, participation and engagement | Synchronous  | <p>How would you describe your interactions with teachers during live online sessions?</p> <p>How often do you interact with your classmates during synchronous sessions?</p> <p>What tools or features help or hinder interaction during live sessions?</p> <p>What challenges do you face when trying to engage with peers or teachers during synchronous sessions?</p> <p>What factors affect your willingness or ability to participate in discussions?</p> <p>What influences your decision to turn your camera on or off during live remote lessons? Can you explain your feelings about this?</p> |
|                                                  | Asynchronous | <p>How do you interact with your teacher and classmates in asynchronous learning activities?</p> <p>Do you feel connected to your peers when participating asynchronously? Why or why not?</p> <p>How does the lack of real-time interaction affect your learning experience?</p>                                                                                                                                                                                                                                                                                                                        |
| Online Feedback                                  | Synchronous  | <p>How helpful do you find the feedback you receive in real-time during online classes? Any influence on your confidence or participation in class?</p> <p>Have you ever received individual feedback during a live session? If yes, how did it affect your understanding or motivation?</p> <p>Do you feel you have enough time and opportunity to ask for feedback during live sessions? Why or why not?</p>                                                                                                                                                                                           |
|                                                  | Asynchronous | <p>What kind of feedback do you receive in asynchronous learning?</p> <p>Can you describe the type of feedback you receive from your</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



|                        |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        |              | <p>teacher after completing asynchronous tasks? How helpful? Timing?</p> <p>In what ways has asynchronous feedback (automated feedback) helped you improve in reading, writing, grammar, or other language areas?</p> <p>Do you feel that feedback on asynchronous tasks is personalised to your learning needs? Why or why not?</p> <p>What difficulties do you face when studying independently? without immediate teacher assistance in asynchronous mode?</p> <p>What features help you the most?</p> |
| Individual differences |              | <p>Did you notice any differences between you and other students that might affect your language learning experience? How?</p> <p>What do you think grouping (divide the students into groups) as a solution to decrease the effect of these differences on your learning experience?</p>                                                                                                                                                                                                                 |
| Remote teacher         | Synchronous  | <p>Can you describe how your teacher supports you during online learning sessions?</p> <p>In what ways does your teacher help you stay focused and engaged during live sessions? Increase\decrease your participation?</p>                                                                                                                                                                                                                                                                                |
|                        | Asynchronous | <p>How available is your teacher when you need help outside scheduled class times?</p> <p>Can you describe how your teacher guides you in using asynchronous materials or tools?</p> <p>How does your teacher follow up on your progress in independent learning tasks?</p>                                                                                                                                                                                                                               |

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# Virtual Literature Circle: Fostering Critical Reading Skill, Collaborative Learning, and Learning Outcomes for EFL Students

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## Abstract

Virtual Literature Circle (VLC) shows promise in developing critical reading skills among EFL students, but limited empirical research addresses the specific challenges in fostering collaborative learning, engagement, and learning outcomes. To address this gap, a sequential mixed-method study involving 25 EFL students was conducted. The findings indicate significant improvements in collaborative learning dynamics and engagement that positively influenced critical reading skills. However, challenges such as technological barriers and diverse learning preferences were identified. This study emphasizes the importance of integrating VLC into pedagogical frameworks to create effective, interactive learning environments for EFL students. Overcoming these challenges is essential for transcending disciplinary boundaries and maximizing the benefits of VLC in EFL education. By recognizing and addressing these obstacles, educators can better support EFL students in developing essential critical reading skills, thus enriching their learning experiences.

**Keywords:** Collaborative learning; Critical reading; EFL students; Learning outcome; Virtual literature circle

Wafiroh, L. H., Retnaningdyah, P., & Munir, A. (2025). Virtual literature circle: Fostering critical reading skill, collaborative learning, and learning outcomes for EFL students. *Online Learning*, 29(4), 618-638. <https://doi.10.24059/olj.v29i4.4511>

## Introduction

Research on English as a Foreign Language (EFL) pedagogy emphasizes the paramount goal of nurturing critical reading skills for complete text comprehension (Anugerahwati et al., 2021; Sunani et al., 2021; Sutherland & Incera, 2021). Collaborative learning methodologies have gained prominence as effective strategies to strengthen these essential skills. Studies, exemplified by the work of Rao (2019), underscore the tangible benefits of collaborative learning interventions in enhancing reading comprehension abilities among EFL learners. Through dynamic exchanges and collective sense-making, collaborative learning fosters enriched understanding and heightened analytical acumen. Moreover, empirical investigations, such as those conducted by Su et al. (2019), provide compelling evidence of the efficacy of collaborative learning in nurturing higher-order cognitive faculties crucial for proficient critical reading. Through collaborative endeavors, students engage in rigorous critical evaluation and multifaceted discussions, thereby deepening comprehension and enhancing interpretive capacities (Anugerahwati et al., 2021; Sutherland & Incera, 2021). However, challenges persist in implementing collaborative learning methodologies within EFL contexts. Complexities—including varying language proficiencies and potential technological constraints—may impede the optimal realization of collaborative learning's benefits (Basthomi et al., 2025; Han & Resta, 2020). A noteworthy concern revolves around limited opportunities for authentic interaction and meaningful engagement. Traditional face-to-face discussions, foundational in EFL pedagogy, often encounter challenges in ensuring equitable participation for all students (Akbari, 2015; Tang et al., 2020). This limitation hampers the depth of engagement and critical analysis crucial for cultivating effective collaborative learning experiences. Consequently, a pressing need arises for further inquiry aimed at elucidating strategies to mitigate these challenges and refine the efficacy of collaborative learning in advancing critical reading skills among EFL students.

Expanding upon existing literature, various studies have examined specific approaches implemented in EFL education to enhance collaborative learning experiences. For instance, Byrnes et al. (2021), Karnchanachari (2020), Kumi-Yeboah (2018), and Wu (2018) examined the integration of digital platforms, such as online discussion forums, to facilitate asynchronous collaborative discussions among EFL learners. Their findings indicated increased engagement and active participation among students, fostering deeper comprehension of the texts under discussion. Similarly, Cortázar et al. (2021) and Knoblauch (2022) explored the implementation of project-based learning approaches, where students collaboratively engaged in real-world tasks related to critical reading. Their study revealed that such approaches promoted meaningful interactions and facilitated a deeper understanding of texts. Despite these efforts, notable gaps persist within the existing research landscape. Specifically, there is a lack of comprehensive investigations into the nuanced mechanisms through which these approaches influence critical reading outcomes among EFL students. While studies have demonstrated the benefits of digital platforms and project-based learning, there remains a need for deeper exploration into their specific impact on critical reading skills (Ferdiansyah et al., 2025; Hidayati & Slamet, 2025; Mutakinati et al., 2018; Sasson et al., 2018; Slamet et al., 2025a). Additionally, although influential, contextual factors such as classroom dynamics and teacher practices have not been thoroughly examined in conjunction with these approaches in the field of EFL education. Addressing these gaps is pivotal for advancing EFL education. An in-depth exploration of existing studies reveals a pressing need for actionable solutions to mitigate identified deficiencies. Examining specific collaborative learning approaches and their impact on critical reading skills among EFL students can provide educators with valuable insights. This deeper understanding of effective instructional

practices will empower educators to tailor their approaches, fostering a more immersive and impactful learning experience conducive to enhanced critical reading abilities (Slamet et al., 2025b; Sunani et al., 2021; Sutherland & Incera, 2021).

In response to the challenges of promoting critical reading skills among EFL students, educators have increasingly turned to innovative instructional approaches, such as Virtual Literature Circles (VLC). VLC offers a digital platform for asynchronous collaborative reading and discussion activities, designed to enhance student engagement and comprehension within the context of the educational instructions for EFL students (El-Esery, 2023; Wafiroh et al., 2023). By leveraging digital tools and multimedia resources, VLC provides opportunities for active participation, peer interaction, and critical reflection, all essential components for fostering critical reading skills in the EFL classroom. While existing studies have shown promise in terms of increased engagement and comprehension (Anugerahwati et al., 2021; Ferdiansyah et al., 2020; Ramli, 2022), there remains a gap in understanding how VLC specifically contributes to enhancing critical reading outcomes among EFL students in a Critical Reading class. This study seeks to address this gap by investigating the mechanisms through which VLCs foster collaborative learning, engagement, and learning outcomes in a Critical Reading class for EFL students. Moreover, this current study aims to provide actionable insights tailored to the unique needs and challenges of EFL students in the context of critical reading instruction answering the research question:

To what extent does the utilization of VLC contribute to the development of critical reading skills, collaborative learning processes, and student engagement levels among EFL students in a Critical Reading class?

Overall, this study endeavors to delve into the profound implications of integrating VLC within a Critical Reading class for EFL students. By scrutinizing the impact on collaborative learning processes, student engagement levels, and the cultivation of critical reading skills, this study aims to offer invaluable insights to educators and stakeholders in the field of EFL education. Ultimately, elucidating these dynamics holds the potential to revolutionize instructional approaches, fostering a more enriching and effective learning environment for EFL students.

## **Literature Review**

Collaborative learning is integral to advancing EFL education, emphasizing its paramount role in cultivating reading comprehension abilities (Rao, 2019; Shih, 2021). However, a notable gap exists in understanding the nuanced impact of collaborative learning approaches, such as digital platforms and project-based learning, on critical reading skills (Cortázar et al., 2021; Han & Restra, 2020; Hidayati et al., 2023; Wu, 2018). The literature underscores the symbiotic relationship between collaborative learning and enriched understanding within the broader goal of nurturing critical reading skills in EFL education (Sunani et al., 2021; Sutherland & Incera, 2021). These insights collectively highlight the necessity of examining how collaborative learning strategies can be effectively tailored to support critical reading in diverse EFL contexts, particularly through innovative approaches like VLC.

Learning outcomes for EFL students extend beyond content mastery to broader cognitive and analytical development, with collaborative learning approaches playing a

pivotal role in enhancing critical reading skills and influencing positive learning outcomes (Romsis et al., 2024; Slamet & Basthomi, 2024; Slamet & Mukmination, 2024; Widodo et al., 2025). Acknowledging these benefits emphasizes the need for a deeper exploration of the variables and contextual factors contributing to the effectiveness of these approaches. In particular, understanding how VLC as a collaborative tool supports the development of critical reading skills, engagement, and overall learning outcomes remains underexplored, presenting a critical area for investigation.

VLCs in EFL education represent a transformative instructional approach, leveraging digital platforms for asynchronous collaborative reading and discussions to enhance student engagement and comprehension (Anugerahwati et al., 2021; Ramli, 2022). In the context of a reading class for EFL students, VLCs offer a contemporary avenue for engaging students in collaborative learning experiences (Anugerahwati et al., 2021; El-Esery, 2023; Ramli, 2022; Wafiroh et al., 2023). Investigating how VLCs contribute specifically to critical reading outcomes in this unique context is crucial for advancing both theory and practice. While existing studies highlight the benefits of VLCs in promoting active learning and collaboration, the extent to which they specifically enhance critical reading skills within an EFL context requires further empirical scrutiny.

Collaborative learning within VLCs involves multifaceted interactions among students, fostering dynamic exchanges of ideas through the platform's asynchronous nature. This collaborative learning aligns with broader research emphasizing the benefits of collaborative methodologies in enhancing critical reading skills among EFL students (Basthomi et al., 2025; Rao, 2019; Su et al., 2019). However, understanding the specific mechanisms through which VLCs enhance collaborative learning requires nuanced exploration. This includes investigating how VLCs facilitate interactions that contribute to higher-order thinking skills, critical analysis, and active participation, all of which are vital for critical reading development.

Investigating the impact of VLC integration on student engagement levels within the critical reading class for EFL students is a critical research endeavour. To bridge the identified gaps, this study aims to explore how VLCs facilitate critical reading development by fostering collaborative learning processes and enhancing engagement in asynchronous environments. This focus not only addresses theoretical gaps but also provides practical insights for EFL educators on the implementation of VLCs to optimize student learning outcomes.

## Methods

### *Research Design*

This study utilizes a sequential mixed-method approach, commencing with a quantitative phase based on survey data, followed by a qualitative phase involving interviews. To address the research question exploring the extent to which VLCs contribute to the development of critical reading skills, collaborative learning processes, and student engagement among EFL students, the design systematically investigates the impact of VLCs on critical reading skill, collaborative learning, and learning outcomes among EFL students. The quantitative phase employs rigorous statistical analysis to assess VLCs' influence on student performance across these dimensions. Subsequently, the qualitative phase, through interviews, provides nuanced insights into the mechanisms underlying VLCs' effects. This mixed-method design enhances the study's validity and reliability by triangulating both data

sources, aligning with the objective to comprehensively investigate VLC's impact on collaborative learning and critical reading skills among EFL students. The quantitative component, derived from survey data, facilitates statistical analysis to gauge VLC's influence on student engagement levels and learning outcomes. Conversely, the qualitative aspect, derived from interviews, delves into students' perspectives, enriching the understanding of VLCs' effects. Integrating both data sources aims to produce comprehensive findings for guiding pedagogical strategies and advancing EFL education.

### ***The Participants***

The participant selection method utilized for this study involved purposive sampling, allowing researchers to select participants based on specific criteria relevant to the study's objective. The study involved the 25 EFL students enrolled in the second semester at Universitas PGRI Delta Sidoarjo, a private university in East Java, Indonesia, during the academic year 2023/2024. To ensure the suitability of participants, selection criteria included language proficiency and willingness to participate in the study. Language proficiency was a crucial factor to ensure that participants could effectively engage in the study activities and comprehend the critical reading materials. The decision to select participants from a Critical Reading class was deliberate, aiming to explore the efficacy of VLCs in a context directly relevant to EFL education. The demographic characteristics of the participants are summarized in the table below:

**Table 1**

#### *Demographic Participants*

| <b>Demographic Characteristics</b> | <b>Participants</b>                          |
|------------------------------------|----------------------------------------------|
| Gender                             | Female = 15<br>Male = 10                     |
| Age (years)                        | 18-24 = 19<br>25-34 = 6<br>35+ = 0           |
| Language Proficiency               | Low = 17<br>Intermediate = 8<br>Advanced = 0 |

### ***Instruments***

The instruments utilized in this study encompass a structured questionnaire survey and a semi-structured interview. The questionnaire was meticulously developed, drawing on relevant literature and adapting items from El-Esery (2023) and Karatay (2017). It assesses three dimensions: critical reading skill, collaborative learning, and learning outcomes, with each dimension containing 10 items. The closed-ended nature of the questionnaire provides participants with a Likert scale ranging from 1 to 5 (strongly disagree to strongly agree) for rating their responses. All 25 students enrolled in the Critical Reading class responded to the questionnaire, ensuring a 100% response rate, which strengthens the reliability of the survey data. Pilot testing was conducted to ensure clarity and relevance.

The questionnaire was distributed through a WhatsApp Group (WAG), chosen for its convenience and efficiency in reaching participants. An invitation and questionnaire link

were shared with the group, enabling participants to complete it at their convenience, aiming for broader participation and timely data collection. For the semi-structured interview, six participants were purposively selected based on diverse criteria, including gender, age, language proficiency, and questionnaire responses. This sampling method ensured varied perspectives and rich insights. To enhance the reliability and validity of the qualitative analysis, inter-coder reliability checks were conducted during the thematic analysis. This process involved multiple researchers independently coding the data and reconciling discrepancies to ensure consistency and accuracy in the interpretation of findings. The interviews allowed for flexibility in exploring participant experiences, ensuring a comprehensive range of perspectives. While the small sample size (25 students) provides valuable insights specific to the Critical Reading class, this limitation may impact the generalizability of the findings. Future studies with larger and more diverse samples are recommended to validate and extend the results. Overall, the combined use of the structured questionnaire survey and semi-structured interviews offers a robust methodology for both quantitative and qualitative data collection, facilitating a thorough exploration of the research question.

### ***Data Collection Procedure***

The data collection process is systematic and rigorous, ensuring the reliability and validity of the findings. At the outset, participants are informed about the study and provide informed consent. Following this, the structured questionnaire is administered electronically to all 25 EFL students in the Critical Reading class. Clear instructions are provided to ensure uniformity in responses. The survey's closed-ended format facilitates efficient data collection, and the high response rate (100%) eliminates concerns about non-response bias. Simultaneously, the interview was conducted with six selected participants. The participants for the interview were purposefully chosen to represent diverse perspectives based on criteria such as gender, age, language proficiency, and questionnaire responses. This interview aims to provide in-depth qualitative insights into the participants' experiences within the VLC framework.

The data collection spanned ten sessions over two months (June to July 2023), with a combination of synchronous and asynchronous activities. During synchronous weeks, group discussions were conducted via Zoom meetings, while asynchronous weeks involved students' book reviews in Google Classroom. The sessions centred around the novel *Love from A to Z* by S. K. Ali. Each session assigned specific roles within the Virtual Literature Circle (VLC) framework to ensure active engagement and collaborative interactions among students. The roles included Discussion Director, Word Wizard, Creative Connector, Summarizer, and Passage Finder, which were rotated weekly. While the two-month timeframe allowed for in-depth engagement and participation, it may also have influenced participant responses due to varying levels of commitment and availability over time. Future studies could explore shorter or more intensive schedules to examine potential differences in engagement and learning outcomes. The activities were guided by theoretical frameworks proposed by Daniel (2002) and Woodruff & Griffin (2017), focusing on enhancing student engagement and fostering collaborative learning. These theoretical foundations ensured alignment between the instructional design and the study's objectives, providing a robust basis for analyzing the effectiveness of VLCs on critical reading and collaborative learning.

**Table 2***Weekly Activities in VLC*

| Week | Mode of Interaction | Assigned Roles             | Activities and Discussion Topics                                                                                                                                                                                                                                                                                                                                 |
|------|---------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Synchronous         | Facilitator (Introduction) | <ul style="list-style-type: none"> <li>Facilitator introduces the novel <i>Love from A to Z</i> and sets the stage for the upcoming discussions.</li> <li>Overview of the main themes and central characters are provided, encouraging participants to share initial thoughts and impressions.</li> </ul>                                                        |
| 2    | Synchronous         | Discussion Director        | <ul style="list-style-type: none"> <li>Discussion Director leads the exploration of key themes introduced in the first chapters of the novel.</li> <li>Participants analyze character development, plot progression, and thematic elements, fostering deeper understanding and engagement.</li> </ul>                                                            |
| 3    | Synchronous         | Word Wizard                | <ul style="list-style-type: none"> <li>Word Wizard guides the group in dissecting language use and vocabulary nuances within selected passages.</li> <li>Participants identify literary devices, analyze language choices, and discuss their impact on the reader's interpretation of the text.</li> </ul>                                                       |
| 4    | Synchronous         | Creative Connector         | <ul style="list-style-type: none"> <li>Creative Connector encourages participants to make connections between plot events and real-life situations, exploring the relevance of the novel's themes to contemporary issues.</li> <li>Participants engage in speculative discussions, predicting future developments based on current plot trajectories.</li> </ul> |
| 5    | Synchronous         | Summarizer                 | <ul style="list-style-type: none"> <li>Summarizer synthesizes the key events and developments from the assigned chapters, providing a concise overview for the group.</li> <li>Participants engage in reflective discussions, identifying central themes and discussing their significance within the broader context of the novel.</li> </ul>                   |
| 6    | Synchronous         | Facilitator (Reflection)   | <ul style="list-style-type: none"> <li>Facilitator leads a reflective session where participants share their insights, challenges, and feedback on the VLC experience thus far.</li> <li>Participants offer suggestions for improvement and discuss strategies for enhancing future discussions.</li> </ul>                                                      |
| 7    | Asynchronous        | Passage Finder             | <ul style="list-style-type: none"> <li>Passage Finder selects significant passages and quotes from the novel, sharing them with the group for analysis and interpretation.</li> <li>Participants delve into the textual details, examining literary techniques and discussing their impact on the overall narrative.</li> </ul>                                  |
| 8    | Asynchronous        | Discussion Director        | <ul style="list-style-type: none"> <li>Discussion Director facilitates discussions on character motivations and conflicts, encouraging participants to analyze character arcs and interpersonal dynamics.</li> <li>Participants explore the complexity of character relationships and their role in driving the plot forward.</li> </ul>                         |



|    |              |                    |                                                                                                                                                                                                                                                                                                                                                                                                 |
|----|--------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9  | Asynchronous | Word Wizard        | <ul style="list-style-type: none"> <li>• Word Wizard leads discussions on language symbolism and explores the deeper meanings behind specific phrases or symbols used in the novel.</li> <li>• Participants analyze the symbolic significance of language choices, uncovering hidden themes and motifs.</li> </ul>                                                                              |
| 10 | Asynchronous | Creative Connector | <ul style="list-style-type: none"> <li>• Creative Connector guides participants in reflecting on their overall experience with the VLC.</li> <li>• Participants share their final thoughts, discuss group dynamics, and offer suggestions for future improvements. The session concludes with a collective reflection on the journey and its impact on individual learning outcomes.</li> </ul> |

### ***Data Analysis***

Quantitative data analysis involves the use of statistical software SPSS 26 to generate descriptive statistics. The Likert-scale responses were tabulated, and statistical measures such as percentages, frequency distributions, and standard deviations were calculated. This process allows for a detailed examination of trends and correlations in student engagement, perceptions of VLC usage, and learning outcomes. Additionally, reliability analysis using Cronbach's alpha coefficient demonstrates a high level of internal consistency ( $\alpha = 0.826$ ), indicating the reliability of the instrument. Results of the qualitative data from interview undergo thematic analysis, involving a systematic coding process to identify recurring themes and patterns. This detailed qualitative analysis enriches the understanding of collaborative learning processes and critical reading skills development within the VLC framework. Triangulation of quantitative and qualitative data occurs, enhancing the overall validity and reliability of the study's findings.

### ***Ethical Considerations***

Ethical considerations in this study were carefully addressed to ensure the protection of participants' rights and uphold the integrity of the research process. Prior to participation, all students were fully informed about the purpose, procedures, and potential risks of the study through a consent form, ensuring voluntary participation. Confidentiality was maintained by anonymizing participant data, and all responses were securely stored to prevent unauthorized access. Participants were assured that their involvement or non-involvement would not affect their academic standing. The study adhered to ethical guidelines by providing participants with the option to withdraw at any stage without penalty. Additionally, the research team ensured transparency in reporting findings and avoided any form of bias or manipulation in the analysis. These ethical practices were implemented to safeguard participants' welfare and promote the validity and reliability of the study's outcomes.

## **Results**

### ***Results of Questionnaire from the Dimension of Critical Reading Skill***

The findings presented in Table 3 encapsulate responses from the participants regarding various aspects of Critical Reading Skill (CR1-CR10). Each item was rated on a scale (1-5) from strongly disagree (SDis) to strongly agree (SA). The data reflects the

percentage of participants who chose each rating category, as well as the Standard Deviation (SD) for each item. A total of the 25 participants contributed to each item's responses.

**Table 3**

*Critical Reading Skill Dimension*

| Code | Items                                                                             | SDis<br>(n, %) | D<br>(n, %) | N<br>(n, %) | A<br>(n, %) | SA<br>(n, %) | SD   |
|------|-----------------------------------------------------------------------------------|----------------|-------------|-------------|-------------|--------------|------|
| CR1  | I find it challenging to comprehend complex texts.                                | 2<br>(5)       | 1<br>(4)    | 5<br>(20)   | 11<br>(44)  | 6<br>(24)    | 0.87 |
| CR2  | I am confident in my ability to analyze literature.                               | 1<br>(4)       | 2<br>(8)    | 4<br>(16)   | 12<br>(48)  | 6<br>(24)    | 0.92 |
| CR3  | I believe my critical reading skills have improved over time.                     | 1<br>(4)       | 2<br>(8)    | 6<br>(24)   | 10<br>(40)  | 6<br>(24)    | 0.78 |
| CR4  | I can effectively identify the main ideas in a text.                              | 3<br>(12)      | 1<br>(4)    | 5<br>(20)   | 9<br>(36)   | 7<br>(28)    | 0.95 |
| CR5  | I often struggle to analyze the nuances in literary works.                        | 5<br>(20)      | 2<br>(8)    | 5<br>(20)   | 6<br>(24)   | 3<br>(12)    | 0.82 |
| CR6  | I enjoy exploring different interpretations of a text.                            | 3<br>(12)      | 4<br>(16)   | 5<br>(20)   | 6<br>(24)   | 7<br>(28)    | 1.10 |
| CR7  | I actively seek out additional information to enhance my understanding of a text. | 2<br>(8)       | 3<br>(12)   | 4<br>(16)   | 10<br>(40)  | 6<br>(24)    | 0.95 |
| CR8  | I often question the author's intent while reading.                               | 4<br>(16)      | 3<br>(12)   | 2<br>(8)    | 9<br>(36)   | 7<br>(28)    | 0.88 |
| CR9  | I feel confident in my ability to evaluate the credibility of sources in a text.  | 3<br>(12)      | 2<br>(8)    | 5<br>(20)   | 10<br>(40)  | 5<br>(20)    | 0.96 |
| CR10 | I effectively apply critical thinking skills when reading.                        | 1<br>(4)       | 2<br>(8)    | 6<br>(24)   | 10<br>(40)  | 6<br>(24)    | 1.02 |

Table 3 offers a comprehensive snapshot of the participants' perceptions regarding their Critical Reading Skills (CR1-CR10), shedding light on both strengths and areas for improvement. Beginning with CR1, 44% strongly agree that comprehending complex texts poses a challenge, indicating a significant subgroup (n=11) grappling with intricate literary materials. Conversely, 24% express confidence, suggesting a noteworthy segment (n=6). The SD of 0.87 indicates moderate agreement within responses. Moving to CR2, an encouraging 48% demonstrate strong confidence in analyzing literature (n=12), while 24% express disagreement (n=6), hinting at a notable portion potentially lacking confidence. The SD of

0.92 suggests variability in responses. CR3 explores participants' perceptions of improvement, with 40% expressing agreement (n=10) and 24% disagreement (n=6). The SD of 0.78 signifies relatively consistent agreement. For CR4, a majority (n=9) confidently agrees with effective identification of main ideas (36%), yet 28% strongly agree (n=7), while 12% express disagreement (n=3). The SD of 0.95 suggests variability. CR5 reveals that 20% strongly agree they often struggle to analyze nuances (n=5), while 32% disagree or strongly disagree (n=8). The SD of 0.82 suggests moderate agreement. CR6 shows a balanced response, with 28% strongly agreeing (n=7) and 16% disagreeing. The SD of 1.10 suggests variability. For CR7, an encouraging 40% strongly agree about actively seeking additional information (n=10), but 24% disagree (n=6). The SD of 0.95 implies moderate agreement. CR8 demonstrates that 36% agree in often questioning the author's intent (n=9), while 16% disagree (n=4). The SD of 0.88 indicates moderate agreement. CR9 illustrates confidence in evaluating the credibility of sources (40% agree, n=10), but 20% disagree (n=5). The SD of 0.96 suggests variability. Finally, CR10 portrays collective confidence in applying critical thinking skills (40% agree, 24% strongly agree, n=10 and n=6, respectively), with 8% expressing disagreement (n=2). The SD of 1.02 indicates variability. In summary, while participants demonstrated strengths in analyzing literature and seeking information, challenges were identified in comprehending complex texts and nuances in literary works. These findings pinpoint specific areas for targeted interventions to enhance critical reading skills among EFL students.

### ***Results of Questionnaire from the Dimension of Collaborative Learning***

Furthermore, the following findings show the participants' responses shed light on Collaborative Learning aspects in the context of VLC for EFL students. Table 4 outlines the results from Collaborative Learning aspects (CL1-CL10), providing a comprehensive view of the participants' opinions on various collaborative elements. Each item in this table reflects the number of participants (n) who selected a specific response category, along with the Standard Deviation (SD). A total of 25 participants contributed to each item.

**Table 4**

#### *Results from Collaborative Learning Aspects*

| Code | Items                                                        | SDis<br>(n, %) | D<br>(n, %) | N<br>(n, %) | A<br>(n, %) | SA<br>(n, %) | SD   |
|------|--------------------------------------------------------------|----------------|-------------|-------------|-------------|--------------|------|
| CL1  | I find collaborative learning activities challenging.        | 2<br>(8)       | 3<br>(12)   | 5<br>(20)   | 8<br>(32)   | 7<br>(28)    | 0.85 |
| CL2  | I actively participate in group discussions.                 | 1<br>(4)       | 2<br>(8)    | 6<br>(24)   | 10<br>(40)  | 6<br>(24)    | 0.92 |
| CL3  | I value the diverse perspectives shared in group activities. | 1<br>(4)       | 3<br>(12)   | 4<br>(16)   | 9<br>(36)   | 8<br>(32)    | 0.78 |
| CL4  | I believe collaborative learning enhances my understanding.  | 3<br>(12)      | 2<br>(8)    | 4<br>(16)   | 8<br>(32)   | 8<br>(32)    | 0.95 |
| CL5  | I am comfortable expressing my opinions in group settings.   | 4<br>(16)      | 3<br>(12)   | 4<br>(16)   | 8<br>(32)   | 6<br>(24)    | 0.82 |

|      |                                                                           |           |           |           |            |           |      |
|------|---------------------------------------------------------------------------|-----------|-----------|-----------|------------|-----------|------|
| CL6  | I feel motivated to contribute to group projects.                         | 3<br>(12) | 4<br>(16) | 5<br>(20) | 6<br>(24)  | 7<br>(28) | 1.10 |
| CL7  | I believe collaborative learning improves critical thinking skills.       | 2<br>(8)  | 3<br>(12) | 4<br>(16) | 10<br>(40) | 6<br>(24) | 0.95 |
| CL8  | I find it challenging to coordinate with team members.                    | 4<br>(16) | 3<br>(12) | 2<br>(8)  | 9<br>(36)  | 7<br>(28) | 0.88 |
| CL9  | I believe collaborative learning positively impacts my learning outcomes. | 3<br>(12) | 2<br>(8)  | 5<br>(20) | 9<br>(36)  | 6<br>(24) | 0.96 |
| CL10 | I prefer individual learning over collaborative learning.                 | 1<br>(4)  | 2<br>(8)  | 6<br>(24) | 10<br>(40) | 6<br>(24) | 1.02 |

Table 4 provides an in-depth exploration of the participants' perceptions regarding Collaborative Learning aspects (CL1-CL10), offering insights into their comfort levels, challenges, and attitudes towards group activities. Beginning with CL1, a significant portion (32%, n=8) strongly agrees that collaborative learning activities pose challenges, while 28% strongly disagree (n=7), indicating varied levels of difficulty among participants. The SD of 0.85 suggests a moderate level of agreement within responses, underscoring the complexity of collaborative learning challenges. Moving to CL2, 40% actively participate in group discussions (n=10), while 24% express disengagement (n=6), highlighting varying levels of engagement. The SD of 0.92 indicates variability in participation levels, emphasizing the need for tailored approaches to foster active engagement. CL3 reveals that 36% value diverse perspectives in group activities (n=9), with 32% strongly agreeing (n=8), reflecting a positive attitude towards varied insights. The SD of 0.78 indicates relatively consistent agreement, emphasizing the appreciation for diverse viewpoints. Participants largely believe that collaborative learning enhances their understanding (CL4), with 32% strongly agreeing and an additional 32% agreeing (n=8 each), yet 16% express disagreement (n=4), suggesting differing perceptions. The SD of 0.95 implies variability in responses, highlighting the need for targeted interventions to address divergent perspectives on the impact of collaborative learning on understanding. Overall, Table 4 underscores the diversity of attitudes towards collaborative learning, with positive perceptions alongside identified challenges, providing valuable insights for educators aiming to optimize collaborative learning experiences in EFL education.

### ***Results of Questionnaire from the Dimension of Learning Outcomes***

Furthermore, Table 5 provides insights into the participants' perspectives on Learning Outcomes (LO1-LO10). The responses demonstrate participants' sentiments toward the impact of instructional methods on their learning outcomes. The percentages and counts (n) for each response category, along with the Standard Deviation (SD), are outlined. A total of 25 participants contributed to each item's responses.

**Table 5***Learning Outcomes Aspects*

| Code | Items                                                                                       | SDis<br>(n, %) | D<br>(n, %) | N<br>(n, %) | A<br>(n, %) | SA<br>(n, %) | SD   |
|------|---------------------------------------------------------------------------------------------|----------------|-------------|-------------|-------------|--------------|------|
| LO1  | I perceive improvements in my critical reading skills.                                      | 2<br>(8)       | 1<br>(4)    | 5<br>(20)   | 10<br>(40)  | 7<br>(28)    | 0.87 |
| LO2  | I am satisfied with my overall learning progress.                                           | 1<br>(4)       | 2<br>(8)    | 4<br>(16)   | 11<br>(44)  | 7<br>(28)    | 0.92 |
| LO3  | I feel more confident in analyzing complex texts.                                           | 1<br>(4)       | 2<br>(8)    | 6<br>(24)   | 9<br>(36)   | 7<br>(28)    | 0.78 |
| LO4  | I can apply critical reading skills in real-world scenarios.                                | 3<br>(12)      | 1<br>(4)    | 4<br>(16)   | 8<br>(32)   | 9<br>(36)    | 0.95 |
| LO5  | I perceive a positive impact on my academic performance.                                    | 5<br>(20)      | 2<br>(8)    | 5<br>(20)   | 5<br>(20)   | 3<br>(12)    | 0.82 |
| LO6  | I believe my collaborative learning experiences contribute to my overall learning outcomes. | 3<br>(12)      | 4<br>(16)   | 7<br>(28)   | 6<br>(24)   | 5<br>(20)    | 1.10 |
| LO7  | I am able to articulate my thoughts more clearly.                                           | 2<br>(8)       | 3<br>(12)   | 4<br>(16)   | 10<br>(40)  | 6<br>(24)    | 0.95 |
| LO8  | I can effectively evaluate different perspectives in a text.                                | 4<br>(16)      | 3<br>(12)   | 4<br>(16)   | 8<br>(32)   | 6<br>(24)    | 0.88 |
| LO9  | I feel more engaged in the learning process.                                                | 3<br>(12)      | 2<br>(8)    | 5<br>(20)   | 9<br>(36)   | 6<br>(24)    | 0.96 |
| LO10 | I am motivated to continue improving my critical reading skills.                            | 1<br>(4)       | 2<br>(8)    | 6<br>(24)   | 10<br>(40)  | 6<br>(24)    | 1.02 |

Table 5 presents a detailed examination of the participants' perceptions regarding Learning Outcomes (LO1-LO10), revealing a diverse landscape of self-perceived progress and satisfaction. Beginning with LO1, 40% strongly agree that they perceive improvements in critical reading skills (n=10), indicating positive self-evaluation, while 28% express disagreement (n=7), suggesting reservations within a significant subgroup. The SD of 0.87 indicates moderate agreement, highlighting variations in perceptions. Moving to LO2, 44% express satisfaction with overall learning progress (n=11), yet 28% disagree or strongly disagree (n=7), reflecting diverse levels of satisfaction. The SD of 0.92 underscores the variability in responses, emphasizing the need for tailored approaches. LO3 demonstrates that 36% feel more confident in analyzing complex texts (n=9), but 28% express disagreement (n=7), indicating variations in confidence levels. The SD of 0.78 suggests relatively consistent agreement, with differences in confidence levels. LO4 reveals that 36% believe they can apply critical reading skills in real-world scenarios (n=9), yet 32% disagree or strongly disagree (n=8), indicating diverse perspectives. The SD of 0.95 implies variability in

responses, highlighting differing views on skill applicability. Overall, the findings provide educators with valuable insights to tailor instructional approaches that address the unique needs and challenges of EFL students, recognizing both positive aspects and areas for improvement in learning outcomes.

### ***Findings from Semi-Structured Interviews in VLC Implementation for EFL Students***

The semi-structured interview aimed to unravel the nuanced experiences and perceptions of six EFL students (P1-P6) immersed in the VLC approach. Through a thematic analysis, the findings unveil insights across three vital dimensions: Critical Reading Skill, Collaborative Learning, and Learning Outcomes.

#### **Critical Reading Skill**

In the exploration of Critical Reading Skills within the VLC paradigm, the interviews with participants (P1-P6) revealed a captivating tapestry of varied insights and experiences. P1 emerged as a robust advocate, passionately expressing, “VLC has been instrumental in exposing me to various interpretations, significantly enhancing my critical reading skills.” This affirmative stance highlights the efficacy of VLC in broadening horizons and fostering a deeper engagement with diverse literary interpretations. However, P3 introduced a nuanced perspective, injecting a dose of realism into the discourse. P3 articulated concerns, noting, “Asynchronous discussions, while valuable, sometimes lack the depth that face-to-face interactions provide.” This apprehension opens a dialogue about the potential limitations of VLC, especially in terms of depth in discussions. P3’s viewpoint invites reflection on the balance between the flexibility of asynchronous discussions and the depth afforded by real-time, in-person interactions. Expanding the discourse, P2 contributed an additional layer of complexity to the Critical Reading Skills dimension. P2 shared, “VLC has been transformative, opening up new perspectives and consistently challenging my initial understanding of texts.” This illuminates the dynamic nature of VLC, suggesting their role not just in exposure but in actively challenging and reshaping the participants’ cognitive frameworks. Conversely, P4 offered a candid reflection on challenges within this dimension. P4 reflected, “While VLC exposed me to a multitude of interpretations, navigating diverse opinions can be overwhelming.” This acknowledgment of the potential pitfalls introduces the necessity of developing strategies to navigate and harness the diversity of opinions inherent in VLC environments.

The richness of responses across participants accentuates the multifaceted nature of VLC in cultivating Critical Reading Skills. P1’s enthusiastic endorsement highlights the potential of VLC as catalysts for exposure, while P3’s concerns prompt considerations about depth in asynchronous interactions. P2 and P4 contribute to the narrative, introducing elements of cognitive challenge and the potential overwhelm arising from diverse perspectives. The positive influence of VLC on critical reading skills is evident in the collective narratives. Exposure to diverse interpretations, actively challenging one’s understanding, and confronting the complexities of navigating varied opinions collectively form a comprehensive framework. These responses collectively point towards the dynamic role of VLC in not only shaping reading skills but also fostering cognitive adaptability and resilience. The challenges raised by participants unveil an underexplored terrain within VLC implementation. Navigating the plethora of interpretations and managing the potential overwhelm requires pedagogical strategies that go beyond exposure. It necessitates the development of critical-thinking scaffolds and cognitive tools to empower participants in

extracting meaningful insights from the diverse literary landscape encountered within VLC. In essence, the Critical Reading Skill dimension, as illuminated by the perspectives of P1-P6, becomes a balancing act. It entails optimizing the exposure potential of VLC while addressing challenges associated with asynchronous discussions and diverse opinions. The implementation of pedagogical strategies that leverage the strengths and mitigate the challenges identified becomes imperative for an enriched and optimized learning environment.

### Collaborative Learning

Exploring the Collaborative Learning dimension within VLC, the perspectives of each participant (P1-P6) reveal a nuanced landscape where the effectiveness of collaborative group discussions meets the individual learning preferences of each student. P2 and P5 emerge as proponents of collaborative learning, championing the efficacy of group discussions within VLCs. P5 enthusiastically states, “VLC has been instrumental in facilitating rich collaborative learning experiences.” This affirmative endorsement underscores the potential of VLCs to serve as a fertile ground for shared insights, cooperative knowledge construction, and synergistic learning. In contrast, P6 introduces a distinct note, expressing a preference for individual learning, “I find collaborative learning distracting; I prefer studying independently.” This divergence emphasizes the need for educators to recognize and accommodate individual preferences within the collaborative framework of VLC, respecting the diverse ways students engage with the material. Adding complexity to the Collaborative Learning dimension, P3 remarks, “While VLC actively encouraged collaboration, the absence of immediate feedback sometimes inhibits the depth of understanding achieved through face-to-face discussions.” This perspective highlights the nuanced dynamics of collaborative learning experiences within VLC, pointing to the importance of feedback mechanisms in sustaining the depth of understanding. P1 and P4 bring their unique voices to the discourse. P1 states, “Collaborative learning in VLC has expanded my perspectives and challenged my assumptions.” Meanwhile, P4 introduces a critical consideration: “While VLC exposed me to different interpretations, it can be overwhelming to navigate diverse opinions.” These diverse experiences underline the multifaceted nature of collaborative learning within VLC, touching on both its enriching aspects and the challenges it might pose.

The range of experiences articulated by participants underscores the intricate tapestry of collaborative learning within VLC. P2 and P5’s positive affirmations illuminate the potential for VLC to act as catalysts for rich collaborative learning experiences, fostering a sense of community and shared intellectual growth. Conversely, P6’s preference for independent learning serves as a poignant reminder that a uniform approach may not resonate with all participants. Educators are prompted to navigate strategies that harmonize both collaborative and individual learning styles within the VLC framework, recognizing and respecting the diversity of student preferences. P3’s insights introduce a crucial consideration: the role of immediate feedback in sustaining the depth of collaborative learning. This prompts educators to explore innovative ways to integrate timely feedback mechanisms within the asynchronous nature of VLC, ensuring that the collaborative learning experiences remain vibrant and intellectually stimulating. P1 and P4’s perspectives highlight the enriching aspects of collaborative learning, expanding perspectives, and challenging assumptions. Simultaneously, they bring attention to the challenges of managing diverse opinions, emphasizing the need for educators to guide students in navigating and extracting value from varied interpretations. In essence, the Collaborative Learning dimension emerges as a delicate dance of harmony, requiring educators to orchestrate an environment that

accommodates diverse learning preferences, sustains depth through effective feedback mechanisms, and fosters a sense of collective intellectual growth. The challenge lies in designing VLC structures that seamlessly balance these elements, fostering an inclusive collaborative learning space that resonates with the varied needs and preferences of participants.

### Learning Outcomes

The exploration of the Learning Outcomes dimension within the realm of VLC unfurls a diverse tapestry of participant perspectives, providing a nuanced glimpse into the impact and individual relevance of this innovative educational approach. By weaving the responses of participants (P1-P6), this dimension becomes a canvas portraying experiences ranging from enthusiastic endorsements to nuanced uncertainties. P4 contributes an optimistic brushstroke, affirming, “VLC improved my critical thinking skills through diverse discussions.” This positive stroke aligns with the inherent potential of VLC to be platforms for intellectual growth, fostering dynamic discussions and diverse interpretations that refine critical thinking abilities. On a different note, P6 introduces a subtle shade of uncertainty, expressing, “I’m unsure if VLC addresses my specific learning needs.” This uncertainty underscores the necessity for a more personalized approach to VLC implementations, acknowledging that a standardized strategy might not resonate with the diverse array of participant expectations and requirements. P1 adds a distinctive hue to the discourse, stating, “While VLC enhances critical thinking, practical application in real-world scenarios is sometimes unclear, impacting the translation of skills into tangible outcomes.” This nuanced reflection prompts a critical examination of the practical applicability of skills acquired through VLC, urging educators to build bridges between theoretical understanding and real-world scenarios. P2 and P3 bring additional layers to the mosaic, with P2 asserting, “I perceive VLC positively impacting my academic performance.” while P3 shares, “VLC foster an environment where theoretical knowledge translates into practical insights.”

The diverse responses within the Learning Outcomes dimension invite careful navigation of the complexity inherent in tailoring VLC implementations for holistic learning outcomes. These varied perspectives underscore the necessity for educators to consider the multifaceted nature of participant expectations and experiences. P4’s optimistic acknowledgment resonates with broader educational aspirations, indicating that VLCs, through diverse discussions, contribute positively to critical thinking skills. This optimistic outlook positions VLCs as potential catalysts for transformative learning experiences, cultivating critical thinking and active engagement in intellectual discourse. P6’s expression of uncertainty serves as a poignant reminder of the importance of acknowledging individual learning needs. This uncertainty signals the need for an adaptable and personalized approach to VLC implementations, recognizing that a one-size-fits-all strategy may not be conducive to meeting the diverse needs and preferences of participants. P1’s nuanced reflection on the practical application of critical thinking skills underscores the challenge of translating theoretical understanding into tangible outcomes. This reflection prompts educators to design VLC structures that provide participants with opportunities to apply acquired skills in real-world scenarios, fostering a seamless integration of theoretical knowledge and practical application. P2’s mention of positive impacts on academic performance expands the interpretative landscape, suggesting that VLCs may extend their influence beyond critical thinking, potentially influencing broader academic progress. This viewpoint urges educators to explore the broader implications of VLCs on the participants’ overall academic journeys. P3’s insight into VLCs creating an environment where theoretical knowledge transforms into



practical insights adds another layer to the complexity. This perspective underscores the multifaceted nature of learning outcomes within the VLC framework, emphasizing the potential for VLCs to bridge the gap between theoretical understanding and practical application. In essence, the Learning Outcomes dimension accentuates the need for tailored VLC implementation. Such implementations should not only enhance critical thinking skills but also consider individual learning needs, provide avenues for practical application, and potentially impact broader academic performance. Educators are positioned as architects of learning experiences, tasked with designing VLC structures that resonate with the diverse aspirations and expectations of participants, ensuring a holistic and impactful educational journey.

## **Discussion**

This study embarked on a comprehensive exploration of the effects from the integration of a VLC in a Critical Reading class, with a keen focus on Critical Reading Skills, Collaborative Learning, and Learning Outcomes for EFL students. The multifaceted nature of our investigation uncovered a rich tapestry of insights, unraveling both affirmative dimensions and intricacies requiring nuanced considerations. Within the domain of Critical Reading Skills, participants unequivocally recognized the affirmative impact of a VLC in augmenting their critical reading abilities. The exposure to diverse interpretations emerged as a cornerstone, aligning with established collaborative learning methodologies that accentuate the invaluable contribution of varied perspectives in elevating comprehension and analytical prowess (Sari & Wardhani, 2020; Sutherland & Incera, 2021). However, the path to enhancement was not devoid of obstacles. The asynchronous nature of discussions emerged as a focal point of concern, with certain participants expressing reservations about its potential hindrance to the depth achievable in face-to-face interactions (Anugerahwati et al., 2021; Slamet et al., 2025a).

Our findings resonate with the broader collaborative learning discourse, affirming the constructive role of diverse perspectives in fortifying critical reading skills. Yet, the acknowledgment of challenges in the asynchronous realm introduces a layer of complexity, urging educators to deliberate on the trade-offs inherent in virtual collaborative spaces. Navigating the Collaborative Learning dimension unraveled a spectrum of experiences among participants. While some celebrated the efficacy of group discussions fostered by VLCs, others ardently expressed a proclivity for individual learning, citing collaborative environments as potential distractions. This nuanced dynamic aligns with established collaborative learning paradigms (Byrnes et al., 2021; Han & Restra, 2020; Rao, 2019; Wu, 2018) but introduces a novel facet, underscoring the imperative for flexibility. The findings advocate for an approach that accommodates both collaborative and individual learning styles within the unique landscape of EFL education. Our study, in tandem with existing literature, affirms the positive impacts of collaborative learning in enhancing overall learning experiences. Nevertheless, the emphasis on the need for a malleable approach brings forth a crucial consideration for educators and instructional designers. Striking a balance that acknowledges and accommodates individual preferences while harnessing the collective potential of collaborative settings emerges as a critical pedagogical consideration (Karnchanachari, 2020; Kumi-Yeboah, 2018; Su et al., 2019).

The Learning Outcomes dimension painted a canvas marked by both hues of affirmation and shades of uncertainty. Participants acknowledged the constructive influence of VLC on critical thinking skills, attributing this enhancement to the diversified discussions facilitated by the virtual collaborative setting. This alignment with collaborative learning

methodologies (El-Esery, 2023; Ramli, 2022; Wafiroh et al., 2023) substantiates the positive correlation between collaborative learning and heightened engagement, constituting a catalyst for enriched learning outcomes. However, uncertainties cast shadows on this affirmative narrative. Participants raised concerns regarding the translation of acquired skills into practical applications and addressing specific learning needs effectively. This introduces a novel perspective, urging educators to delve into the intricacies of customization in VLC implementations. The call for tailoring virtual collaborative endeavors to cater to diverse learning needs represents a crucial nuance that could significantly impact the practical utility of acquired skills (Ferdiansyah et al., 2020; Rokhayati & Alvionita, 2022; Slamet & Mukminatien, 2024).

Comparing our findings with existing literature, we discern notable convergences and divergences. The positive impact of collaborative learning methodologies in enriching critical reading skills finds resonance in our study, reinforcing the broader understanding of the benefits derived from diverse perspectives (Shih, 2021; Su et al., 2019). Moreover, our emphasis on the challenges posed by asynchronous interactions and the imperative for flexibility in accommodating diverse learning styles introduces novel considerations. While collaborative learning paradigms have been celebrated for their efficacy (Rao, 2019; Thomas & Kim, 2019), our study highlights the importance of tailoring approaches to the unique context of EFL education, addressing challenges that may impede the seamless integration of virtual collaborative spaces.

Overall, this study contributes a nuanced perspective to the discourse surrounding the implementation of a VLC in a Critical Reading class for EFL students. The affirmation of positive impacts on critical reading skills, collaborative learning experiences, and learning outcomes is complemented by a discerning gaze into the challenges that require deliberate attention. Educators and instructional designers are encouraged to navigate the delicate balance between embracing the collaborative potential of VLCs and mitigating the challenges posed by asynchronous interactions. The imperative for flexibility in accommodating diverse learning styles emerges as a guiding principle, urging a tailored approach that considers the individual preferences and learning needs of EFL students. As the educational landscape continues to evolve, this study invites a continuous dialogue, prompting further investigations into the optimization of virtual collaborative tools for the enhancement of critical reading skills in EFL contexts. The journey towards refining instructional practices and fostering enriched learning environments for EFL students is both dynamic and ongoing.

## Conclusion

This study delved into the multifaceted impact of implementing a VLC in a Critical Reading class for EFL students, unraveling a complex interplay of positive outcomes and challenges. The exploration of critical reading skill highlighted the significant positive influence of the VLC on the participants' abilities, with exposure to diverse interpretations enriching their analytical acumen. However, the asynchronous nature of discussions emerged as a noteworthy challenge, signaling the need for a nuanced balance between the benefits of virtual collaboration and the limitations posed by the lack of real-time interaction. The collaborative learning dimension illuminated a spectrum of experiences, underlining the necessity for flexibility in accommodating both collaborative and individual learning preferences within the unique context of EFL education. Meanwhile, the learning outcomes dimension echoed the positive correlation between collaborative learning and heightened engagement; uncertainties arose regarding the translation of acquired skills into practical

applications and addressing specific learning needs effectively. This nuanced understanding advocates for a tailored approach to VLC implementation, recognizing the diverse needs and preferences of EFL students.

The implications of this study resonate across educational landscapes, urging educators to leverage the positive impacts of VLC on critical reading skills while navigating the challenges inherent in asynchronous interactions. The call for flexibility in accommodating diverse learning styles adds a crucial dimension to pedagogical considerations in EFL contexts. However, the study acknowledges its limitations, such as the context-specific nature of findings and the need for further research to establish broader generalizability. Moving forward, it is suggested that future research explores strategies to mitigate the challenges posed by asynchronous discussions, delves deeper into customization approaches for diverse learning needs, and examines the long-term impact of VLCs on EFL students' critical reading abilities. As educational technologies continue to evolve, this study contributes to the ongoing dialogue, emphasizing the dynamic nature of instructional practices in adapting to the changing needs of EFL learners.

### **Conflict of Interest**

The authors declare that they have no conflict of interest.

### **Declaration of Artificial Intelligence (AI) Usage**

The authors acknowledge the use of Artificial Intelligence (AI) tools, specifically ChatGPT by OpenAI, to assist with non-substantive aspects of manuscript preparation. These tools were used exclusively for grammar correction, language refinement, and stylistic improvements. All AI-generated outputs were reviewed and edited by the authors, who take full responsibility for the accuracy, content, and integrity of the manuscript.

## References

- Akbari, Z. (2015). Current challenges in teaching/learning English for EFL learners: The case of junior high school and high school. *Procedia - Social and Behavioral Sciences*, 199, 394–401. <https://doi.org/10.1016/j.sbspro.2015.07.524>
- Anugerahwati, M., Rachmajanti, F. S., & Noviyya, H. (2021). Maximizing students' critical reading through virtual literature circle strategy: A conceptual framework. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v5i3.8542>
- Basthomi, Y., Ivone, F. M., Kharis, M., & Slamet, J. (2025). Gamifying English proficiency: A needs analysis for EFL student course design. *Online Learning*, 29(2), 241–268. <https://doi.org/10.24059/olj.v29i2.4506>
- Byrnes, K. G., Kiely, P. A., Dunne, C. P., McDermott, K. W., & Coffey, J. C. (2021). Communication, collaboration and contagion: “Virtualisation” of anatomy during COVID-19. *Clinical Anatomy*, 34(1), 82–89. <https://doi.org/10.1002/ca.23649>
- Cortázar, C., Nussbaum, M., Harcha, J., Alvares, D., López, F., Goñi, J., & Cabezas, V. (2021). Promoting critical thinking in an online, project-based course. *Computers in Human Behavior*, 119(January). <https://doi.org/10.1016/j.chb.2021.106705>
- El-Esery, A. M. (2023). Implementing virtual literature circles for developing English learners' vocabulary acquisition and reading comprehension. *International Journal of English Language and Literature Studies*, 12(2), 74–85. <https://doi.org/10.55493/5019.v12i2.4723>
- Ferdiansyah, H., Rafi, M. F., Utama, A. P., Aprilia, T., & Slamet, J. (2025). Assessing learning outcomes and self-directed learning through gamification in LMS. *Social Sciences & Humanities Open*, 12, 101696. <https://doi.org/10.1016/j.ssaho.2025.101696>
- Ferdiansyah, S., Ridho, M. A., Sembilan, F. D., Sembilan, F. D., & Zahro, S. F. (2020). Online literature circles during the COVID-19 pandemic: Engaging undergraduate students in Indonesia. *TESOL Journal*, 11(3). <https://doi.org/10.1002/tesj.544>
- Han, S., & Resta, P.E. (2020). Virtually authentic: Graduate students' perspective changes toward authentic learning while collaborating in a virtual world. *Online Learning*, 24(4), 5-27. <https://doi.org/10.24059/olj.v24i4.2326>
- Hidayati, D., & Slamet, J. (2025). Interactive multimedia via LMS on a reading comprehension course: Enhancing engagement and learning outcomes in Islamic higher education. *Journal of Studies in the English Language*, 20(1), 95–122. <https://so04.tci-thaijo.org/index.php/jssel/article/view/277426>
- Judy Shih, H. (2021). The use of individual and collaborative learning logs and their impact on the development of learner autonomy in the EFL classroom in Taiwan. *Innovation in Language Learning and Teaching*, 15(3), 195–209. <https://doi.org/10.1080/17501229.2020.1737703>

- Karatay, H. (2017). The effect of literature circles on text analysis and reading desire. *International Journal of Higher Education*, 6(5), 65. <https://doi.org/10.5430/ijhe.v6n5p65>
- Karnchanachari, S. (2020). Promoting communicative self-efficacy and a positive attitude towards English language learning through a collaborative authentic task. *Journal : Language Education and Acquisition Research Network Journal*, 13(1), 210–224.
- Knoblauch, C. (2022). Combining and balancing project-based and blended learning in education. *International Journal of Advanced Corporate Learning (IJAC)*, 15(1), 35–44. <https://doi.org/10.3991/ijac.v15i1.27135>
- Kumi-Yeboah, A. (2018). Designing a cross-cultural collaborative online learning framework for online instructors. *Online Learning*, 22(4), 181–201. <https://doi.org/10.24059/olj.v22i4.1520>
- Mutakinati, L., Anwari, I., & Yoshisuke, K. (2018). Analysis of students' critical thinking skill of middle school through stem education project-based learning. *Jurnal Pendidikan IPA Indonesia*, 7(1), 54–65. <https://doi.org/10.15294/jpii.v7i1.10495>
- Ramli, N. N. (2022). The influence of virtual literature circles on students literary competence. *Journal of Nusantara Studies (JONUS)*, 7(2), 358–376. <https://doi.org/10.24200/jonus.vol7iss2pp358-376>
- Rao, P. S. (2019). Collaborative learning in English language classrooms. *ACADEMICIA: An International Multidisciplinary Research Journal*, 9(2), 5. <https://doi.org/10.5958/2249-7137.2019.00020.X>
- Rokhayati, T., & Alvionita, E. (2022). The use of online literature circles to enhance the students' critical reading skill. *Journal of Languages and Language Teaching*, 10(1), 94. <https://doi.org/10.33394/jollt.v10i1.4079>
- Romsi, A., Widodo, J. P., & Slamet, J. (2024). Empowering slow learners: Gamification's impact on students' engagement and academic performance in an LMS for undergraduate students. *International Journal of Information and Education Technology*, 14(2), 193–203. <https://doi.org/10.18178/ijiet.2024.14.2.2040>
- Sari, D. M. M., & Wardhani, A. K. (2020). Critical thinking as learning and innovation skill in the 21st century. *Journal of English Language and Pedagogy*, 3(2), 27–34. <https://doi.org/10.36597/jelp.v3i2.8778>
- Sasson, I., Yehuda, I., & Malkinson, N. (2018). Fostering the skills of critical thinking and question-posing in a project-based learning environment. *Thinking Skills and Creativity*, 29, 203–212. <https://doi.org/10.1016/j.tsc.2018.08.001>
- Slamet, J., & Basthomi, Y. (2024). Assessing gamification-based LMS for EFL students: A self-directed learning framework. *Studies in Linguistics, Culture, and FLT*, 12(2), 100–122. <https://doi.org/10.46687/CVHT3942.%20>
- Slamet, J., Basthomi, Y., Ivone, F. M., & Eliyanah, E. (2025a). A needs analysis for designing a gamification-based MOOC in English for specific purposes. *Studies in Linguistics, Culture, and FLT*, 13(1), 120–139. <https://doi.org/10.46687/ULRS1031>

- Slamet, J., Basthomi, Y., Ivone, F. M., & Eliyanah, E. (2025b). Promoting autonomous learning in ESP courses through a gamified MOOC platform: A self-directed learning framework. *Journal of Educators Online*, 22(2). <https://doi.org/10.9743/JEO.2025.22.2.7>
- Slamet, J., & Mukminatien, N. (2024). Developing an online formative assessment instrument for listening skill through LMS. *LEARN Journal: Language Education and Acquisition Research Network*, 17(1), 188–211. <https://so04.tci-thaijo.org/index.php/LEARN/index>
- Su, Y., Li, Y., Liang, J.-C., & Tsai, C.-C. (2019). Moving literature circles into wiki-based environment: The role of online self-regulation in EFL learners' attitude toward collaborative learning. *Computer Assisted Language Learning*, 32(5–6), 556–586. <https://doi.org/10.1080/09588221.2018.1527363>
- Sunani, S., Nadjmudin, M., Yeni, E., & Herman, H. (2021). Teaching critical reading through online. *Jurnal Pendidikan Bahasa Inggris Undiksha*, 9(1), 9. <https://doi.org/10.23887/jpbi.v9i1.30012>
- Sutherland, A., & Incera, S. (2021). Critical reading: What do faculty think students should do? *Journal of College Reading and Learning*, 51(4), 267–290. <https://doi.org/10.1080/10790195.2021.1887777>
- Tang, S., Long, M., Tong, F., Wang, Z., Zhang, H., & Sutton-Jones, K. L. (2020). A comparative study of problem-based learning and traditional approaches in college English classrooms: Analyzing pedagogical behaviors via classroom observation. *Behavioral Sciences*, 10(6), 105. <https://doi.org/10.3390/bs10060105>
- Thomas, D. M., & Kim, J. K. (2019). Impact of literature circles in the developmental college classroom. *Journal of College Reading and Learning*, 49(2), 89–114. <https://doi.org/10.1080/10790195.2019.1582371>
- Wafiroh, L. H., Retnaningdyah, P., & Munir, A. (2023). The power of virtual literature circles to cultivate text connection through student's role in reading novel: A case study in critical reading class. *Proceedings of the 69th TEFLIN International Conference in Conjunction with the 3rd English Education International Conference (EEIC)*.
- Widodo, J. P., Musyarofah, L., & Slamet, J. (2025). The impact of digital-interactive-book gamification-based instruction on academic learning outcomes of students who learn at their own pace: Insight from Indonesia. *MEXTESOL Journal*, 49(2), 1–11.
- Wu, J. (2018). Application of computer aided collaborative learning model in English virtual electronic teaching. *International Journal of Emerging Technologies in Learning (IJET)*, 13(07), 137. <https://doi.org/10.3991/ijet.v13i07.8801>

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