

In Memoriam

In Memoriam: Dr. Karen Swan

Dr. Peter Shea, Editor-in-Chief, Online Learning
University at Albany, State University of New York, USA



Dr. Karen Swan

The community that makes up the Online Learning journal lost a colleague, leader, and dear friend recently. Dr. Karen Swan, a founding member of the Online Learning Consortium and the James J. Stukel Distinguished Professor of Educational Leadership at the University of Illinois Springfield passed away on September 5, 2021. Karen was a central figure on the editorial board of this journal, and we will miss her wisdom, kindness, and spirit.

A graduate of Columbia University's Teachers College, Karen was a member of the International Adult and Continuing Education Hall of Fame, a compassionate teacher, and an inspiration to many younger scholars aspiring to contribute to the field. She taught online for more than 20 years and this work informed her research on learning effectiveness, interactivity, the Community of Inquiry framework, and social presence, as well as issues affecting the retention and progression of online undergraduate students.

Her scholarly publications include more than 160 published articles, proceedings, and book chapters: three books, and numerous multimedia programs. Karen led or participated in hundreds of presentations and served on nearly 40 dissertation committees, including doctoral candidates from around the world. She oversaw funded research projects of over \$2.7 million. Karen was widely recognized for her research and received the Sloan-C award for Outstanding Achievement in Online Learning by an Individual and was a member of the Sloan-C Inaugural Class of Fellows.

Karen was named the 2010 Distinguished Alumni from Teachers College, Columbia University and received the 2014 Burks Oakley II Distinguished Online Teaching Award. She served on the editorial review boards for the *Educational Psychologist*, *International Journal of Instruction*, *Internet and Higher Education*, *Journal of Asynchronous Learning Networks*,

In Memoriam

and *Journal of Distance Education*. She was a special issue editor for OLJ bridging the Online Learning Consortium (OLC) with the American Educational Research Association (AERA) through this work.

Karen was also a close, personal friend and mentor to me and many others in the Educational Technology field. In 2004, when I decided to step down from an administrative position at the State University of New York, she encouraged me to apply for the position she was then vacating at the University at Albany and served as a reference for me. I was hired for the position and moved into her old office. I, like so many others in the field, owe a great debt of gratitude to Karen Swan.

Our community has suffered a deep loss and we mourn Karen's passing as we celebrate her warmth, humanity, generosity, commitment, and singular contributions to the field.

Introduction to the Special Issue: Highlighting AERA's Online Teaching and Learning SIG 2021

Daniela Castellanos-Reyes
Purdue University, USA

Jennifer Richardson
Purdue University, USA

Karen Swan
University of Illinois – Springfield, USA

The American Educational Research Association (AERA) is a professional organization representing researchers in the United States and globally in their efforts to improve education by encouraging academic inquiry and implementing of educational research results. Since 1916, AERA has connected scholars worldwide from approximately 96 countries. Each year, around 14,000 attendees engage in scholarly discussions in more than 2,600 sessions. In 2021, the annual meeting theme was “Accepting Educational Responsibility,” reflecting the interdisciplinary background of its 25,000 members. During the 2021 meeting, AERA members adapted to a virtual format after the cancellation of the 2020 annual meeting due to the COVID-19 pandemic.

As part of AERA, the Online Teaching and Learning (OTL) Special Interest Group (SIG) leads the discussion on the latest research, achievements, and trends in higher education, K-12, and workplace online teaching and learning. In 2021, the OTL–SIG sponsored 17 sessions resulting in a stimulating and multifaceted conversation that translated systematic research into practical recommendations for online learning practices. For more information about the OTL SIG, please visit their website <https://www.aera.net/SIG035/Online-Teaching-and-Learning-SIG-35>. The OTL–SIG and the Online Learning Consortium (OLC) have a long-lasting partnership to communicate the latest research to practitioners. Since 2016, the OLC has sponsored a special issue of *Online Learning* journal (OLJ) with research papers presented by members of OTL–SIG at the annual meeting.

The ten research articles in this year's issue showcased research devoted to advancing high-quality online learning around four themes: learner engagement, the use synchronous video-based communication to support teaching, instructors' perspectives and experiences, and pedagogical recommendations.

The first category of studies centered on student engagement. In “What We Learned When We Compared Discussion Posts from One MOOC Hosted on Two Platforms,” Rebecca M. Quintana, Juan D. Pinto, and Yuanru Tan detailed how different discussion board structures

in Massive Open Online Course (MOOC) effected student engagement in discussion boards through content analysis of 194 students' posts. The authors found that learners' answers to the proposed prompts were more assertive when MOOC platforms forced them to respond to a discussion prompt before seeing peers' comments. Conversely, when peer comments were open to view prior to posting, learners engaged in reflective and persuasive discourse without answering the discussion prompts. Their study provides practical recommendations for MOOC developers and instructional designers.

In "A Case Study of Learners' Engagement in Mobile Learning Applications," Chenxi Liu and OTL SIG chair Ana-Paula Correia used a case-study design to investigate the top six mobile learning applications from a customer engagement perspective. Using inductive coding, the authors analyzed 2,064 customers' reviews posted in Google Play and Apple Stores to identify the factors impacting learners' engagement with mobile learning applications. Their results show that usability, course availability, learning features (e.g., note-taking), interpersonal interaction, and incentives for completion were critical factors to maintain student engagement. Liu and Correia's study was an innovative interdisciplinary integration of education and marketing perspectives to understand learner engagement. Readers will find practical recommendations for developers of mobile learning applications, students, and instructors alike.

The final study in the learner engagement strand, "Learning presence and the reconceptualization of language and literacy teachers' online professional development," was by Faridah Pawan, Rajagopal Sankaranarayanan, Rodney Myers, and Dorcas Miao. The mixed methods study examined how online instructors' learning engagement shapes their teaching practices. The authors found that instructors enrolled in an online professional development program to meet "professionalization and professionalism" goals while being online learners. Using content analysis of online discussion boards, survey responses, and interviews of 17 instructors, they found that this online professional learning allowed instructors to obtain a credential and test their ideas about teaching online while being learners. Pawan and colleagues' study informs those interested in online instructors' professional development and serves instructional designers, administrators, and instructors alike.

Two of our studies addressed synchronous video-based communication. First, Patrick Lowenthal, Richard West, Leanna Archambault, Jered Borup, and Eric Belt examined how the COVID-19 pandemic changed "Faculty Perceptions of Using Synchronous Video-based Communication Technology." The study used an explanatory two-phased, sequential, mixed-methods and included 336 survey responses and 18 interviews. The authors contended that most traditional online learning relied on asynchronous text-based communication, yet synchronous video-based communication became more widely used during the COVID-19 pandemic. The researchers found that video-based communication had several challenges like fatigue and distraction despite instructors feeling satisfied with using it for teaching and non-teaching work alike due to its flexibility. The authors conclude that video-based communication is likely to remain as a tool in online teaching and learning. Therefore, they invite the educational technology community to guide faculty on how to use it strategically.

Like Lowenthal and colleagues, Cynthia Carson and Jeffrey Chopin also focused on the potential of synchronous video communication to support teaching. They studied the implementation of virtual coaches in "Coaching from a Distance: Exploring Video-based Online Coaching." Their NSF-funded study explores the trajectory of nine math coaches who use video-

based coaching to support rural teachers. Their analysis of pre- and post- intervention lesson plans and interviews showed that video-based online coaching allowed teachers and coaches to establish a trusting and productive collaboration despite the lack of in-person interaction. Professional development researchers and math coaches will find Carson and Chopin's work gives insightful examples of what math coaches *do* and *why* they do it during coaching cycles. The authors conclude that video-based coaching efficient tool to connect geographically distant teachers and experts, and therefore, it merits scalation to reach a larger audience.

The third category of this special issue pivots to faculty perspectives and experiences in online environments. First, Katrina Borowiec, Deoksoon Kim, Lizhou (Jo) Wang, Julie Kim, and Stanton Wortham's study "Supporting Holistic Student Development Through Online Community Building" won the 2021 Best Research Paper Award of the OTL SIG. Using an exploratory sequential mixed method study, answered the questions *How did faculty foster a sense of community online to support students' holistic well-being during the COVID pandemic? What strategies can faculty use to create community and foster well-being in online courses?* Their rich data that included faculty interviews (n = 37), course evaluations (n = 13), and survey responses (n = 347) showed that successful strategies focused on purposeful course design, establishing expectations, and fostering a trustworthy learning environment. Borowiec and colleagues found that instructors used many techniques closely tied to teaching and social presence to sustain a holistic online community during the COVID-19 pandemic. Their work is valuable to understand how faculty from different disciplines experienced remote teaching.

Next, in "Teaching Presence in Online Courses: Similar Perceptions but Different Experiences from Multiple Instructor Perspectives," Murat Turk, Aly Ceyhum Muftuoglu, and Sinem Toraman used a qualitative-multiple case study to understand online instructors' perceptions and experiences while teaching. They interviewed nine online instructors and found that pre-course design is a critical factor of online instructors' overall experiences of feeling present while teaching. This article will be particularly useful for those investigating the nuances between teaching and instructor presence in online learning.

In the final category, three studies provided pedagogical recommendations to enhance online teaching and learning. First, the study "Exploring Online Pedagogical Practices for Enhancing Transfer of Learning in Higher Education" by Tamara Galoyan, Kristen Betts, Brian Delaney, and Mariette Fourie built on their previous work on the Integrative Transfer of Learning (ITL) Model to explore the perceptions of online graduate students about the transfer of learning and draw pedagogical recommendations for practitioners. Employing an exploratory sequential mixed methods design, the interview results of seven graduate students confirmed that the ITL model reflected their conceptualization of transfer of learning. Then, drawing on survey data (n = 68), the authors provide valuable recommendations on pedagogical practices that enhance the transfer of learning that can inform instructors' decisions. Galoyan and colleagues' work is a timely approach to address how online learning fosters transferring skills and experiences from the classroom to the workplace.

In "An Exploratory Examination of Student-Led, Asynchronous Collaborative Online Discussions in Fostering Higher Order Cognitive Skills and Ethical Leadership Learning," Graziella Pagliarulo McCarron, Larisa Olesova, and Brianna Calkins analyzed online discussion boards at the beginning, middle, and end of an Ethics and Leadership class. Their three-point analysis (n = 35) showed that students achieved cognitive and ethical leadership skills, yet

demonstrations of their skills decreased by the end of the course. The authors contend that factors like video conference fatigue and end-of-term exhaustion decreased engagement in discussions. Their work provides readers with a holistic view of how online learning can support leadership training.

Additionally, Yishi Long and Adrie Koehler focused on pedagogical recommendations for online discussion facilitation in “Student Participation and Interaction in Online Case-Based Discussions: Comparing Expert and Novice Facilitation.” Through mixed-method social network analysis, Long and Koehler described how expert instructors who initiated online discussions result in more active student interactions. Although the authors observed that both novice and expert instructors used similar facilitation strategies like social congruence, cognitive congruence, and content expertise, they found that novice instructors varied their approaches less. Their fresh look to discussion forums provides pragmatic recommendations to instructors and professional development programs for online teaching and learning.

We would like to extend our special thanks to OJL editor-in-chief Peter Shea, OJL managing editor and OTL–SIG program chair Mary Rice, and OTL–SIG chair Ana-Paula Correia. We also sincerely appreciate our authors’ effort in making this special issue possible.

Finally, this year’s special OLC/SIG–OTL issue mourns the loss of Dr. Karen Swan, who was an impressive scholar and a founding Executive Board member of the OJL and the OLC, and an editor for this special issue. She passed away peacefully on September 5, 2021, amid the preparations for the final version of this special issue. Dr. Swan’s efforts to think constructively and collaboratively about online learning have shaped the online learning field. Likewise, her exemplary mentoring touched the hearts of countless students throughout her career. We are deeply humbled to have worked with Dr. Swan. Therefore, this special issue honors her lifelong career.

- Daniela (Ela) Castellanos-Reyes, Doctoral Student, Learning Design and Technology program, Curriculum and Instruction Department, Purdue University, USA; casteld@purdue.edu
- Jennifer C. Richardson, Professor, Learning Design and Technology program, Curriculum and Instruction Department, Purdue University, USA; jennrich@purdue.edu
- Karen Swan, Stukel Professor of Educational Leadership, University of Illinois-Springfield, USA

What We Learned When We Compared Discussion Posts from One MOOC Hosted on Two Platforms

Rebecca M. Quintana
University of Michigan, USA

Juan D. Pinto,
University of Illinois at Urbana-Champaign, USA

Yuanru Tan
University of Wisconsin-Madison, USA

Abstract

We compared discussion posts from a data science ethics MOOC that was hosted on two platforms. We characterized one platform as “open” because learners can respond to discussion prompts while viewing and responding to others. We characterized the other platform as “locked” because learners must respond to a discussion prompt before they can view and respond to others. Our objective is to determine whether these platform differences are consequential and have the potential to impact learning. We analyzed direct responses to two discussion prompts from two modules located in modules two and six of an eight module course. We used conventional content analysis to derive codes directly from the data. Posts on the “open” platform were characterized by failure to completely address the prompt and showed evidence of persuasion tactics and reflective activity. Posts on the “locked” platform were characterized by an apparent intent to complete the task and an assertive tone. Posts on the “locked” platform also showed a diversity of ideas through the corpus of responses. Our findings show that MOOC platform interfaces can lead to qualitative differences in discussion posts in ways that have the potential to impact learning. Our study provides insight into how “open” and “locked” platform designs have the potential to shape ways that learners respond to discussion prompts in MOOCs. Our study offers guidance for instructors making decisions on MOOC platform choice and activities situated within a learning experience.

Keywords: online learning, discussion forums, discussion boards, usability

Quintana, R. M., Pinto, J. D., & Tan, Y. (2021). What we learned when we compared discussion posts from one MOOC hosted on two platforms. *Online Learning, 25*(4), 7-24.
DOI: 10.24059/olj.v25i4.2897

In both face to face and online learning contexts, discussion is a key aspect of social learning (Cohen et al., 2003; Conole, 2014; Kellogg & Oliver, 2014). Within the context of Massive Open Online Courses (MOOCs), fostering rich social interaction is challenging, because features of MOOC platforms are limited, and instructors must rely on discussion forums as a primary space for learners to interact (Almatrafi & Johri, 2018). There are other potential challenges associated with fostering meaningful peer-to-peer interaction within MOOCs, including low participation rates (Bruff et al., 2013), limited instructor involvement in discussions (Chandrasekaran et al., 2015), and interface usability issues (Azhar & Santoso, 2019). Scholars have noted that the chaotic structure of forums can create a disjointed experience for learners who must piece together fragmented threads (c.f., Almatrafi & Johri, 2018). Other research has shown that most discussion forum posts serve to highlight information acquisition, rather than critical thinking (c.f., Bonafini et al., 2017). Yet, despite these known limitations, MOOC instructors continue to use forums for discussion-oriented activities because they offer opportunities for learners to respond to open-ended prompts and engage in higher order cognitive tasks (Ferguson & Sharples, 2014).

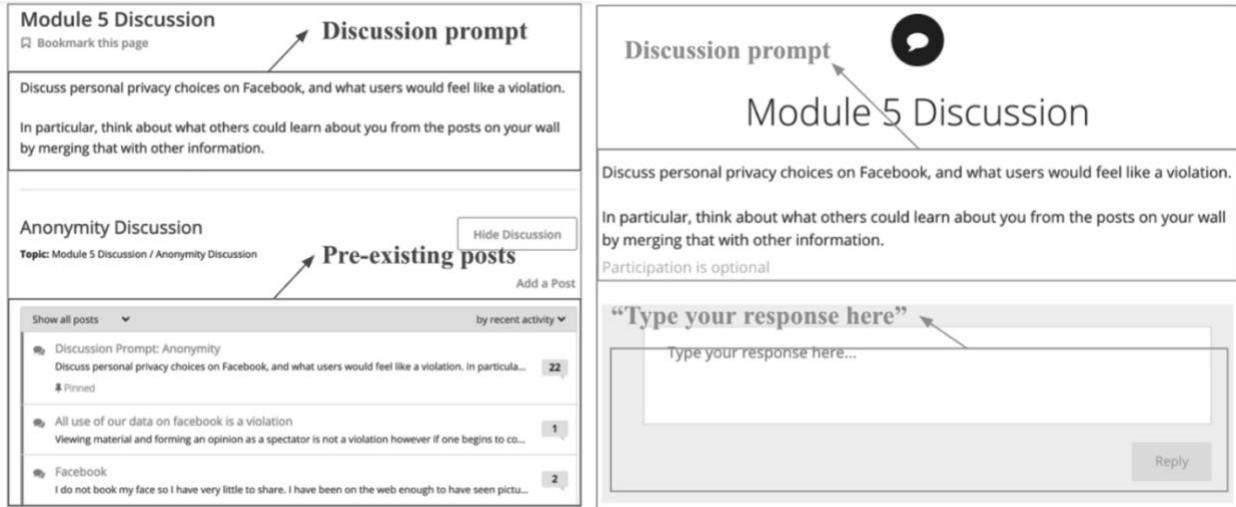
The question at the heart of this study is *how might differences in MOOC platform interfaces influence discussion post characteristics?* A related question is if MOOC platform interfaces have the potential to shape discussion posts, *how might these differences matter for learning?* MOOC discussion forum interfaces differ in important ways. Notably, on platforms whose discussion forums we would characterize as “open,” learners are shown discussion prompts alongside responses that learners have already given. This provides learners an opportunity to peruse the responses of others before submitting one of their own. On platforms that we would characterize as “locked,” learners are shown a discussion prompt and must submit a response before they can view and respond to the posts of others. Given that there are such differences, research is needed to understand ways in which platform interface differences are consequential to the learning experience. A deeper understanding of these outcomes could influence platform choice from the outset. Once the platform is selected, research findings could guide the selection and creation of learning activities for specific platforms.

To explore this issue, we qualitatively examined discussion posts of learners who enrolled in a data science ethics MOOC offered on two platforms: edX (edX Inc., 2020) and Coursera (Coursera Inc., 2020). The course design was the same in every respect (i.e., all lecture videos and discussion prompts were identical), except that some learners took the course on edX and others took it on Coursera. Building on earlier studies of this MOOC that showed differences in interaction patterns in discussion forum activity across platforms (Tan & Quintana, 2019; Tan et al., 2020), the present study investigated how platform interfaces may influence *qualitative* aspects of learners’ responses to discussion posts. Specifically, we sought to understand how learners responded when they were shown an active discussion forum prior to submitting a response (i.e., on edX) compared to learners who were not shown an active discussion forum prior to submission (i.e., on Coursera). Throughout this study, we called the edX interface “open” and the Coursera interface “locked.” Our study consisted of a content analysis and did not require us to alter the platform interfaces in any way. All discussion forums were “open” on edX and “locked” on Coursera by default or by virtue of interface design decisions made by platform providers. MOOC instructors and learning experience designers did not have the ability

to alter these interfaces, setting them to “open” or “locked.” Furthermore, the data science MOOC discussion prompts did not request that learners respond to their peers; instead, the prompts offered learners an open-ended question that focused on a data science issue raised in the lecture materials.

Figure 1 illustrates differences in the user interfaces that learners used to interact with discussion prompts on edX and Coursera, respectively.

Figure 1
Platform differences between Coursera and edX.



Note. The differences in the way that learners interact with discussion prompts on edX and Coursera. Left: On edX (open), pre-existing posts are visible to learners before they respond to a prompt. Right: on Coursera (locked), learners are asked to respond to the prompt without seeing historic posts.

Literature Review

MOOCs have long been associated with individualistic models of instruction and transfer-oriented pedagogies (Eisenberg & Fischer, 2014). Although some early MOOC designs (i.e., cMOOCs) promoted collectivist approaches and constructivist pedagogies (c.f., Downes, 2009), the xMOOC model is by far the most dominant type of MOOC, and its associated pedagogies (i.e., transfer-oriented, self-paced) are reinforced by platform affordances. While some design efforts have been made to create opportunities for deep learning in large-scale, open access learning environments through the advancement of community-oriented instructional models (c.f., Quintana et al., 2020; Håklev & Slotta, 2017), these efforts have largely focused on pedagogical decisions within the course, including careful placement of instructional items within a course sequence (Quintana & Tan, 2021), development of co-dependent activity structures (Emmanuel & Lamb, 2017), and creation of effective participant structures (Quintana et al., 2020). Since MOOC discussion forums remain the primary mode of learner-to-learner interaction within at scale learning environments, more research is needed to understand how learners use platform affordances to respond to discussion prompts and to engage with peers. Our literature review elucidates how learners’ use of discussion forums has changed over time revealing new challenges associated with their use. We also describe existing research on the user interface design within MOOCs and situate the present study within prior research on dual platform comparisons and qualitative analysis methods used in the context of MOOC discussion forums.

Recent studies by learning analytics scholars have identified trends in learners' use of MOOC discussion forums that shed light on possible challenges associated with their continued use. Poquet et al. (2018a) found that over multiple iterations of the same MOOC categories of learners tended to remain consistent (e.g., drop-ins, occasional posters, hyper-posters), while group activity has generally decreased. This suggests that learners are losing interest in using discussion forums to create social spaces for learning. Research on how learners perceive social presence in MOOCs supports this assertion. For example, Poquet et al. (2018b) found that learners generally reported higher social presence scores in smaller courses, though all MOOC learners—regardless of course size—experienced a low sense of familiarity, emotional connection, and trust. Both studies show that a variety of factors can influence learner behavior in discussion forums, including their perceived usefulness as a social space for learning and perceived social presence relative to cohort size.

Existing research on MOOC platform design has thus far focused mostly on user experience design, including studies that use heuristic evaluation techniques to identify interface problems on individual MOOC platforms (Glory et al., 2019; Hanifa et al., 2019). With respect to user experience design, Hanifa et al. (2019) evaluated the Coursera MOOC platform using Shneiderman's (1997) interaction design principles and Gagné et al.'s (1992) principles of instructional design. Concerning discussion forums, Hanifa et al. (2019) made recommendations to increase the visibility of the entry field for direct responses and to minimize entry fields for replies. Glory et al. (2019) evaluated the edX platform following the same criteria adopted by Hanifa et al. (2019) and reported that the "add a post" and "add a response" buttons on edX discussion forums could be more self-evident if they were repositioned on the interface. Research that compares MOOC platforms has also focused on usability (c.f., Tsironis et al., 2016) and user satisfaction with respect to how various platform features support learning activities (Oktavia et al., 2018). Such usability and user studies do not shed light on the intersection of platform design and learning.

The present study examined the same data science ethics MOOC studied by Tan & Quintana (2019) and Tan et al. (2020), who focused on how learner interaction might differ across MOOC platforms using social network analysis and clustering analysis methods. These two studies in combination revealed that learners on the edX platform who were more interest driven as indicated in their responses in the pre-course survey demonstrated higher engagement in discussion forums than learners on Coursera, who were more motivated by career advancement. Building on this earlier work (Tan & Quintana, 2019; Tan et al., 2020), the present study aimed to scrutinize the *content* of learners' discussion posts and so qualitative approaches must be considered. Although qualitative methods are rarely used in at-scale learning environments, Wong et al. (2015) provide an example of qualitative methods being used to identify the types of knowledge exchange associated with Bloom's taxonomy occurring in a MOOC discussion forum. Dowell et al. (2018) used group communication analysis methods to understand how the frequency of posting activity might influence the quality of MOOC discussion posts. They found that increased posting activity correlated with reduced quality of conversation, and vice versa. Such qualitative approaches to analysis are more commonly found in formal higher education contexts that are not implemented at scale. For example, Hara et al. (2000) found that students' conversations that exhibited higher order cognition usually contained explicit references to peers' posts based on a qualitative content analysis of a graduate level psychology course's asynchronous discussion forum. In another example, McLoughlin and

Mynard (2009) used qualitative content analysis to identify evidence of higher-order thinking processes in a 20-week semester undergraduate online discussion forum. We similarly used qualitative content analysis in this study, though we did so to compare learner discussions on two distinct MOOC platforms. We detail the specifics of our data set and approach to analysis in the Methods section below.

For the present study, our objectives were to provide instructional teams with findings to support decision-making around platform choice and to enable them to tailor discussion activities based on platform affordances.

To meet the stated objectives, we pursued the following research questions:

1. In what ways are learners' discussion posts qualitatively different when answered on an "open" platform or a "locked" platform?
2. How might differences in MOOC platform interfaces influence qualitative aspects of discussion posts? (i.e., "open" or "locked")
- 3.

Method

Context

We examined discussion posts from a data science ethics MOOC created by a large U.S. Midwestern university. The course presented issues related to the ethics of data and was intended for data scientists and decision-makers across any professional domain. The course offered a series of case study videos that provided a basis for engaging in discussion around issues such as who owns data and how we value privacy. The course also presented a framework for analyzing various issues, including how to approach data-driven algorithms and avoid unintended bias. The course consisted of eight modules, with one case study and discussion prompt per module.

Participants

Demographic data of learners across platforms were similar. On Coursera, roughly two-thirds of learners were male, roughly half were between the ages of 25–39, and half had completed a master's degree before enrolling in the course. On edX, three-quarters of learners were male, just under half were between the ages of 25–39, and 40% had completed a master's degree before taking the course.

Data Sources

We analyzed discussion posts from two modules of the course, called Prompts 1 and 2 in this study (see Appendix A). Prompt 1 was located in module two of the course and Prompt 2 was located in module six of the course. The first prompt asked learners to consider whether customers should be informed or give consent when a company uses their data to inform market strategy and a trade journal article. Our rationale for choosing this prompt was that the prompt asked learners to reason about a given problem, which would allow them to demonstrate critical thinking, going beyond information acquisition (the issue highlighted by Bonafini et al., 2017). The second prompt asked learners to express concerns about validity with respect to the design of a survey. Our rationale for selecting this prompt was similar in that the prompt asked learners to engage in a problem-solving activity. The discussion forums were not facilitated by an instructor, so instructor presence is not a relevant factor in our analysis.

We examined data from only the first six months that the course ran on each platform to eliminate the potential effects of a platform marketing intervention on one of the platforms where learners were essentially prompted to pay a small fee to continue in the course. The course was released "on demand," so all course materials and discussion prompts were available from the outset and for the full six months of our study. On edX, 6,058 learners enrolled and on Coursera

1,204 learners enrolled during this six-month timeframe. We studied only *direct responses* to prompts because we wanted to understand how platform interfaces (i.e., “open” or “locked”) might influence qualitative aspects of discussion posts *at the point of interaction* with the prompt itself. Our choice to study direct responses only relates to the instructional goal of providing discussion opportunities within the course, which was to offer learners an opportunity to engage with data science issues presented by the instructor through a video lecture. Although it may have been a hoped-for outcome, the prompts themselves did not extend an explicit invitation to learners to interact with other learners in the course.

Our dataset consisted of 110 Coursera posts and 16 edX posts for Prompt 1 and 54 Coursera posts and 14 edX posts for Prompt 2. Enrollment was five times higher on edX than on Coursera, so it appears that there was a disproportionately low number of posts on edX compared with Coursera. We will elaborate on possible explanations for this difference in the discussion, including that Coursera’s linear platform design makes it appear that learners must progress sequentially through all course items. Another reason could be that the visibility of all learners’ posts on edX offers learners many posts to peruse, leaving them with less inclination or time to submit a response of their own.

Approach to Analysis

We employed a conventional content analysis, which starts with observation of the data and derives codes directly from the data (Hsieh & Shannon, 2005). This method was well-suited to our study because existing literature on the intersection of platform interface and discussion post content is extremely limited. We collected and uploaded data into a cloud-based, qualitative software, which allows for collaborative coding by multiple users. The primary coder first created a preliminary codebook using an inductive and iterative approach to category creation (Thomas, 2006). They then coded 30 posts each from prompt 1 (alongside coder 2) and prompt 2 (alongside coder 3). After meeting and discussing the results, the primary and second coder established a pooled Cohen’s kappa (de Vries et al., 2008) of 0.73 for question 1 using 30 different excerpts, and the primary and third coder established a pooled kappa of 0.89 for question 2 using another 20 excerpts. The second and third coders then coded the rest of the dataset for Prompts 1 and 2, respectively, using the finalized codebook (see Appendix B). We then used these final codings to calculate the mean, standard deviation, and confidence interval (at 95%) for each platform-code combination. We compared results between the two platforms by conducting a two-tailed, two-sample t-test for each code.

Results

We now present qualitative characteristics of discussion posts on the “open” and “locked” platforms, organized by each prompt. As shown in Appendix A, prompt one described a mood manipulation experiment run by a social media platform and asked whether this company should inform users of this experiment and obtain consent before publishing results in a trade journal. Prompt two asked learners to surface validity concerns for a survey created by a parent company on user satisfaction of a product from a subsidiary company.

Prompt One

For prompt one, we coded whether learners addressed all aspects of the prompt completely, partially, or not at all. Our initial reading of the data showed that variation existed in the substantiveness of responses, so our analysis probed this difference with respect to “open” and “locked” platform interfaces. Learners who took the MOOC on the “locked” platform answered the prompt in its entirety more often than those on the “open” platform.

Learners on the “open” platform failed to answer the prompt 37.5% of the time, whereas learners on the “locked” platform did not answer the prompt 7.3% of the time ($p < 0.001$, indicating high statistical significance despite the small “open” platform sample size). Appendix B provides representative examples of each category: completely, partially, or not at all.

Our initial reading of the data suggested that the “degree of completeness” might relate to a learner’s intent in engaging with the prompt. Our inductive approach to analysis culminated in three codes, and for each response we coded whether learners’ intent was to complete the task, persuade, or reflect. Responses that were coded as “intent to complete the task” were generally succinct and to the point, without an explanation or reasoning behind the response. An example of a response that we coded as “intent to complete the task” reads: *Yes, they should inform; yes, take consent*. Responses that were coded as “intent to persuade” tended to use examples, explanations, or rhetorical moves to support a point of view. An excerpt of a response that we coded as “intent to persuade” reads:

I don’t believe that Company X needs to inform its customers about this effort or obtain consent. Company X is doing a straight A/B test—they are not conducting an experiment to see whether the stories change buying behavior.

An excerpt of a response that we coded as “reflect” reads: *It could go either way but consent from the users would be good because this was affecting their emotions*. On the “locked” platform, 31.8% of responses were coded as “intent to complete task,” as opposed to 6.3% on the “open” platform ($p < 0.05$). Learners on the “open” platform demonstrated evidence of persuasion tactics and reflective writing.

Related to the idea that learners might have varying intentions when providing responses to discussion prompts, we also coded confidence levels, either assertive or tentative for each response. Responses that were coded as “assertive” used language that was sure and direct, without any indication of caution, indecisiveness, or ambiguity. Responses that were coded as “tentative” used hedging phrases such as “I think,” “perhaps,” and “it seems.” Responses were generally more assertive on the “locked” platform (50.9%) compared to the “open” platform (43.8%), although we did not find this difference to be statistically significant.

Prompt Two

For prompt two, we generated a codebook that characterized various validity concerns surfaced by learners in their responses. Validity concerns encompassed some of the following: leading questions, sampling bias, participation bias, other types of selection bias, and poor-quality responses (e.g., one- or two-word answers). Our codebook also included several learner-generated improvements, such as including customers outside of the subsidiary company’s customer base, alternative data collection methods, and restructuring of sampling methods. We observed a wider *variety* of responses on the “locked” platform, indicated by the fact that three of our codes ($n = 12$) only applied to this, and not the “open,” platform. We also observed a unique phenomenon in the “open” platform where learners referred to others’ posts, even within the direct responses to prompts we analyzed (as opposed to nested replies to others’ responses). We would not have expected to see this behavior on the “locked” platform, since discussion posts of others did not become visible to learners until after submission.

Discussion

The results of our analysis hint at some possible underlying explanations and their implications for learning design. Learners on the “open” platform may have failed to fully answer the prompt because they saw that other learners had already provided a valid response and therefore did not see value in reiterating what had already been said. Instead, they offered a different perspective that might have been complementary but could not be coded as “completely answers the prompt.” We also witnessed reflection activity and persuasion tactics on the “open” platform. It is perhaps surprising that learners engaged in reflective activity in the presence of others (a somewhat personal endeavor), but they may have seen value in sharing formative ideas to engage in collective forms of inquiry, rather than individualistic ones. Additionally, as learners were aware of other perspectives, it is not surprising that they referenced existing ideas and engaged in persuasion tactics to convince others of the validity of their own views. While the present study did not examine learners’ responses to other learners’ posts (only direct responses to the prompt), the finding from Tan & Quintana (2019) showing that the edX network had higher network centrality and cohesion is consistent with the idea that learners appeared to exhibit greater awareness of other learners in the course. On the “open” platform, we also saw that learners tended to use less assertive language than on the “locked” platform. A potential interpretation of the use of more tentative language used in responses may be that the “open” platform design caused learners to feel intimidated by the presence of other learners in the course. Poquet et al.’s (2018b) finding that MOOC learners experienced a low sense of familiarity, emotional connection, and trust regardless of cohort size, could support the assertion that learners on the “open” platform felt a sense of unease in the presence of other learners. Open platform interface designs may reinforce a learner’s sense that they are engaging with unknown peers in a course.

Learners on the “locked” platform may have viewed posting responses to discussion prompts as a necessary task within a learning sequence. Learners may have perceived that providing a response was fulfilling a requirement that allowed them to move towards a goal of course completion. Although most MOOC platforms do not have a mechanism for instructors to grade the quality of discussion posts and generally do not allow discussion activity to count towards a final grade, the user interface of the “open” platform design may have made interaction with the discussion prompt seem less compulsory than that of the linear user interface on the “locked” platform design. Furthermore, the “locked” platform shows learners a green checkmark when an item is complete, further reinforcing a “completionist” mindset. We noted that responses on the locked platform had a more “assertive” level of confidence, using language that was clear and sure. Thus, the “locked” platform design seemed to cultivate attributes of efficiency and task completion. Tan et al.’s (2020) earlier finding that the most engaged learners on the Coursera platform were career motivated, rather than interest driven, supports the idea that learners on the “locked” platform had a more individualistic mindset. This finding is also consistent with Poquet et al.’s (2018a) research that suggested that “contemporary” MOOC learners are finding less value in using discussion forums as a space for social learning.

Our study shows that differences in platform interfaces do promote qualitative differences in discussion posts, which have the potential to impact learning. Our study also provides guidance for design teams on platform selection, relative to instructional goals. If it were important for every learner to engage directly with ideas presented, it would be worthwhile knowing that “open” platforms do not necessarily advance that goal. Instead, instructional teams might choose to use a “locked” platform design to advance that learning goal. If showcasing

diversity of ideas shared within a community was a pedagogical goal (Scardamalia & Bereiter, 2006), an “open” platform design might not achieve this, a somewhat counterintuitive finding. In fact, we found that learners on the “locked” platform also presented a wider range of ideas, which suggests that a productive instructional strategy could be to ask learners to engage with an idea individually before sharing with the larger community (as on Coursera). If providing opportunities for learners to make persuasive arguments was a critical instructional objective, then situating discussion prompts within an “open” platform could help achieve this goal. If an instructional objective is to promote deep reflection (Boud et al., 1985), a “locked” discussion forum design may not necessarily foster that activity, as learners interacting on this platform tend to adopt a “completionist” mindset.

Our study provides insight into how “open” and “locked” designs have the potential to shape the way learners respond to discussion prompts and can thus guide instructors towards making decisions about MOOC platforms and instructional activities situated within a learning sequence. Another productive outcome of this study could be to encourage MOOC platform providers to allow instructors and designers to choose whether a discussion prompt should be made “open” or “locked,” depending on instructional goals for the activity or course. This would greatly increase the options available to design teams and would allow them to tailor activities to meet learning goals for a course. It would also give researchers greater insight into how aspects of MOOC interface designs can affect outcomes. Other novel platform configurations could include a “locked” forum where learners are shown peers’ responses immediately after submitting their own response, followed by the opportunity to revise their original response. Since MOOC discussion forum interface designs have changed very little over the past few years, it would be beneficial to explore new options for deeper learning.

Our study contains some limitations, including a relatively small sample size with an uneven distribution of responses across platforms. Additionally, we only studied responses to two prompts from one MOOC. Given that there is limited research on the way discussion forum interfaces impact discussion post responses, we hope to build on the present study and conduct future research that examines other cases of MOOC discussion prompts hosted on multiple platforms.

Acknowledgements

The authors would like to acknowledge the contributions of Kelly Chan, who assisted in the preparation of the manuscript. Additionally, the authors would like to thank Sadia Nawaz who provided thoughtful comments and suggestions on an early draft of the manuscript.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received approval from the ethics review board of the University of Michigan, USA for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Almatrafi, O., & Johri, A. (2018). Systematic review of discussion forums in massive open online courses (MOOCs). *IEEE Transactions on Learning Technologies*, 12(3), 413–428.
- Azhar, T. F., & Santoso, H. B. (2019). Evaluation of instructional and user interface design for MOOC: Short and free FutureLearn courses. *In the 2019 International Conference on Advanced Computer Science and Information Systems (ICACSIS)* (pp. 425–434). IEEE.
- 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. <http://dx.doi.org/10.24059/olj.v21i4.1270>
- Boud, D., Keogh, R., & Walker, D. (Eds.). (1985). *Reflection: Turning experience into learning*. Kogan Page.
- Bruff, D. O., Fisher, D. H., McEwen, K. E., & Smith, B. E. (2013). Wrapping a MOOC: Student perceptions of an experiment in blended learning. *Journal of Online Learning and Teaching*, 9(2), 187.
- Chandrasekaran, M. K., Kan, M., Tan, B. C., & Ragupathi, K. (2015). Learning instructor intervention from MOOC forums: Early results and issues. *Proceedings of the 8th international conference on education data mining*, pp. 218–225.
- Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2003). Resources, instruction, and research. *Educational evaluation and policy analysis*, 25(2), 119–142.
- Conole, G. (2014). A new classification schema for MOOCs. *The International Journal for Innovation and Quality in Learning*, 2(3), 65–77.
- Coursera: Take the world's best courses, online. (n.d.). Retrieved August 14, 2020, from <http://www.coursera.org>
- De Vries, H., Elliott, M. N., Kanouse, D. E., & Teleki, S. S. (2008). Using pooled kappa to summarize interrater agreement across many items. *Field Methods*, 20(3), 272–282.
- Dowell, N., Poquet, O., & Brooks, C. (2018). Applying group communication analysis to educational discourse interactions at scale. In J. Kay and R. Luckin, (Eds.), *Rethinking Learning in the Digital Age: Making the Learning Sciences Count*, 13th International Conference of the Learning Sciences (ICLS) 2018, Volume 3. London, UK: International Society of the Learning Sciences.
- Downes, S. (2009, February 24). Connectivist dynamics in communities. *Half an Hour*. <http://halfanhour.blogspot.co.uk/2009/02/connectivist-dynamics-in-communities.html>
- Edx: Free Online Courses by Harvard, MIT, & More, online. (n.d.). Retrieved August 14, 2020, from <https://www.edx.org/>

- Eisenberg, M., & Fischer, G. (2014). MOOCs: A perspective from the learning sciences. *Proceedings of the 11th International Conference of the Learning Sciences (ICLS)*, 190–197
- 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). <http://dx.doi.org/10.24059/olj.v21i2.845>
- Ferguson, R., & Sharples, M. (2014). Innovative pedagogy at massive scale: teaching and learning in MOOCs. In *European Conference on Technology Enhanced Learning* (pp. 98–111). Springer.
- Glory, C., & Santoso, H. B. (2019). Evaluation and recommendations for edX MOOC platform based on instructional design and interaction design principles. In *2019 International Conference on Advanced Computer Science and Information Systems (ICACISIS)* (pp. 441–450). IEEE.
- Håklev, S., & Slotta, J. D. (2017, May). A principled approach to the design of collaborative MOOC curricula. In *European Conference on Massive Open Online Courses* (pp. 58–67). Springer, Cham.
- Hanifa, M. R., & Santoso, H. B. (2019). Evaluation and recommendations for the instructional design and user interface design of Coursera MOOC platform. In the *2019 International Conference on Advanced Computer Science and Information Systems (ICACISIS)* (pp. 417–424). IEEE.
- Hara, N., Bonk, C. J. & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology course. *Instructional Science* 28, 115–152. <https://doi.org/10.1023/A:1003764722829>
- 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>
- 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>
- Oktavia, T., Prabowo, H., & Supangkat, S. H. (2018). The comparison of MOOC (massive open online course) platforms of edx and coursera (Study case: Student of programming courses). In *2018 International Conference on Information Management and Technology (ICIMTech)* (pp. 339–344). IEEE.
- Poquet, O., Dowell, N., Brooks, C., & Dawson, S. (2018a). Are MOOC forums changing? *LAK '18 Proceedings of the 8th International Conference on Learning Analytics and Knowledge*, pp. 340–349. <http://dx.doi.org/10.1145/3170358.3170416>.

Poquet, O., Kovanovic, V., Hennis, T., de Vries, P., Joksimovic, S., Gasevic, D., & Dawson, S. Social presence in Massive Open Online Courses. (2018b). *International Journal of Research in Open and Distributed Learning*, 19(3). <http://dx.doi.org/10.19173/irrodl.v19i3.3370>

Quintana, R. M., Hearn, C., Peurach, D. J., & Gabriele, K. (2020). Self-directed, community-supported learning in practice: A case of elevated support. In L. Wilton & C. Brett (Eds.), *Handbook on research on online discussion-based teaching methods* (pp. 312–332). IGI Global.

Quintana, R. M., & Tan, Y. (2021). Visualizing course structure: Using course composition diagrams to reflect on design. *Tech Trends*, 65, 562–575. <https://doi.org/10.1007/s11528-021-00592-x>

Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97–118). Cambridge University Press.

Tan, Y., & Quintana, R. M. (2019, March). What can we learn about learner interaction when one course is hosted on two MOOC platforms? *Proceedings of the 9th International Conference on Learning Analytics and Knowledge (LAK)*. (pp. 149–150). Tempe, Arizona.

Tan, Y., Quintana, R. M., & Sohn, J. (2020, April). Cross-platform engagement in MOOCs: Understanding learner audiences on two course delivery platforms. Poster accepted to the Annual Meeting of the American Educational Research Association (AERA). Conference Cancelled.

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27(2), 237–246.

Tsironis, A., Katsanos, C., & Xenos, M. (2016). Comparative usability evaluation of three popular MOOC platforms. *2016 IEEE Global Engineering Education Conference (EDUCON)* (pp. 608–612). IEEE.

Wong, J. S., Pursel, B., Divinsky, A., & Jansen, B. J. (2015). Analyzing MOOC discussion forum messages to identify cognitive learning information exchanges. *Proceedings of the Association for Information Science and Technology*, 52(1), 1–10. <https://doi.org/10.1002/pr2.2015.145052010023>

Appendix A

Prompts 1 and 2 were the basis of discussion posts we examined in this study

Prompt 1

Company X has learned about Facebook's mood manipulation experiment and believes that a happy person is much more likely to buy than a grumpy one. Therefore, it has designed its web site to tell heart-warming stories in callout boxes on every page. These stories, at best, are tangentially related to the products being sold on the page. They A/B test this website before launch to see if the story boxes do have the intended effect. They find that the boxes do have the desired effect of increasing sales. They then adopt the new website design with the story boxes, and they write an article describing their findings in a Marketing Journal.

- Does Company X need to inform its customers about this effort? To what extent?
- Does it need to obtain consent? If so, for what?

If you answered YES to the consent question above, what is the smallest change to the scenario described above that would make you change your answer to NO.

Prompt 2

Seeking to expand their business and improve their product, suppose that Amazon sends a survey to all Kindle owners asking them what they like and dislike about their Kindle. What validity concerns would you have about the survey results obtained? If the primary goal is to grow Kindle sales, what could Amazon do to get more valid data.

Appendix B

Codebook for Posts in Prompt 1

Code	Description	Example(s)
Answers prompt: Yes	The response fully answers the question(s) in the prompt. It includes a response to the two main questions included in the prompt (i.e., a reference to inform and to consent).	<i>I don't believe that Company X needs to inform its customers about this effort or obtain consent. Company X is doing a straight A/B test—they are not conducting an experiment to see whether the stories change buying behavior—rather they assume that this is true at the start based on Facebook's experiment and are simply comparing two website designs—with and without stories—and measuring which drives greater sales.</i>
Answers prompt: No	The response does not fully answer the question(s) in the prompt.	<i>I think the ethical problem is not so much the experiment, but what the limits are to manipulating the weaknesses of humans into buying stuff. For instance, the idea that pictures of your friends and family can be used to generate a personalised advertisement. It will subconsciously cause you to believe the message because your brain recognises your friends' trades. That is unethical.</i>
Answers prompt: Partially	The response partially answers the question(s) in the prompt.	<i>Yes, I think Company X needs to inform its customers about the experiment so that they can have a right to withdraw if need be.</i>
Intent: Complete task	The response indicates that the learner simply wanted to complete the task. These responses are often succinct and to the point, with no explanation of the reasoning behind the response.	<i>Yes, they should inform. Yes, take consent.</i>
Intent: Persuade	The response indicates that the learner is trying to persuade others as to why they are correct. These responses may use explanations, examples, and/or rhetorical moves to prove a point.	<i>I don't believe that Company X needs to inform its customers about this effort or obtain consent. Company X is doing a straight A/B test—they are not conducting an experiment to see whether the stories change buying behavior—rather they assume that this is true at the start based on Facebook's experiment and are simply comparing two website designs—with and without stories—and measuring which drives greater sales.</i>
Intent: Reflect	The response indicates that the learner is using this space as a self-reflection of their own thought processes. These responses are often written in a stream-of-consciousness style. They may also consider opposing views in a sort of self-dialogue.	<i>I feel like the people in this experiment should have been notified. Although I feel like it should be a very vague notification, so it doesn't mess with the data. It could go either way but consent from the users would be good because this was affecting their emotions. I would have added a small page that would ask you if you would like to participate in a test but be vague.</i>

Discussion Posts from One MOOC Hosted on Two Platforms

Confidence: Assertive	The response uses language that is sure and direct.	<i>The company does not have to obtain consent from its customers in this scenario. They did not obtain any customer info per se, and any action on behalf of the customer was of their own informed accord. The action of the company to use feel-good stories to accompany their product pitches is the very essence of the discipline known as 'marketing.'</i>
Confidence: Tentative	The response uses language that is not entirely certain of itself, such as “I think,” “perhaps,” “it seems,” etc.	<i>I think the company should provide a statement in their terms of use letting the public know that they will use their data to improve the site (this would include improving sales). I think this is standard business practice and is understood (i.e., ethical). Publishing in a journal is research and requires informed consent.</i>
Examples: External	The response uses examples not found in completed parts of the course.	<i>If they are not lying, the practice is acceptable. Turn on your TV set and look at any ad. My favorite example at this moment is for a product being pitched to people with non-small cell sarcoma of the lung, which if you read the fine print accompanying the ad says that in clinical trials it raised the lifetimes of the subjects on the average by 3 months. The ad shows happy, smiling people, and repeatedly promises a longer life. In reality, someone with end stage lung cancer is not out walking around or watching baseball games. Is the ad ethical? Absolutely. It makes no false promises or claims. Is it realistic? No less so than the ad for the baldness product that shows the 'after' guy hand in hand with a beautiful woman. I challenge my fellow students to cite a single example of an advertisement that does not attempt to place the viewer or reader in a happy mood. Some of the most successful ads in all history were ones that were simply humorous, barely even mentioning or showing the product being sold. For those of you old enough to remember, VW beetle ads; Alka-Seltzer.</i>
Examples: Internal	The response uses <i>Yes</i> . Examples found in completed parts of the course, e.g., Facebook, OKCupid.	<i>There is a fine line between research and business though. For business purposes you are not required to explicitly ask for consent. But after Facebook and OKCupid's experiment, and the backlash they faced, it makes sense to have this written in the terms of service/privacy agreement.</i>

References other posts
The response refers to other posts in the same module.

I think this sort of thing is fine, and it's primarily because of context. A company website exists first and foremost to sell the company's products, so anyone visiting the website may reasonably expect to be marketed to. Even small improvements in the UI can lead to more 'desirable' (i.e., buying) behavior, and these are common and well-researched tactics as well. I think it would become unacceptable if the company strongly implied that these were testimonials; or lied about the tactics when directly questioned; or as R_Streeter said, didn't anonymize the information.

Codebook for posts in Prompt 2

Code	Description	Example(s)
Validity concerns: Sampling bias	The surveyed sample isn't representative of the target population, or the surveying method itself is otherwise problematic. For example, only surveying existing Kindle customers negatively impacts validity.	<i>My primary validity concern would be the choice of a representative sample. Current Kindle owners will probably not be representative of the (potential) user groups Amazon would like to sell new Kindle's.</i>
Validity concerns: Participation bias	Similar to sampling bias, but in this case the unbalanced representation arises from people choosing to participate or not. Those who choose to respond may share attributes not representative of the target population.	<i>Persons who are very happy or very unhappy with their Kindle may be more inclined to respond versus those who don't feel as strongly one way or another. The unbalanced response rates might affect validity.</i>

<p>Validity concerns: Other selection biases</p>	<p>Other validity concerns dealing with the group that is being surveyed. Examples include:</p>	<p><i>The first validity concern (supposing that the survey is sent via an email which could be accessed in any device) would be if it is sent to the correct person i.e., it should be a current and active user of the device for a relatively accurate response. If the survey is sent to an in-built kindle application, then the above thing won't be a concern. So supposing the second possibility the next validity concern would be of demographics. If the survey doesn't collect info like sex, age, ethnicity and even income levels then the survey data would have to be taken as a very broad based data set which won't be useful for them to customise their product for target groups. Secondly, this method will yield subjective data—only things the users are aware of, sometimes possibly being a hypothesis that is not true. Furthermore, some users (competitors?) might intentionally enter incorrect data.</i></p>
<p>Validity concerns: Poor-quality responses</p>	<ul style="list-style-type: none"> ● Respondents may rarely use their Kindles ● Kindle customers may not be the consumers ● Kindle model differences ● Possibility of low response rates ● Customer saturation 	
	<p>The quality of the responses themselves may lead to questionable validity. Examples include:</p> <ul style="list-style-type: none"> ● Skewed results based on current events ● Subjective responses ● Purposefully misleading responses 	
<p>Validity concerns: Leading questions</p>	<p>Asking questions on the survey that may sway participants to answer in a specific way.</p>	<p><i>Asking users what is liked and disliked will likely steer users away from a neutral rating, compared to asking users to merely give their reflections about their purchase.</i></p>
<p>Improving validity: Include non-Kindle-owners</p>	<p>The survey should also be sent to people who don't already own a Kindle. Examples include:</p> <ul style="list-style-type: none"> ● Target other Amazon customers ● Target regular book readers 	<p><i>I'd advise Amazon to include a random sample of all Amazon users to get more valid data. This sample will be more representative of all people that might be interested in buying a Kindle.</i></p>
<p>Improving validity: Alter sampled group in other ways</p>	<p>The surveyed group should be modified in other ways. Examples include:</p>	<p><i>Amazon could offer a gift card to have focus groups done where they can select the demographics they want to know more about.</i></p>
<p>Improving validity: Survey content/design suggestions</p>	<ul style="list-style-type: none"> ● Ideas for increasing response rate ● Survey newer Kindle owners 	<p><i>Amazon could ask to every amazon user that doesn't buy a kindle device if there is a reason why they did not, and if they have bought another eBook reader, why they preferred it to the kindle, and of course, to those that have bought it, if there is something that they would change or improve in a future version.</i></p>
<p>Improving validity: Alternatives to surveys</p>	<p>Specific suggestions for the types of questions that should be asked on the survey or the survey's design to improve validity.</p> <p>An alternative data-collection method should be considered—something different than surveys.</p>	<p><i>To get data that was more valid, Amazon could invite non-users to participate in paid focus groups or demos where they used a Kindle and shared about their experience.</i></p>

Improving validity: Control for representation biases in the analysis	The analysis stage of the study should include ways to account for representation biases in the sample. This often includes taking varying demographics into account.	<i>Amazon must make a random sampling of those who have Kindle and still use it. Segmentation must be based on location, age, gender, education level, occupation, income range and the model that they bought as. Societal practices may be relevant to usage patterns, occupation is necessary as some professions require a lot of reading while certain others read out of interest. Similarly medical certain conditions that happened after purchase of Kindle that prevent them now from using Kindle comfortably needs to be taken into consideration. The segmented population must be weighted when the number isn't equal it's most often unlikely to have an equal number.</i>
Improving validity: Anonymous/ confidential feedback/data	Considerations regarding the anonymity/confidentiality of participants may contribute to increased validity.	<i>Confidentiality must be assured and that details collected will not be sold to third parties or be used for other purposes not meant for at the time of data collection.</i>
Additional points not directly related to validity:	The learner's response includes suggestions/thoughts that are unrelated to the validity of the proposed study.	<i>Among the responses, Amazon can find some that have a good suggestion on how to improve the product. In this sense, the survey can provide valid input.</i>

A Case Study of Learners' Engagement in Mobile Learning Applications

Chenxi Liu

Ana-Paula Correia

The Ohio State University, USA

Abstract

Although mobile learning applications play a crucial role in today's education and can support learning, the low retention rate is a prevalent challenge in mobile learning. Existing studies have found that interpersonal interaction, high expectations, and supportive environment (from an educational perspective) as well as compatibility, interactivity, and usability (from a marketing perspective) can impact learners' engagement in learning activities and customers' engagement in mobile applications. However, comprehensive studies investigating learners' engagement in mobile learning applications from educational and marketing perspectives are rare. To fill the research gap, we analyzed learners' reviews on five top-ranked lifelong learning applications (Udemy, LinkedIn Learning, Coursera, edX, and Skillshare). Inductive coding was used to identify critical factors impacting learners' engagement in mobile learning applications, such as usability, availability of learning experiences, features to facilitate learning, interpersonal interaction, and incentives for completion. We further explored specific engagement strategies displayed in the analyzed applications through an analytical evaluation. Besides, this study expands Hew's model of learners' engagement and suggests new conceptual relationships between critical factors impacting learners' engagement, self-determination theory, and learners' engagement.

Keywords: mobile learning, engagement, mobile learning application design, lifelong learning

Liu, C., & Correia, A. (2021). A case study of learners' engagement in mobile learning applications. *Online Learning*, 25(4), 25-48. DOI: 10.24059/olj.v25i4.2827

Mobile learning is defined as an extension of digital learning, allowing learners to access information, resources and perform learning activities anytime and anywhere with the assistance of mobile computing devices and information and communication technologies (Qiu, 2019). Previous review studies on mobile learning have found that most mobile learning can produce positive results in education (Wu et al., 2012; Chee et al., 2017). Specifically, mobile learning can effectively improve learners' achievement, motivation, and interests in learning with proper design and development (Hwang & Wu, 2014).

With the rapid development of mobile applications and online educational resources, mobile learning applications play a crucial role in today's education (Ansari & Tripathi, 2017). Mobile learning applications can not only facilitate knowledge acquisition and transfer (Hannon, 2017), but also increase retention rates and academic performance (Deb et al., 2017; Pechenkina et al., 2017), and promote learning engagement (Noel et al., 2015). Using mobile learning applications, learners can engage in learning anytime and anywhere (Ansari & Tripathi, 2017), and their need for personalized learning can also be satisfied (Pechenkina et al., 2017).

Although using mobile applications in teaching and learning brings many advantages, mobile learning applications are facing a common problem of low retention rate. Retention rate is the percentage of users continuing to use an application within a certain number of days since first use (Zuniga et al., 2019). After one month since installation, a 2.5% retention rate of a mobile learning application is 2.5%, meaning that only 25 out of 1,000 users are still in use after 30 days, which is lower than that of most other types of applications (Statista Research Department, 2021).

Previous research suggested that interpersonal interactions, learning design, and supportive environment can impact learners' engagement in learning activities (from an educational perspective) (e.g., Davis & Frederick, 2020; Freitas et al., 2015; Hew, 2016). Additionally, compatibility, interactivity, and usability factors that can impact customers' engagement in mobile applications have also been identified (from a marketing perspective) (e.g., Baker, 2020; Fang et al., 2017; Kim & Baek, 2018). However, few studies have considered both perspectives to investigate learners' engagement in mobile learning applications generally released on the mobile application market for educational purposes.

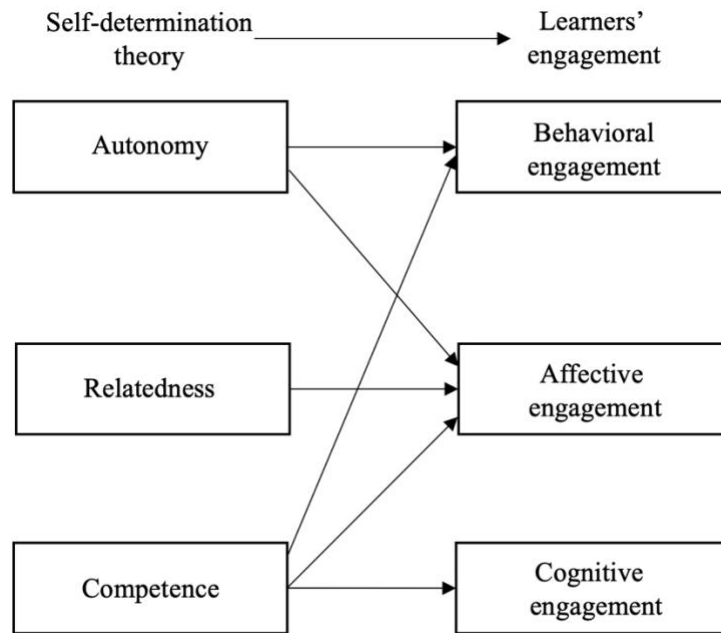
Online reviews are a crucial source for obtaining users' opinions, inquiries, and requirements on a product (Chen et al., 2019; Pongwat, 2019). Learners' online reviews for mobile learning applications involve their perceptions on both learning and application use. Therefore, this study investigated learners' online reviews for five top-ranked lifelong learning applications, aiming to gain a more comprehensive understanding of factors impacting learners' engagement.

Theoretical Framework

The concept of engagement has been extensively investigated in both education and marketing (Cheung et al., 2011). Yet, a clear definition of engagement is still challenging due to the disagreement about its attributes (Bond et al., 2020; Cheung et al., 2011; Harris, 2008), which fall into two categories. One claims that engagement consists of three components: behavioral engagement, emotional or affective engagement, and cognitive engagement (Brodie et al., 2011; Fredricks et al., 2004; Trowler, 2010). While the other suggests an additional component, social engagement (Fredricks et al., 2016; Vivek et al., 2012) or agentic engagement (Reeve, 2012). Because the former category is more widely accepted (Bond et al., 2020; Hollebeek, 2011), this study refers to engagement as an individual's behavioral, affective, and cognitive involvement with an activity.

Learner engagement is often defined as an individual's interaction with activities and conditions conducive to learning and development (Coates & Radloff, 2012). According to Kuh (2001), learners' engagement consists of participation in meaningful academic activities. Based on the three components of engagement, behavioral engagement is learner participation in learning activities; affective engagement is learner emotional response regarding learning activities; cognitive engagement is learner thinking for a specific task while conducting a learning activity (Fredricks et al., 2004).

Figure 1
Hew's (2016) proposed model of learners' engagement



Self-determination theory argues that motivation is affected by three psychological needs: competence, relatedness, and autonomy (Deci & Ryan, 2008). According to Cooke et al. (2016), “autonomy is defined as volition and choice.... Relatedness represents the level of connectedness to others.... Competence refers to being effective within an environment and able to obtain valued outcomes from it” (p. 633). Hew (2016) proposed a model to demonstrate the connections between the three components of engagement and the three psychological needs of self-determination theory. We believe that learners' engagement can be influenced by the three psychological needs (Figure 1). To explore critical factors impacting learners' engagement in mobile learning applications and engagement strategies employed in top-ranked mobile learning applications, this study used Hew's (2016) model as its theoretical lenses.

A Review of Existing Studies

Mobile learning applications are generally released on the mobile application market for educational purposes. To comprehensively understand how users' engagement in mobile learning applications is affected, it is necessary to review previous studies on learners'

engagement in diverse learning environments (from the educational perspective) and customers' engagement in mobile applications (from the marketing perspective).

Factors Impacting Customers' Engagement

Although factors that affect customers' engagement in mobile applications are different depending on the studies, common factors are compatibility, interactivity, and usability. In addition, accomplishment rewards, such as task completion certifications, are particularly emphasized in mobile learning applications.

In the reviewed literature, compatibility refers to customers' perceptions of how mobile applications meet their needs and preferences (Fang et al., 2017). Mobile applications with a high level of customization attributes and personalized adaptation can effectively improve customers' engagement (Fang et al., 2017; Kim & Baek, 2018; McLean, 2018; Pham & Chen, 2019).

Interactivity involves customer-to-customer interaction and customer-to-application interaction. Lele (2015) and Dinner et al. (2015) suggested that adding social features to mobile applications facilitated the interaction and communication between customers, therefore increasing customers' engagement. Besides, by enabling mobile applications to appropriately push notifications (Pham & Chen, 2019; Pham et al., 2016) and send in-app messaging (Baker, 2020; Perro, 2018), customers' attention to mobile applications is grabbed so that their engagement can also be improved.

Usability is a quality attribute of system acceptability (Nielsen, 1993) and refers to the ease with which users can learn to operate and use a system (IEEE, 1990). In the reviewed studies, the aspects related to usability and impacting users' engagement in mobile applications involve ease of use (McLean, 2018; Fang et al., 2017), usefulness (McLean, 2018), convenience (Kim & Baek, 2018; McLean, 2018), interface design (Fang et al., 2017; Pham & Chen, 2019; Tarute et al., 2017), and privacy/security (Fang et al., 2017).

Accomplishment reward is a factor that is closely related to mobile learning applications. Pham and Chen (2019) proposed a Personalized Adaptive CARD-based interface (PACARD) to improve learners' engagement with mobile learning applications. By integrating PACARD into an English-language learning mobile application and analyzing engagement-related data (e.g., application retention and time spent), PACARD has been proved to increase learners' engagement in mobile learning applications. Accomplishment reward is one of the factors included in PACARD, and it is reflected in the form of digital badges. By completing specific tasks, learners receive corresponding digital badges as their accomplishment rewards.

Table 1 shows the identified factors impacting customers' engagement in mobile applications.

Table 1
Summary of Identified Factors Impacting Customers' Engagement

Factors	Description	Research
Compatibility	Mobile applications' customization attributes and personalized adaptation	Fang et al. (2017); Kim & Baek (2018); McLean (2018); Pham & Chen (2019)
Interactivity	1. Customer-to-customer interaction (e.g., social features) 2. Customer-to-application interaction (e.g., push notifications, in-app messaging)	Baker (2020); Dinner et al. (2015); Lele (2015); Perro, (2018); Pham & Chen (2019); Pham et al. (2016)
Usability	Ease of use, usefulness, convenience, interface design, privacy/security	Fang et al. (2017); Kim & Baek (2018); McLean (2018); Pham & Chen (2019); Tarute et al. (2017)
Accomplishment rewards	e.g., digital badges	Pham & Chen (2019)

Factors Impacting Learners' Engagement

Interpersonal interaction, curriculum and learning design, achievement motivation, high expectations, and supportive environment are the commonly mentioned factors that impact learners' engagement in diverse learning environments, including online learning, mobile learning, face-to-face learning, and blended learning.

In the reviewed studies, interpersonal interaction primarily includes learner-to-instructor interaction and learner-to-learner interaction. Learner-to-instructor interaction in online learning can be achieved using different strategies. Examples are:

1. Sending announcements or emails (Martin & Bolliger, 2018).
2. Providing feedback on learners' work (Sadaf et al., 2019).
3. Holding office hours (Hew, 2016).
4. Increasing teacher presence (Hong & Gardner, 2019).

Learner-to-learner interaction can be enhanced by, for example, working collaboratively (e.g., Guenther & Miller, 2011; Zepke & Leach, 2010), participating in discussions (Guajardo Leal et al., 2019; Hew, 2016; Martin & Bolliger, 2018; Sadaf et al., 2019), and providing peer feedback (Hew, 2016). Freitas et al. (2015) proposed a third model for online learning, which suggested that social interactions should be accounted for one-third of the time for online learning. Sun et al. (2019) claimed that relationship quality, including trust and commitment, significantly and positively impacted learners' psychological engagement in massive open online courses.

In terms of curriculum and learning design, providing authentic learning activities (Buelow et al., 2018; Martin & Bolliger, 2018), incorporating active learning (Guenther & Miller, 2011; Hew, 2016), and delivering appropriate course resources (Hew, 2016) are widely recognized strategies to promote learners' engagement. Among those, course resources should meet the needs of different learners by delivering clear learning objectives and instructions, including a wide variety of formats and difficulty levels (Hew, 2016; Sadaf et al., 2019). An appropriate level of difficulty and interactive digital learning content can increase learners' engagement in online learning (Freitas et al., 2015). Through the strategic use of multimedia, learners' engagement in online learning can also be promoted (Buelow et al., 2018; Davis & Frederick, 2020).

Achievement motivation refers to a person's tendency to participate in achievement-driven behaviors and do things well (Guenther & Miller, 2011). It corresponds to learners' self-

belief and inner desire to acquire knowledge. When learners can work autonomously and achieve self-learning goals, achievement motivation can be increased (Guenther & Miller, 2011; Zepke & Leach, 2010). Guajardo Leal et al. (2019) claimed that learners with higher levels of motivation were more likely to have higher levels of engagement in online learning.

High expectations include learners' expectations and challenges set by others, such as instructors and schools. High academic expectations created by learners, instructors, and schools have been documented to increase learners' engagement (Guenther & Miller, 2011). By establishing high academic standards and assigning assessment tasks, teachers can create challenging and enriching educational experiences for learners to improve their learning engagement (Zepke & Leach, 2010). Sadaf et al. (2019) found that setting clear expectations in online courses could positively impact learners' engagement. And Freitas et al. (2015) claimed that the difficulty level of the assessment had a positive effect on learners' engagement.

A supportive environment consists of instructor support, infrastructure and technical support. Instructor support consists of instructors' accessibility and presence (Hew, 2016; Hong & Gardner, 2019; Zhang et al., 2016), passion, and differentiated instruction (Hew, 2016). Infrastructure and technical support are established by offering a welcoming and diverse learning environment, providing various support services, and allowing learners to access internet services and devices (Guenther & Miller, 2011; Tarantino et al., 2013; Zepke & Leach, 2010).

Table 2 summarizes the identified factors impacting learners' engagement in education.

Table 2
Summary of Identified Factors Impacting Learners' Engagement

Factors	Description	Research
Interpersonal interaction	1. Learner-to-instructor (e.g., send announcements or emails, provide feedback, hold counseling hours, have instructors present in online learning)	Freitas et al. (2015); Guenther & Miller (2011); Hew (2016); Hong & Gardner (2019); Guajardo Leal et al. (2019); Martin & Bolliger (2018); Sadaf et al. (2019); Sun et al. (2019); Zepke & Leach (2010)
	2. Learner-to-learner (e.g., participate in online discussions, work collaboratively, provide feedback)	
Curriculum & learning design	1. Authentic learning activities	Buelow et al. (2018); Davis & Frederick (2020); Freitas et al. (2015); Guenther & Miller (2011); Hew (2016); Martin & Bolliger (2018); Sadaf et al. (2019)
	2. Active learning	
	3. Course resources (e.g., clear learning objectives and instruction, a wide variety of resource formats and difficulty levels, interactive digital content, multimedia)	
Achievement motivation	1. Learners' self-belief and inner desire to acquire knowledge	Guajardo Leal et al. (2019); Guenther & Miller (2011); Zepke & Leach (2010)
	2. Work autonomously	
	3. Achieve self-learning goals	
High expectations	1. Set by learners and others	Freitas et al. (2015); Guenther & Miller (2011); Sadaf et al. (2019); Zepke & Leach (2010)
	2. e.g., high standards for acceptable academic work, high and clear academic expectations, and difficulty level of assessments	
Supportive environment	1. Instructor support (e.g., instructors' accessibility and presence, passion, and differentiated instruction)	Guenther & Miller (2011); Hew (2016); Hong & Gardner (2019); Tarantino et al. (2013); Zepke & Leach (2010); Zhang et al. (2016)
	2. Infrastructure support (e.g., welcome and diverse learning environment, various support service, devices and internet accessibility)	

An Analysis of Online Reviews

Online reviews have become an important source of information reflecting users' perceptions of a product, which triggered many studies investigating it to facilitate improvements in mobile applications. For instance, Khalid et al. (2015) qualitatively studied the low-rating reviews posted online for 20 iOS applications and identified 12 types of complaints to help developers better understand and address users' concerns. Based on online ratings and reviews, Chen et al. (2019) developed a user requirements mining framework that has been empirically examined to promote the quality upgrade of mobile applications.

In education, Pongwat (2019) investigated learners' online reviews for a mobile learning application. In addition to contributing to the quality evaluation of mobile learning applications, Pongwat's study revealed potential issues application developers need to consider.

According to Tucker and Kim (2011), using online reviews to promote product improvement and design has two notable benefits. First, it enables researchers to access and store large amounts of product review data in a short time. Second, it is based on users' revealed preference (users' feedback on a product after a considerable interaction time) rather than users' stated preference (users' responses to a hypothetical scenario survey). Furthermore, online reviews are highly correlated with application downloads (Harman et al., 2012) and are a crucial measure of an application's quality (Khalid et al., 2015). In summary, we decided to use learners' online reviews as data to address the research questions.

Research Questions

The current case study investigated learners' online reviews (e.g., reviews posted on App Store and Google Play) of five top-ranked lifelong learning mobile applications to provide a comprehensive understanding of learners' engagement in mobile learning applications. Through inductive coding and analytical evaluation, we answered the following research questions.

Research Question 1: What factors are critical to learners' engagement in mobile learning applications?

Research Question 2: Which engagement strategies are offered by mobile learning applications that promote learners' engagement?

This study relied on Aspin and Chapman's (2000) definition of "lifelong learning for all" as a complex and multi-faceted process, that begins in pre-school, is carried on through compulsory and post-compulsory periods of formal education and training, and is then continued throughout life, through provision of such learning experiences, activities and enjoyment in the home, in the work-place, in universities and colleges, and in other educational, social and cultural agencies, institutions and settings—both formal and informal—within the community. (p. 16)

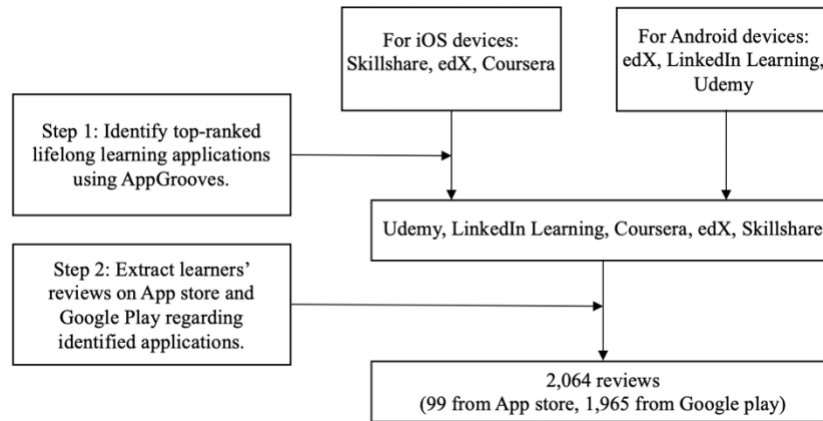
Research Methodology

The current study employed a qualitative case study research approach. To answer the research questions above, we first applied inductive coding to identify critical factors impacting learners' engagement in mobile learning applications. We then conducted an analytical evaluation to explore specific strategies those applications offered to promote learners' engagement.

Data Collection

The data selection process involved two steps: (1) identify mobile learning applications and (2) collect learners' reviews to ensure comprehensiveness and reliability. In November 2019, AppGrooves was used to identify five top applications from App Store and Google Play. These applications were Udemy, LinkedIn Learning, Coursera, edX, and Skillshare. AppGrooves was used as the application selection tool. This tool collects, reviews, and ranks applications by blending quantitative analysis (data-driven algorithm initially filters high-quality applications) and qualitative analysis (independent editorial team further refines the selected applications) during the review process (AppGrooves, n.d.).

Figure 2
Summary of the data selection process



After identifying the mobile learning applications to be analyzed, a total of 2,064 learners' reviews on Udemy, LinkedIn Learning, Coursera, edX, and Skillshare were extracted between November 1 and December 1 of 2019. These included 99 reviews from App Store and 1,965 from Google Play. The learners' reviews analyzed were written in English. Compared with iOS, the Android operating system has a larger market share (Mobile Operating System Market Share Worldwide, 2020) which means that applications on Google Play show more downloads than on App Store. Thus, the number of reviews available on Google Play was higher than that on the App Store. Figure 2 exhibits the summary of the data selection process.

To protect the anonymity and privacy of the study subjects, we only collected the publicly available information needed for this study without including any identifiable information, not even learners' screen names. All the collected data were stored in a cloud drive with password protection and can only be accessed by the researchers. The backup data was stored on one researcher's personal computer, and the laptop was also password protected.

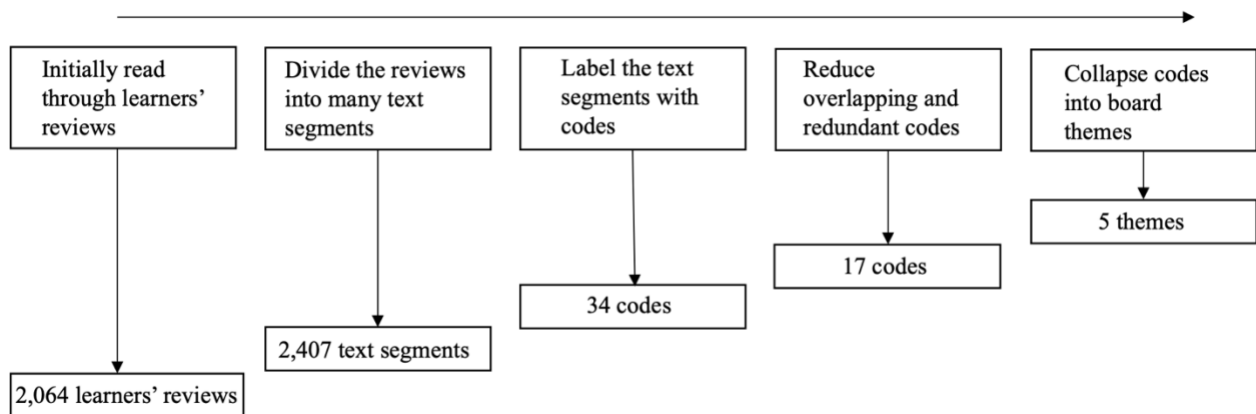
Data Analysis

This study used inductive coding to identify critical factors impacting learners' engagement in mobile learning applications. Inductive coding is a systematic qualitative data analysis procedure whereby researchers use raw data to derive concepts, themes, or a model through interpretations based on the raw data (Thomas, 2006). Questions best suited for

qualitative data analysis seek to obtain a deep understanding of a phenomenon (Creswell, 2012). In contrast to quantitative analysis, which is more deductive, qualitative analysis is more inductive (Creswell, 2012). Because researchers do not impose preconceptions in inductive coding, it can reveal critical themes that might be obscured, reframed, or overlooked in deductive coding (Thomas, 2006). Consequently, inductive coding is more appropriate for this study.

This study followed Creswell's (2012) coding process, as shown in Figure 3. Specifically, we first exported the 2,064 learners' reviews into Microsoft Excel in a standard format with a backup and initially read them. Secondly, we divided these reviews into 2,407 text segments based on their content and relevance to this study. Some reviews were broken down into several segments with different meanings. In contrast, some reviews were excluded from further coding because they were not related to the three psychological needs of self-determination theory. Next, after a discussion among the authors, we developed a coding framework to guide the coding based on our understanding of the reviews gained in the previous step. The description of each code was also noted. As more reviews were coded, the coding framework was revised as new codes emerged. Some reviews were re-read and recoded based on the new framework. After labeling all the text segments, we identified a total of 34 codes. Then, we created a list of the 34 codes, carefully grouped similar codes, and remove redundant codes. We reduced the number of codes to 17. Finally, through analyzing the attributes of the 17 codes and repeatedly reading their corresponding text segments, we further collapsed the 17 codes into five broad themes to answer the first research question. The five themes and the 17 codes are presented in Table 3 as factors and subfactors, respectively.

Figure 3
Summary of the inductive coding process



The method used to explore specific strategies offered by the mobile applications to promote learners' engagement was analytical evaluation. Such involves analyzing a system's features and their implications for use (Rosson & Carrol, 2002). Based on the five critical factors yielded from learners' reviews and their subfactors, we carefully explored the relevant contents and features of the five identified mobile learning applications by browsing and operating these applications in person.

Specifically, we installed these applications on our phones and then operated them one by one as general learners. For each application, we first explored it by following its navigation

menu to get familiar with it. Then, we searched available courses offered by it and randomly enrolled three courses. Next, we observed the contents and structures of these courses by carefully reading their introductions, browsing their curriculums, and taking them. In the whole analytical evaluation process, we primarily focused on those contents and features related to the identified five critical factors and their subfactors. Due to the nature of some critical factors, it is not always feasible to observe the corresponding strategies offered by these applications. As a result, only the factors whose strategies were observable through operating the identified mobile learning applications were included in this process.

The Reliability Process

We used a qualitative approach to establish consistency among the two authors' coding through extensive and frequent virtual discussions. Combined, the authors have extensive experience in teaching, learning technologies, learning design, human-computer interaction and in using inductive coding as a data analysis process. First, the reviews were reviewed individually by each author having the research questions in mind. After that, the authors met virtually to identify any levels of disagreement in relation to their analysis process and outcomes. The two authors reached consensus on which codes and themes to use in the analysis.

Findings

The following paragraphs present the findings of this study. The critical factors to learners' engagement in mobile learning applications (Udemy, LinkedIn Learning, Coursera, edX, and Skillshare) that emerged from the inductive analysis and the engagement strategies identified from the analytical evaluation are discussed.

What Factors are Critical to Learners' Engagement in Mobile Learning Applications?

The identified critical factors were:

1. Usability.
2. Availability of learning experiences (e.g., courses).
3. Features to facilitate learning.
4. Interpersonal interaction.
5. Incentives for completion.

As shown in Figure 4, usability (68.97%) was the most frequently identified factor, followed by availability of learning experiences (17.45%), features to facilitate learning (9.93%), interpersonal interaction (2.41%), and incentives for completion (1.25%).

Figure 4

Distribution of analyzed text segments by factors impacting learners' engagement in mobile learning applications (n = 2,407)

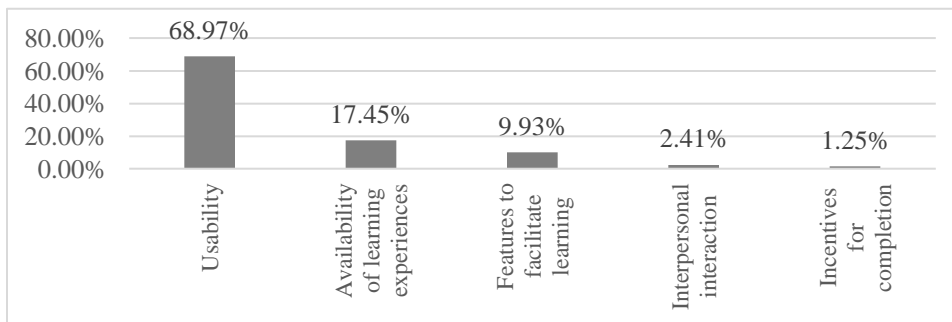


Table 3 shows each factor studied in more detail through the codes used in the analysis. These codes were called subfactors. The cost of the applications was not included because we believed that cost is more relevant for business decisions than educational ones.

Table 3
Critical Factors Impacting Learners' Engagement and Corresponding SubFactors

Factor/Subfactor	Number of reviews	Percentage
Usability		
Learner satisfaction	1,236	74.46%
Errors & system stability	276	16.63%
Ease of use	103	6.20%
Loading time	45	2.71%
Total	1,660	100.00%
Availability of learning experiences		
Course quality & design	266	63.33%
Course options & coverage	108	25.71%
Instructor expertise	46	10.95%
Total	420	100.00%
Features to facilitate learning		
Learning on-the-go	89	37.24%
Customized video play	61	25.52%
Cross-platform functionality	42	17.57%
Managing learning	21	8.79%
Course capabilities	19	7.95%
Note-taking capability	7	2.93%
Total	239	100.00%
Interpersonal interaction		
Customer service support	48	82.76%
Peer interaction	6	10.34%
Instruction interaction/feedback	4	6.90%
Total	58	100.00%
Incentives for completion		
Certifications/degrees	30	100.00%
Total	30	100.00%

Regarding usability, learner satisfaction (74.46%) was the most frequent subfactor, followed by errors and system stability (16.63%), ease of use (6.20%), and loading time (2.71%). Learner satisfaction refers to the user's likeability of the system. Errors mentioned by learners were related to video downloads, offline mode, sign-in process, payment process, video playback functionality, and overall stability of the app. In terms of ease of use, it mostly about interface design and navigability. Learners' reviews regarding loading time mainly focused on video loading time and application loading time.

Course quality and design (63.33%), course options and coverage (25.71%), and instructor expertise (10.95%) were the three subfactors under the availability of learning experiences. The attributes regarding course quality and design included learning content, audio and video quality, learning duration, and opportunities for practice. In terms of course options and coverage, learners preferred mobile learning applications that offer many courses with different topics. Besides, learners preferred applications with highly professional instructors.

Features to facilitate learning included six subfactors:

1. Learning on-the-go (37.24%).
2. Customized video play (25.52%).
3. Cross-platform functionality (17.57%).
4. Managing learning (8.79%).
5. Course capabilities (7.95%).
6. Note-taking capability (2.93%).

Learning on-the-go was primarily related to downloading files and offline working. Customized video play included speed change, background or audio-only play, closed captioning, and screen rotation. In terms of cross-platform functionality, attributes raised by learners involved video casting, information syncing, and operational consistency. Moreover, learners mentioned that the course organization and process saving functions effectively helped them manage their learning. Course capabilities refer to the abilities of mobile learning applications to help learners discover the desired courses. The higher the course capabilities, the easier it is for learners to find the learning content. Additionally, learners highlighted the importance of note-taking capability for their learning.

When it comes to interpersonal interaction, the majority of reviews were related to customer service support (82.76%), followed by peer interaction (10.34%), and instructor interaction (6.90%). When faced with problems, learners preferred easy access to customer service. Also, they mentioned the importance of interacting with a peer, such as participating in discussion, collaborative working, and interacting with instructors, such as contacting instructors and receiving feedback.

Incentives for completion include the internal motivation and external motivation of a user to accomplish something. In this study, external motivation was the main focus because could directly promote it by optimizing the design of mobile learning applications. In learners' reviews, certifications and degrees issued by learning applications were mentioned many times, which shows the value learners attached to them. Table 4 presents the examples of learners' reviews.

Table 4
Examples of Learners' Reviews

Factor/Subfactor	Examples
Usability	
Learners' satisfaction	This app and the courses are fantastic. The best professional education application.
Error & system stability	I have downloaded the video, but I couldn't access it offline. Have been trying to put in my credit card details, but it keeps telling me invalid card. When watching video, the main screen (slide) is not showing. After the recent update, the [name of the app] crashed and isn't opening.
Ease of use	I am super satisfied with all the dynamic interface and software platform.
Loading time	Most of the videos are not loading or take too much time to load. The app is a bit slow to open at the start.
Availability of learning experiences	
Course quality & design	Demo video is good after that I bought a course very low audio and video quality very worst. Courses were designed for shorter duration which is keeping the viewers motivated to watch.

	It is very good educational app, but it could be improved by adding some exercises or quizzes between each lecture to practice what we have learnt.
Course options & coverage	There is a huge variety of videos.
Instructor expertise	Teachers are knowledgeable and easily to understand.
Features to facilitate learning	
Learning on-the-go	Very great on mobile with the offline downloadable features.
Customized video play	There should be an option for incremental speed using 10 steps or 5 steps instead of 25 steps. I love that there is an audio only option. Great, but it should have a tool for subtitles. This app really missing some features like ... being able to rotate the screen in any direction.
Cross-platform functionality	I miss the ability of streaming/casting videos from the app directly to my TV. The synchronization works well.
Managing learning	Can you please keep some additional filters in "My Course?" Saves your progress for easy access when you're coming back.
Course capabilities	There should be more options through the app to explore new categories and topics.
Note-taking capability	Would be nice to listen to lectures and take notes at the same time.
Interpersonal interaction	
Customer service support	Super quick response on the weekend and my issue was quickly resolved.
Peer interaction	The discussion groups look pretty good, but I rarely participate.
Instructor interaction	Wish there was a channel inside the platform where I could connect with the teacher/coach on time.
Incentives for completion certifications/degrees	Great app, always looking for learning and certifications on different subjects.

Which Engagement Strategies are Offered by Mobile Learning Applications that Promote Learners' Engagement?

Based on the identified critical factors and their subfactors, the specific strategies provided by Udemy, LinkedIn Learning, Coursera, edX, and Skillshare to promote learners' engagement are discussed below.

Engagement Strategies Regarding Availability of Learning Experiences

In terms of availability of learning experience, the five examined applications provided learners with general descriptions about their courses, including:

1. Course provider (instructor's qualifications and/or affiliated institution).
2. Course introduction (in text and/or video format).
3. Course features (e.g., rating, number of enrollments, total length, learning level).
4. Course structure.

Although the general descriptions deviated among these applications, it allowed learners to have a straightforward impression of the quality and popularity of the courses.

A variety of learning materials can enhance learners' engagement and learning outcome (Hew, 2016; Sadaf et al., 2019). The analyzed applications typically offered courses containing different learning materials in multiple formats, such as short videos, auto-graded quizzes, and selected readings. Auto-graded quizzes with multiple attempts help learners reinforce learning. Some courses in Coursera, edX, LinkedIn Learning, and Udemy offered supplemental learning

materials to allow learners to go deeper into specific topics. According to Freitas et al. (2015), learners are more engaged when receiving interactive digital learning content. Coursera and edX provided interactive videos to attract learners' attention.

Regarding course options and coverage, these mobile learning applications offered a wide range of courses and/or modules across different subjects to meet learners' diverse learning interests and goals. Coursera and LinkedIn Learning offered courses from various countries, and LinkedIn Learning and Udemy released new learning experiences periodically. Except for taking individual courses, learners also had opportunities to obtain degrees through Coursera and edX.

Instructor expertise brings credibility to the courses and relates to the course quality. Therefore, learners believe that instructor self-introduction impact their learning and engagement (Sadaf et al., 2019). The analyzed applications provided each instructor's basic information, such as name, title, organization, career, and educational background, on the course page taught by him/her. Also, LinkedIn Learning provided the link to each instructor's LinkedIn profile, and Udemy provided each instructor's learner amount, course amount, average rating, and contact information. This information allowed learners to know more about their instructors.

Engagement Strategies Regarding Features to Facilitate Learning

Downloadable learning materials facilitate online learning by avoiding internet lag or system crash (Hew, 2016). Through providing downloadable materials, the analyzed applications enabled learners to utilize their fragmented time to learn offline. Additionally, cross-platform video casting and information synchronization delivered learners more options and consistency. For example, most applications enabled learners to cast course videos from mobile devices to other devices, such as TV, speaker, etc. Thus, learners could get a better audio-visual experience. Some applications automatically synced learners' courses and learning progress between different platforms to equip learners with more choices on learning devices without worrying about consistency problems.

Mobile learning engagement can be promoted when learners have a personalized adaptive learning experience (Pham & Chen, 2019). To meet learners' personalized video playback needs, most of these applications made the following options available: play/pause, forward/back, subtitles on/off, full-screen play with automatic screen rotation, speed changes, and background play. Additionally, learners could change video quality on Udemy, used the picture-in-picture function on LinkedIn Learning, and viewed video transcripts with auto sliding text on Coursera and edX. Selecting appropriate ways to play course videos can enhance learners' learning and satisfy their unique learning needs. Coursera and Udemy, in particular, also allowed learners to take notes while watching videos. Those notes could be saved with corresponding video clips. Therefore, learners could recap previous contents by viewing their notes and the relevant video clips.

These applications automatically saved learners' learning progress. Learners could stop learning at any time and started from where they left without worrying about losing previous progress. If offline learning progress could not be automatically tracked, Udemy allowed learners to mark courses as completed manually. Furthermore, learners could set up reminders in Coursera, LinkedIn Learning, Udemy, and Skillshare to keep them on track. If learners enrolled in many courses or took a large number of notes, they could quickly find the materials they need by using the search bar, course filter, or sorting function available on Udemy.

Learning activities revolve around the course learners are taking; therefore, what courses learners can find will directly determine learners' learning experiences. The analyzed applications allowed learners to find courses through the search bar, course topics, and course

categories to facilitate the course searching process. EdX, LinkedIn Learning, and Udemy provided course filters to help learners narrow their search. Most of these applications recommended courses to learners based on their interests, searching history, and viewed courses through algorithms. On LinkedIn Learning, Udemy, and Skillshare, if learners were interested in a particular instructor, they could find all courses offered by the instructor on the instructor's introduction page. According to McLean (2018), the ease of use of a mobile application positively impacts customers' engagement with it.

Engagement Strategies Regarding Interpersonal Interaction

Facilitating conditions, the degree to which users believe that an organizational and technical infrastructure exists to support use of a system, is a critical factor impacting users' adoption of a system (Venkatesh et al., 2003). To create facilitating conditions for using mobile learning applications, these applications enabled learners to get in touch with customer support in different ways, such as through help centers, social media, and email and helped them solve the problems encountered in using. On each course's homepage, Coursera also listed the frequently asked questions and answers about that course.

Peer interaction is critical to enhance learners' engagement in online environments (Guajardo Leal et al., 2019). To promote peer interaction, these applications allowed learners to share courses through a link. Each course also had a discussion/Q&A forum on its homepage. Some courses on Coursera and edX contained peer-review assignments. Moreover, Coursera and Skillshare allowed learners to view and interact with peers' feedback. Learners of LinkedIn Learning and Skillshare could get necessary information about their peers by clicking on others' avatars. LinkedIn Learning also revealed the typical job titles of learners enrolled in the same course.

Learner-to-instructor interaction also plays an important role in facilitating learners' engagement in online environments (Martin & Bolliger, 2018). In addition to asking questions on the discussion/Q&A forum mentioned above, learners could also receive feedback and announcements from instructors in some courses. Besides, LinkedIn Learning and Udemy allowed learners to contact instructors by making instructors' contact information available directly, and Skillshare let learners follow instructors' accounts to get updated information.

Engagement Strategies Regarding Incentive for Completion

Completion certificates encourage learners to continue using mobile learning applications by creating clear goals and enjoyable learning challenges (Pham & Chen, 2019). Coursera, edX, Udemy, and LinkedIn Learning provided course completion certificates to learners. Although not all certificates could be used for formal accreditation, such as certificates issued by LinkedIn Learning and Udemy, they were intuitive incentives to motivate learners to complete their studies. Using the certificate-issuing feature, these certificates could be published directly on learners' LinkedIn or other social media platforms and be downloaded and printed. Therefore, learners could easily add them to their CVs, resumes, or other documents.

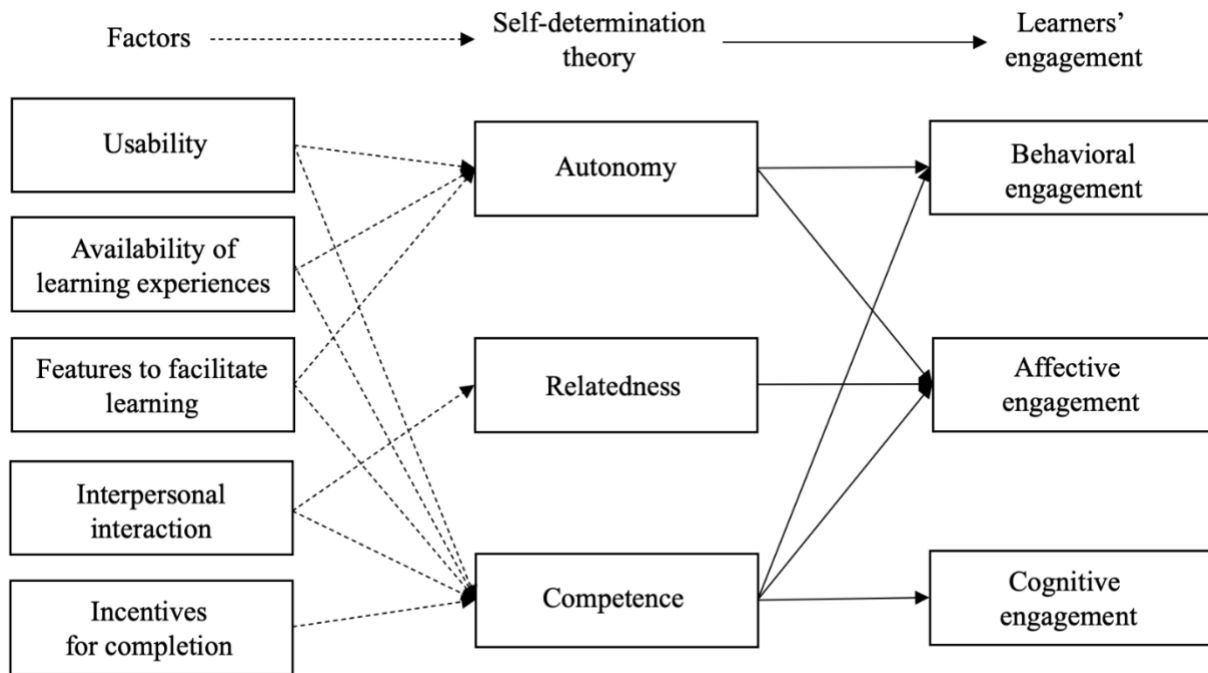
Alternatively, Skillshare used completed course projects as its unique completion incentive. Learners of Skillshare needed to complete a project for every enrolled course, and could display the completed project on the course's homepage to demonstrate their mastery of specific skills. Additionally, the analyzed applications informed learners of the knowledge they would obtain after completing a course, which helped learners understand their learning outcomes.

Discussion

The results of this study further expanded Hew's (2016) model of learners' engagement, as shown in Figure 5. Because the relations between the self-determination theory and learners' engagement were adopted from Hew (2016), we mainly elaborated the relations newly developed in this study below, which were the relations between the five factors emerging from this study and the self-determinate theory.

In this study, usability involves learners' satisfaction, errors and system stability, ease of use, and loading time. Because usability refers to how easy it is for users to learn to operate and use a system (IEEE, 1990), it directly impacts learners' use of mobile learning applications and affects the completion of tasks that learners desire. If an application is hard to operate, crashes all the time, or cannot load learning materials, learners cannot use it. Consequently, the completion of learning tasks and the achievement of learning goals are also be hindered. As a result, usability caters to learners' need for autonomy and competence.

Figure 5
Model of Relations Among Identified Factors, Self-Determinate Theory, and Learners' Engagement Expanded from Hew's (2016) Model



Note. The solid lines indicate the relations from Hew's model, while the dashed lines indicate the relations proposed in this study.

Course quality and design as well as instructor expertise are two of the subfactors of availability of learning experiences. High-quality and well-designed courses can ensure excellent course content, thereby increasing learning engagement and learning outcome (e.g., Hew, 2016; Sadaf et al., 2019). And professional instructors can facilitate the efficient delivery of the course content. Hence, the two subfactors play an essential role in learners' learning and can impact learners' knowledge acquisition, which caters to learners' need for competence. Also, when

courses offered through mobile learning applications provided a high number and variety of topics, learners have more learning choices, which meets their need for autonomy.

The features to facilitate learning include six subfactors: learning on-the-go, customized video play, cross-platform functionality, manage learning, note-taking capability, and course capability. The first three allow learners to freely choose their learning location and time, video-playing methods, and learning devices, fostering a sense of autonomy. The last three subfactors facilitate learners' learning and enable learners to organize their learning better. Therefore, it can also foster a sense of competence.

In terms of interpersonal interaction, it serves learners' needs for relatedness and competence. Through acquiring adequate customer support, communicating with peers and instructors, learners can build social connections with others (e.g., Freitas et al., 2015; Hew, 2016). Asking learning-related questions and getting feedback from peers and instructors can also improve learners' learning.

Last but not least, incentives for completion fosters learners' sense of competence. In this study, incentives for completion were expressed in different forms, such as certificates, degrees, or completed projects. These incentives are intuitive rewards for learners, which can boost learning motivation. Therefore, this factor can meet learners' competence needs.

Implications

The findings of this case study suggest that factors impacting learners' engagement in education and factors affecting customers' engagement in mobile applications both matter to learners of mobile learning applications. For example, previous studies from the education field (Martin & Bolliger, 2018) and the marketing field (Lele, 2015; Dinner et al., 2015) recognized the importance of interpersonal interaction to learners/customers' engagement. This factor is also highlighted in this study. Achievement motivation (Zepke & Leach, 2010) and accomplishment rewards (Pham & Chen, 2019) match this study's incentives for completion factor. Hegarty and Thompson (2019) mentioned the impact of curriculum & learning design on learners' engagement. This viewpoint relates to the availability of learning experiences in this study. Besides, ease of use (McLean, 2018; Fang et al., 2017) and compatibility (Kim & Baek, 2018; McLean, 2018; Fang et al., 2017) emphasized in previous studies also correspond to this study's usability and features to facilitate learning respectively.

Although this study primarily focuses on learners' engagement, its findings corroborate the foundational variables of mobile learning application quality suggested by Pongwat (2019). These foundational variables are pedagogical, functionality, performance, usability, support, security, portability, communication, and synchronization. For example, this study's usability factor relates to the foundational variables labeled performance, usability, and security. The availability of learning experiences (e.g., courses) corresponds to the pedagogical foundation. Features to facilitate learning match the foundational variables named functionality, portability, and synchronization. Interpersonal interaction corresponds to the communication and support variables. Therefore, this study also provides implications for the analysis of mobile learning applications' educational quality. In the current study, the subfactor of usability, namely system errors, revolved around video downloads, offline mode, sign-in, payment processes, video playback functionality, and overall stability of applications. These errors are similar to the weaknesses of mobile learning applications recognized by Pongwat (2019). Therefore, it can be concluded that they are common errors in mobile learning applications. Researchers and professionals in related fields should pay special attention to them.

This study contributes to the design and development of mobile learning applications with higher levels of learners' engagement. The revealed specific engagement strategies, such as providing different learning material formats, automatically syncing the learning process between other platforms, and offering discussion/Q&A forums for interpersonal interaction, offer practical guidelines to mobile learning application designers. The identified five factors and the expanded Hew's (2016) model also offer theoretical implications for further research regarding learners' engagement in mobile learning applications.

Limitations

However, there are some limitations to the current study. The sample consisted of five top-ranked lifelong mobile learning applications, which cannot represent all types of mobile learning applications. Future research can investigate more applications to broaden or strengthen the findings of this study. Moreover, this study only analyzed the public reviews posted on App Store and Google Play. As a result, the findings of this study may have limitations. Future research can also explore the standpoint of learners who did not post their reviews online. The current study proposed a model that suggests the interrelations among identified factors between self-determination theory and learners' engagement. However, this model is to be further verified by research that employs quantitative approaches.

Conclusion

Through focusing on learners' engagement in lifelong learning mobile applications and proposing a model that suggests the interrelations among identified factors, self-determinate theory, and learners' engagement, this study emphasized the importance of combining learning design in mobile learning. The five identified factors (usability, availability of learning experiences, features to facilitate learning, interpersonal interaction, and incentives for completion) comprehensively explain how to improve learners' engagement in mobile learning applications from multiple perspectives, such as education, mobile application design, and marketing.

Declarations

The author(s) declare that there is no conflict of interest in this study.

The authors received approval from the ethics review board of The Ohio State University, USA for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Ansari, M. S., & Tripathi, A. (2017). An investigation of effectiveness of mobile learning apps in higher education in India. *International Journal of Information Studies & Libraries*, 2(1), 33–41.
- AppGrooves. (n.d.). *About AppGrooves*. <https://appgrooves.com/about>
- Aspin, D. N., & Chapman, J. D. (2000) Lifelong learning: concepts and conceptions. *International Journal of Lifelong Education*, 19(1), 2–19.
- Baker, O. (2020, March 24). *8 Mobile App Retention Strategies For 2020 [With Examples]*. Web Engage. <https://webengage.com/blog/mobile-app-retention-strategies/>
- Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education*, 17(2), 1–30. <https://doi.org/10.1186/s41239-019-0176-8>
- Brodie, R. J., Hollebeek, L. D., Jurić, B., & Ilić, A. (2011). Customer engagement: Conceptual domain, fundamental propositions, and implications for research. *Journal of Service Research*, 14(3), 252–271. <https://doi.org/10.1177/1094670511411703>
- Buelow, J. R., Barry, T. A., & Rich, L. E. (2018). Supporting learning engagement with online students. *Online Learning*, 22(4), 313–340. <https://doi.org/10.24059/olj.v22i4.1384>
- Chee, K. N., Yahaya, N., Ibrahim, N. H., & Hasan, M. N. (2017). Review of mobile learning trends 2010–2015: A Meta-Analysis. *Journal of Educational Technology & Society*, 20(2), 113–126. <https://www.jstor.org/stable/10.2307/90002168>
- Chen, R., Wang, Q., & Xu, W. (2019). Mining user requirements to facilitate mobile app quality upgrades with big data. *Electronic Commerce Research and Applications*, 38, 1–11. <https://doi.org/10.1016/j.elerap.2019.100889>
- Cheung, C., Lee, M., & Jin, X. (2011). Customer engagement in an online social platform: A conceptual model and scale development. *International Conference on Information Systems 2011 Proceedings*. 8. <https://aisel.aisnet.org/icis2011/proceedings/onlinecommunity/8>
- Coates H., & Radloff A. (2012) Measurement of student engagement in learning. In N. M. Seel (Ed.), *Encyclopedia of the Sciences of Learning*. Springer. https://doi.org/10.1007/978-1-4419-1428-6_923
- Cooke, A. N., Fielding, K. S., & Louis, W. R. (2016). Environmentally active people: The role of autonomy, relatedness, competence and self-determined motivation. *Environmental Education Research*, 22(5), 631–657. <https://doi.org/10.1080/13504622.2015.1054262>

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Pearson. <https://www.pearson.com/us/higher-education/product/Creswell-Educational-Research-Planning-Conducting-and-Evaluating-Quantitative-and-Qualitative-Research-4th-Edition/9780131367395.html>

Davis, T., & Frederick, T. V. (2020). The impact of multimedia in course design on students' performance and online learning experience: A pilot study of an introductory educational computing course. *Online Learning*, 24(3), 147–162. <https://doi.org/10.24059/olj.v24i3.2069>

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne*, 49(3), 182–185. <https://doi.org/10.1037/a0012801>

Deb, D., Fuad, M. M., & Kanan, M. (2017). Creating engaging exercises with mobile response system (MRS). *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education*. <https://doi.org/10.1145/3017680.3017793>

Freitas, S. I., Morgan, J., & Gibson, D. (2015). Will MOOCs transform learning and teaching in higher education? Engagement and course retention in online learning provision. *British Journal of Educational Technology*, 46(3), 455–471. <https://doi.org/10.1111/bjet.12268>

Dinner, I. M., van Heerde, H. J., & Neslin, S. (2015). Creating customer engagement via mobile apps: How app usage drives purchase behavior. *Tuck School of Business Working Paper No. 2669817*. <https://doi.org/10.2139/ssrn.2669817>

Fang, J., Zhao, Z., Wen, C., & Wang, R. (2017). Design and performance attributes driving mobile travel application engagement. *International Journal of Information Management*, 37(4), 269–283. <https://doi.org/10.1016/j.ijinfomgt.2017.03.003>

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109. <https://doi.org/10.3102/00346543074001059>

Fredricks, J. A., Filsecker, M., & Lawson, M. A. (2016). Student engagement, context, and adjustment: Addressing definitional, measurement, and methodological issues. *Learning and Instruction*, 43, 1–4. <https://doi.org/10.1016/j.learninstruc.2016.02.002>

Guajardo Leal, B. E., Valenzuela González, J. R., & Scott, J. (2019). Student engagement as predictor of xMOOC Completion: An analysis from five courses on energy sustainability. *Online Learning*, 23(2), 105–123. <https://doi.org/10.24059/olj.v23i2.1523>

Guenther, C. L., & Miller, R. L. (2011). Factors that promote engagement. In R. L. Miller, E. Amsel, B. M. Kowalewski, B. C. Beins, K. D. Keith, & B. F. Peden (Eds.), *Promoting student engagement* (Vol. 1, pp. 10–17). Society for the Teaching of Psychology. https://cpltl.iupui.edu/doc/Miller%20et%20al_2011.pdf

- Hannon, K. (2017). Utilization of an educational web based mobile app for acquisition and transfer of critical anatomical knowledge, thereby increasing classroom and laboratory preparedness in veterinary students. *Online Learning*, 21(1), 201–208. <https://eric.ed.gov/?id=EJ1140261>
- Harman, M., Jia, Y., & Zhang, Y. (2012). App store mining and analysis: MSR for app stores. *2012 9th IEEE Working Conference on Mining Software Repositories (MSR)*, 108–111. <https://doi.org/10.1109/msr.2012.6224306>
- Harris, L. R. (2008). A phenomenographic investigation of teacher conceptions of student engagement in learning. *The Australian Educational Researcher*, 35(1), 57–79. <https://doi.org/10.1007/BF03216875>
- Hegarty, B., & Thompson, M. (2019). A teacher's influence on student engagement: Using smartphones for creating vocational assessment ePortfolios. *Journal of Information Technology Education: Research*, 18, 113–159. <https://doi.org/10.28945/4244>
- Hew, K. F. (2016). Promoting engagement in online courses: What strategies can we learn from three highly rated MOOCs: Engagement: lessons from MOOCs. *British Journal of Educational Technology*, 47(2), 320–341. <https://doi.org/10.1111/bjet.12235>
- Hollebeek, L. (2011). Exploring customer brand engagement: definition and themes. *Journal of Strategic Marketing*, 19(7), 555–573. <https://doi.org/10.1080/0965254x.2011.599493>
- Hong, Y., & Gardner, L. (2019). Undergraduates' perception and engagement in Facebook learning groups. *British Journal of Educational Technology*, 50(4), 1831–1845. <https://doi.org/10.1111/bjet.12672>
- Hwang, G. J., & Wu, P. H. (2014). Applications, impacts and trends of mobile technology-enhanced learning: A review of 2008–2012 publications in selected SSCI journals. *International Journal of Mobile Learning and Organisation*, 8(2), 83–95. <https://doi.org/10.1504/ijmlo.2014.062346>
- IEEE. (1990). IEEE standard glossary of software engineering terminology. *IEEE Std 610.12-1990*, 1–84. <https://doi.org/10.1109/ieeestd.1990.101064>
- Khalid, H., Shihab, E., Nagappan, M., & Hassan, A. E. (2015). What do mobile app users complain about? *IEEE Software*, 32(3), 70–77. <https://doi.org/10.1109/ms.2014.50>
- Kim, S., & Baek, T. H. (2018). Examining the antecedents and consequences of mobile app engagement. *Telematics and Informatics*, 35(1), 148–158. <https://doi.org/10.1016/j.tele.2017.10.008>
- Kuh, G. D. (2001). Assessing what really matters to student learning: Inside the National Survey of Student Engagement. *Change: The Magazine of Higher Learning*, 33(3), 10–17. <https://doi.org/10.1080/00091380109601795>

- Lele, S. (2015, March 2). *8 Tips for Boosting App Retention: Create an App for the Long Run*. Business 2 Community. <https://www.business2community.com/mobile-apps/8-tips-boosting-app-retention-create-app-long-run-01172687>
- 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>
- McLean, G. (2018). Examining the determinants and outcomes of mobile app engagement—A longitudinal perspective. *Computers in Human Behavior*, 84, 392–403. <https://doi.org/10.1016/j.chb.2018.03.015>
- Nielsen, J. (1993). *Usability engineering*. Morgan Kaufmann.
- Mobile Operating System Market Share Worldwide. (December 2020). *statcounter GlobalStats*. <https://gs.statcounter.com/os-market-share/mobile/worldwide>
- Noel, D., Stover, S., & McNutt, M. (2015). Student perceptions of engagement using mobile-based polling as an audience response system: Implications for leadership studies. *Journal of Leadership Education*, 14(3), 53–70.
- Pechenkina, E., Laurence, D., Oates, G., Eldridge, D., & Hunter, D. (2017). Using a gamified mobile app to increase student engagement, retention and academic achievement. *International Journal of Educational Technology in Higher Education*, 14(1), 1–12. <https://doi.org/10.1186/s41239-017-0069-7>
- Pham, X. L., & Chen, G. D. (2019). PACARD: A new interface to increase mobile learning app engagement, distributed through app stores. *Journal of Educational Computing Research*, 57(3), 618–645. <https://doi.org/10.1177/0735633118756298>
- Pham, X. L., Nguyen, T. H., Hwang, W. Y., & Chen, G. D. (2016). Effects of push notifications on learner engagement in a mobile learning app. *2016 IEEE 16th International Conference on Advanced Learning Technologies (ICALT)*, 90–94. <https://doi.org/10.1109/icalt.2016.50>
- Pongwat, A. (2019). Investigating the voice of customers for m-learning application quality. *Proceedings of the European Conference on E-Learning*, 486–494. <https://doi.org/10.34190/EEL.19.071>
- Qiu, J. (2019). A review of mobile learning research at home and abroad in recent 20 years. *Journal of Language Teaching & Research*, 10(5), 1097–1102. <https://doi.org/10.17507/jltr.1005.24>
- Reeve J. (2012) A self-determination theory perspective on student engagement. In S. L. Christenson et al. (Eds), *Handbook of Research on Student Engagement* (pp. 149–172). Springer. https://doi.org/10.1007/978-1-4614-2018-7_7

- Rosson, M. B., & Carroll, J. M. (2002). *Usability engineering: Scenario-based development of human-computer interaction*. Academic Press.
- Sadaf, A., Martin, F., & Ahlgrim-Delzell, L. (2019). Student perceptions of the impact of quality matters-certified online courses on their learning and engagement. *Online Learning*, 23(4), 214–233. <https://doi.org/10.24059/olj.v23i4.2009>
- Statista Research Department. (2021, July 6). *Mobile app user retention rate worldwide 2020, by vertical*. Statista. <https://www.statista.com/statistics/259329/ios-and-android-app-user-retention-rate/>
- Sun, Y., Ni, L., Zhao, Y., Shen, X. L., & Wang, N. (2019). Understanding students' engagement in MOOCs: An integration of self-determination theory and theory of relationship quality. *British Journal of Educational Technology*, 50(6), 3156–3174. <https://doi.org/10.1111/bjet.12724>
- Tarantino, K., McDonough, J., & Hua, M. (2013). Effects of student engagement with social media on student learning: A review of literature. *The Journal of Technology in Student Affairs*, 1(8), 1–8. http://www.studentaffairs.com/ejournal/Summer_2013/EffectsOfStudentEngagementWithSocialMedia.html
- Tarute, A., Nikou, S., & Gatautis, R. (2017). Mobile application driven consumer engagement. *Telematics and Informatics*, 34(4), 145–156. <https://doi.org/10.1016/j.tele.2017.01.006>
- Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27(2), 237–246. <https://doi.org/10.1177/1098214005283748>
- Trowler, V. (2010). *Student engagement literature review*. The Higher Education Academy. <https://www.advance-he.ac.uk/knowledge-hub/student-engagement-literature-review>
- Tucker, C., & Kim, H. M. (2011). Predicting emerging product design trend by mining publicity available customer review data. *18th International Conference on Engineering Design (ICED11)*, 6, 43–52.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Vivek, S. D., Beatty, S. E., & Morgan, R. M. (2012). Customer engagement: Exploring customer relationships beyond purchase. *Journal of Marketing Theory and Practice*, 20(2), 122–146. <https://doi.org/10.2753/mtp1069-6679200201>
- Wu, W., Wu, Y. J., Chen, C., Kao, H., Lin, C., & Huang, S. (2012). Review of trends from mobile learning studies: A meta-analysis. *Computers & Education*, 59(2), 817–827. <https://doi.org/10.1016/j.compedu.2012.03.016>

Zepke, N., & Leach, L. (2010). Improving student engagement: Ten proposals for action. *Active Learning in Higher Education*, 11(3), 167–177. <https://doi.org/10.1177/1469787410379680>

Zhang, H., Lin, L., Zhan, Y., & Ren, Y. (2016). The Impact of teaching presence on online engagement behaviors. *Journal of Educational Computing Research*, 54(7), 887–900. <https://doi.org/10.1177/0735633116648171>

Zuniga, A., Flores, H., Lagerspetz, E., Tarkoma, S., Manner, J., Hui, P., & Nurmi, P. (2019). Tortoise or Hare? quantifying the effects of performance on mobile app retention. In *Proceedings of the 2019 World Wide Web Conference (WWW '19)* (pp. 2517–2528). <https://doi.org/10.1145/3308558.3313428>

Learning Presence and the Reconceptualization of Language and Literacy Teachers' Online Professional Development

Faridah Pawan
Rajagopal Sankaranarayanan
Rodney Myers
Dorcas Miao
Indiana University, USA

Abstract

Besides teaching the way they were taught, teachers teach the way they learned (Oleson & Hora, 2014). Thus, if teachers are to be guided to teach online effectively, their learning experiences and the ways they learn online need to be understood. This study focused on second/foreign language and literacy teachers' (LLTs) Learning Presence (LP) as they engaged online to update their teaching expertise in a formal, doctoral-level professional development program (PD). LP is defined as individuals' self- and co-regulation of their behaviors in online environments in order to be effective learners (Shea et al., 2014). We undertook a mixed-method study involving a content analysis of 9 weeks of online seminar discussions, a 27-question survey that corresponded to Shea et al.'s (2014) LP framework and interviews with the LLTs. The prevalent patterns in the LLTs' online engagement that emerged were in the Strategy Use and Monitoring LP categories. They demonstrated the nature of the engagement amongst LLTs, including peer-to-peer and heterarchical learning. The findings also provided evidence that when supported by the affordances of the online medium, the LLTs' straddled "professionalization and professionalism" goals. In terms of the implications, the findings suggested a reconceptualization of three existing teacher PD models, including that of Darling-Hammond et al.'s (2017). The research's limitations were also identified, pertaining to the way the study was structured, its instruments and their implementation, as well as the constraints of the LP framework itself. Finally, the study concluded with the next steps in research to address the limitations.

Keywords: learning presence, language and literacy teachers, online teacher professional development

Pawan, F., Sankaranarayanan, R., Myers, R., & Miao, D. (2021). Learning presence and the reconceptualization of language and literacy teachers' online professional development. *Online Learning*, 25(4), 49-73. DOI:10.24059/olj.v25i4.2888

This study focuses on second/foreign language and literacy teachers' (LLTs) online Learning Presence (LP) (Shea & Bidjerano, 2010). In the U.S. the online teaching skills and expertise of these teachers are vital to support second language learners of English, also known as English Learners (ELs). At the height of the pandemic, less than half of ELs who had access to online learning programs actually logged in to their online classes (Sugarman & Lazarin, 2020). As a result, much of the country experienced sharp increases in the percentage of ELs failing to attain grade level achievement, as they learned through the online medium. In a California school district, for example, failures jumped from 34% to 50% (U.S. Department of Education, 2021). Given the fact that online schools and instruction are "here to stay" (Singer, 2021) in the post-pandemic era, LLTs' online pedagogical knowledge needs to be closely studied so that they can be supported to serve their online ELs in the most effective way.

One of the most influential sources of teaching knowledge, besides the way they were taught, is the ways teachers themselves learned (Oleson & Hora, 2014). Thus, this study focuses on an analysis of K-12 teachers' online learning experiences. This research is thus timely in that the recent and sudden immersion of classroom teachers in the online medium left many unprepared. In the U.S., for example, prior to 2020, 70% of teachers and educators did not have any experience teaching online (Hechinger & Lorin, 2020) and had little prior knowledge to draw upon to inform their teaching. Thus, if teachers are to be guided to teach online effectively, their own online learning experiences need to be understood.

We undertook a mixed method study consisting of a content analysis of discussions supported by survey findings and interviews. In this LP research, we focused on LLTs who were mid-career teacher professionals pursuing advanced doctoral-level education. In our context, the enrollment of teachers in the online doctoral program has increased significantly in the last few years. Between the fall of 2015 and the fall of 2020, we had an enrollment increase of 242% and this mirrors a national trend of steep enrollment increases in online doctoral programs in general (Vinson, 2020). There is thus a situated need for this study. The main research question for the study is: "What are the LP patterns in LLTs' engagement in an online doctoral-level classroom?"

Literature Review and Theoretical Framing

In this section, we discuss Learning Presence (LP) as a theoretical concept and review existing research on its various aspects. We also discuss research in the field of Second/Foreign Language Teaching and Learning (SFLTL) that is related to Teaching, Social and Cognitive Presences (TP, SP, & CP respectively) in Garrison et al.'s (2001) Community of Inquiry (CoI) framework. The reviews in both areas demonstrated that our research fills a gap in an area of research in online SFLTL and contributes to ongoing explorations in LP as a lens for understanding online engagement.

Learning Presence as a Concept in CoI: A Continuing Conversation

The literature review in this section demonstrates that LP remains an evolving and contested concept. Nevertheless, LP's components in the framework that encompass the concept, address the specific purposes of this research, namely, to understand the ways teachers as learners in the study took charge of their online engagement for learning.

Shea et al. (2014) defines learning presence (LP) as individuals' self- and co-regulation of their behaviors in online environments to be effective learners. Through research (Shea & Bidjerano, 2010, 2012; Shea et al., 2014), they converged on the concept and its subsequent framework. Their theoretical perspective is informed by Bandura's (1986) and Zimmerman's (2011) sociocognitive influences (see Table 1). There are three identifiable learner self- and co-regulated phases in the framework, namely, forethought (planning, coordinating, and task delegation), performance (monitoring and strategy use), and reflection.

Amidst the ongoing LP research as a concept, its place in CoI remains contested. Through primarily quantitative studies, Shea and his colleagues took the position that learning presence had been left out of the CoI or unnecessarily subsumed under the three other presences (Shea & Bidjerano, 2012). However, Garrison and Akyol (2013) argued that LP was already inherent and manifested in the intersections of the existing CoI's three presences. In such a community, all participants, including teachers and students alike shared responsibilities to facilitate and direct the co-construction of meaning for themselves and each other.

In response, Shea and his colleagues countered that the three existing presences had generally been approached primarily from the instructors' perspective (see Shea & Bidjerano, 2010, Shea & Bidjerano, 2012; Shea et al., 2014). In particular, the focus had previously been on instructors facilitating and setting up of the instructional environment (Teaching Presence); in drawing out authentic projections of themselves as well as that of their students in interactions (Social Presence); and in engaging students through the cyclical stages of triggering, exploration, integration and resolution of ideas (Cognitive Presence). These three presences alone were unable to fully explain student agency, or "the attitudes, abilities, and behaviors that active and engaged students bring to their individual and collaborative online activities" (Shea et al., 2014, p. 10). Furthermore, collapsing LP into the other presences, Shea et al. (2014) asserted, did not reflect the reality of teachers' and students' power dynamics and differentials. Instructors are assumed to be experts, but students are compelled to participate in ways that demonstrated their competency (Shea et al., 2014, p. 11). Teachers design courses and facilitate as well as support students by finding ways to draw students into the center of the learning community. Students, on the other hand, must demonstrate ways in which they are doing so and are attaining instructor-determined performance goals.

Table 1
Learning Presence Categories and Indicators

Category	Indicators
Forethought and Planning	<p>Goal Setting: Learner decides upon specific actions and outcomes.</p> <p>Planning: Learner decides on methods or strategies appropriate for the task.</p> <p>Coordinating Tasks: Learner distributes and sequences sub-tasks to other/self for future completion.</p>
Monitoring	<p>Checking for Understanding: Learner seeks verification of understanding of task, events, or processes.</p> <p>Identifying Problems: Learner identifies difficulties or problems that interfere with completion of tasks, performances, products, or other outcomes.</p> <p>Noting Completion: Learner makes comments that indicate that certain tasks or activities have been finished to support attaining a goal.</p> <p>Evaluating Quality: Learner evaluates the quality of a product, its content, or its parts as working toward completion.</p> <p>Taking Corrective Action: Learner makes statements that monitor individual or group performance that results in corrective action based on feedback or reflection.</p>

Appraising Engagement: Learner comments about self or others' engagement, interest, commitment, or participation (includes personal "reactions" to tasks, materials, and activities).

Recognizing Learning Behaviors: Learner makes statements about individual or group preferences, strengths, or weaknesses as learners.

Advocating Effort: Learner encourages others to contribute or focus on interest, commitment, or participation (includes personal "reactions" to tasks, materials, and activities).

Noting Use of Strategies: Learner makes statements that illustrate that they are mindful and aware of the strategies that they are using.

Strategy Use	<p>Seeking or Offering Help: Learner requests, offers or provides assistance related to learning materials, tasks, processes, or products.</p> <p>Recognizing Knowledge Gap: Learner makes statements indicating that they are aware of a gap in knowledge and its connection to the current task, process, or product.</p> <p>Reviewing: Learner makes comments noting the need to review or to complete reviewing content related to the course.</p> <p>Noting Outcomes: Learner makes statements in which they acknowledge the relevance of current tasks or processes to a future outcome.</p> <p>Seeking and Offering Information: Learner looks beyond course content and materials to locate additional information to deepen understanding.</p>
Reflection	<p>Change in Thinking: Learner makes statements that indicate a change in thinking as a result of a process, product, or outcome.</p> <p>Causal Attribution: Learner makes statements in which they credit their results to their performance (i.e., use of forethought, planning, monitoring, strategies).</p>

Note. The chart is adapted from Shea, P., Hayes, S., Uzuner-Smith, S., Gozza-Cohen, M., Vickers, J. and Bidjerano, T. (2014). Reconceptualizing the community of inquiry framework: An exploratory analysis, *Internet and Higher Education*, 23, 15–16. <https://doi.org/10.1016/j.iheduc.2014.05.002>. We abbreviated the original chart by juxtaposing the indicators and their descriptions. We also did not include example quotes and sources that were provided in the original chart.

Existing research involving LP demonstrates that there are continuing efforts to refine and formulate Shea et al.'s (2014) articulation of the LP's conceptual framework. One set of research focused on refining LP's components as a learning construct. For example, in a study of 180 U.S. undergraduate students, Cho et al. (2017) argued that self-regulated learning (SRL) was a critical component in LP because it was the primary factor that influenced the students' sense of achievement and confidence. Their findings resonated with that of Pool & Reitsma's (2017) findings that SRL skills such as time management, coordination, and management of tasks were critical LP components of 58 South African teacher-trainees. In Kang et al.'s (2014) study, LP as a construct, consisted of Cognitive, Emotional, and Social Presences. Using these LP components, they demonstrated that each could predict different outcomes, namely improvement, satisfaction, and achievement outcomes, respectively.

There was also research undertaken that strove to show LP's impact on learning that correlated with the original CoI presences. For example, using a Chinese CoI version that included LP, Ma et al. (2017) surveyed 350 Chinese undergraduate students and concluded that a correlation was evident between increased students' perceptions of LP and higher levels of TP, SP, and CP. In a qualitative study, Scott et al. (2016) researched students in informal learning virtual spaces, in a Master's program. The cognitive benefits of LP correlated with that of CP's. In their survey of 696 online 8th to 12th grade students, Zhang and Lin (2021) provided

empirical evidence that the cumulative effects of the Teaching (TP), Cognitive (CP), and Learning (LP) Presences led to higher course satisfaction and course grades.

A third line of research focused on the unique insight LP was able to yield about learning and learners that eluded the three existing Presences. Popescu and Badea (2020) explored LP along with the Presences in a blended learning environment through a content analysis of students' blog posts and tweets. The researchers found that the use of LP enabled them to identify students' self- and co-regulatory behaviors, barely reflected by the other Presences. Blaine's (2019) research demonstrated that there were opposing differences between teachers' and students' perceptions of the success of a high school's Virtual Advanced Placement courses. The student views could only be captured when LP was used in the qualitative content analysis in conjunction with CoI. Witthaus (2018) utilized LP in her analysis of the MOOC experiences of 10 refugees in Germany. Only with LP, was she able to identify these individuals' goal setting and planning strategies for their learning, amidst the chaotic uncertainty of their circumstances.

Although, LP's place in CoI remains unresolved and LP as a concept is still the subject of active investigation, the mixed-method research reported here served to add another layer to the ongoing conversation. It did so by looking into LP's utility as a lens to bring to light the online learning patterns of teachers as learners. This learner perspective could provide insights into students' efforts to take charge of their own learning that could complement their instructors' efforts to improve online teaching and learning.

CoI and Online Presences in Second/Foreign Teaching and Learning (SFLTL)

Garrison, Anderson, and Archer's (2001) CoI framework has been the guiding framework in online learning and teaching research SFLTL. Social (SP), Cognitive (CP) and Teaching (TP) Presences are fundamental in research in the area. However, our survey of research revealed that that LP in SFLTL is largely unexplored. Thus, the current research attempts to fill the gap in LP research in the area.

A review of current research (2015–2020) in SFLTL from research journals, conference proceedings, and dissertations identifies several observable trends in the study of online presences. One trend is the identification of CoI's existing Presences in online language learning experiences (see Toyoda, 2015; Sarieva & Badrinathan, 2016; Tunceren, 2017; Nami et al., 2018; Omohundro, 2019; and Gunter et al., 2019). For example, Toyoda (2015) explored CP in a Japanese-as-a-foreign language course in which Australian students developed, shared, and discussed their videos through YouTube and Facebook with peers in Japan to increase intercultural awareness. Discussions between the two groups demonstrated higher order thinking—reflection, synthesis, and analysis—that was further facilitated by TP and SP.

The second line of inquiry is on the roles and impact of those Presences. In particular, research has focused on how those presences contributed to effective online language teaching and learning that led to successful performances (see, for example, Batardiè, 2015; Konstantinidis & Gorla, 2016; Rodriguez, 2016; Ozbek et al., 2017; Rubio et al., 2018; Schumann, 2019). For example, Ozbek et al.'s (2017), demonstrated that English teachers' TP in a Turkish university's English class undertaken in Second Life, an online virtual world, positively affected communicative engagement amongst English-as-a-Foreign language (EFL) students. The TP involved a range of scaffolding pre-activities, including role-playing scenario designs and translation checks. All served to increase authenticity and just-in-time support to enhance language use (instead of language knowledge) that is primary in language acquisition.

The implementation of tools and interventions to enact the Presences in language teaching has also been a subject of investigation (see, for example, Shin, 2016; Sun et al., 2017;

Elverici & Karadeniz, 2018; Fornara & Lomicka, 2019). Of particular interest to researchers has been the use of social media tools and instructional approaches in establishing SP to enhance community building in the classroom. For example, Fornara and Limicka (2019) researched French and Italian teachers' use of Instagram by U.S. undergraduate students studying the languages. They found that in using the application, students posted a high density of visual "self-disclosure" activity posts, an SP community building indicator. Such public sharing of posts raised curiosity that drew the classroom community together in actively seeking language practice beyond the classroom.

Finally, Kurek and Müller-Hartmann's (2019) is the only research that we uncovered thus far in SFTL to include LP. It was an action research of 38 Polish and German students training to be Teachers of English to Speakers of Other Languages (TESOL). The research demonstrated that LP worked in tandem with TP to counterbalance tensions and challenges in the ways the international team of teachers in a virtual classroom worked together. This was achieved by engaging the teacher trainees in the preparatory design task phase, where they were given the opportunity to take charge of designing rules of conduct and problem-solving.

The review above of CoI-related SFLTL research in the virtual environment demonstrated that, except for LP, the existing presences (TP, SP, and CP), prevailed in the area. The research reported in this manuscript thus undertook an inquiry to address the absence of studies in LP. There is also both a need and value in our immediate context to studying LLTs in SFLTL who are doctoral students. As mentioned earlier, in our program, enrollment of teachers in doctoral programs has increased dramatically the last five years. Most of these doctoral students are part-time students who are fully employed. This is not surprising; the online medium has provided a means for professionals such as these students to maintain their jobs while pursuing their tertiary goals, and thus the reason for their predominance nationally in higher education programs in the medium (Bamforth, 2021).

The literature review above provides the justification for our research. We undertook the research because, as demonstrated above, we wanted to explore the ability of LP, as defined by Shea et al (2014), to trace the patterns of learners' engagement from a relatively new lens. Also, this research is timely because LP is an under-researched area in SFLTL and is needed in our context. Our research question thus centered on the LP patterns of language and literacy teachers' (LLTs) engagement in an online doctoral-level classroom.

Method

We undertook a mixed-method study consisting of a content analysis of discussions supported by descriptive statistics from a survey. The study also included individual interviews with highly engaged students. Thus, to identify LP patterns and instances, we undertook a content analysis (Woods et al., 2002) of discussions in an LLTs' online classroom using Shea et al.'s (2014) LP framework. We then triangulated our findings in two ways. First, to situate them in a larger context, we developed and sent out a survey to all LLTs in an online doctoral program (see Appendix A). Finally, to gain deeper insight and to contextualize the findings in the reasons behind the LP patterns, we interviewed the LLTs in the online classroom.

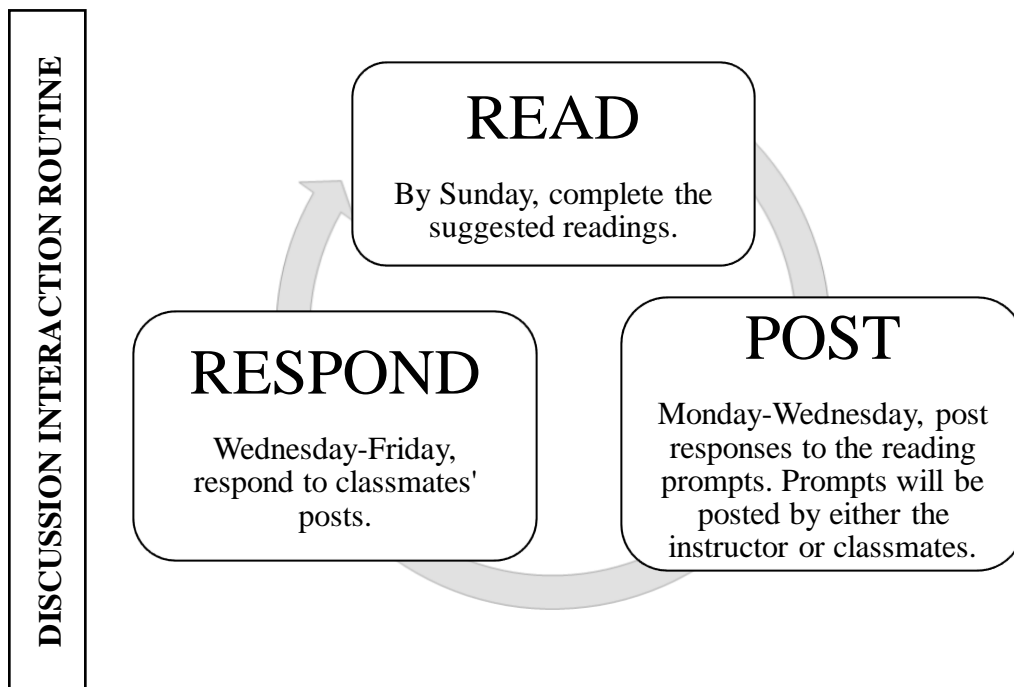
Research Context

The research was conducted in a 16-week online seminar that took place in the 2019–2020 academic year. The seminar explored the intersections of theory, research, and practice in second/foreign language and literacy. The participants were 17 second/foreign language teaching

and literacy professionals who were pursuing the online doctorate. The LLTs ranged in age from the mid-thirties to their late fifties, with two-thirds of the students being females, which is a norm for this particular online doctoral program as a whole. All were fully employed as language/literacy teachers and/or teacher educators (LLTs). Thus, the LLTs were pursuing their education while continuing in their jobs.

In the online class, although the instructor developed a syllabus and a readings list, the LLTs had the option of selecting readings provided for discussions or using readings they selected from elsewhere. The instructor and the LLTs also took turns posting questions and/or discussion prompts for discussions.

Figure 1
Class discussion routine



Data Collection and Analysis

Data were collected from three sources. The first source of data consisted of 9 weeks of class discussions (1,614 speech segments, 720 postings, 145,810 words). The second source was responses from a survey sent out to all LLTs in the online program, consisting of 27 questions based on Shea et al.'s (2014) LP categories and indicators (see Appendix A). The response return rate was 47.2% (34 of 72). Finally, for a deeper analysis and to uncover reasons for the LP patterns utilized, we focused on the (volunteer) interview responses (40 minutes each) of three of

the most engaged individuals, identified from the course analytics that showed them to lead in the number of messages they sent out and the responses they received from classmates.

To uncover instances of LP patterns as per Shea et al.'s (2014) categories and indicators, we focused on data collected from the LLTs' discussions. We chose to look at 9 weeks where discussions were the core of the class and excluded the early weeks that consisted of them figuring out class logistics and the weeks that they were working on individual assignments. Six coders initially worked in pairs before all of them came together to compare their coding. Before the coding, they spent eight weeks discussing and familiarizing themselves with Shea et al.'s (2014) framework. The coders were also trained to use speech segments as a unit of analysis. Henri and Rigault (1996) defined a speech segment as "the smallest unit of delivery linked to a single theme, directed at the same addressee (all, individual, subgroup), identified by a single type (illocutionary act), having a single function (focus)" (p. 62). An example is provided below:
Edward, [i.e., targeted at an individual]

This resonated with me as the idea of the teaching-learning transaction [i.e. the overall theme]. It really is two sides of the same coin. Also, that instead of focusing on teaching that we focus on LEARNING. If we learn how to coach learners instead of how to "teach" a person [i.e. focus within the theme], I think we will overall be more successful [i.e. the illocutionary act of intent]. (Naomi, First Quarter, 2019–2020 Academic Year)

The coders then undertook a content analysis of individual discussions, using Shea et al.'s framework to describe LP patterns, as per the focus of this study. They then met to compare their work and to discuss any disagreements. The cumulative interrater agreement across the three groups was at 83.3%, determined by the number of agreements over total agreements and disagreements (Bauer, 2000).

To situate the LP findings from the class discussions within the opinions of the larger group, we developed an online survey, using Shea et al.'s (2014) indicators (see Table 3). The survey was sent to all LLTs in the online program at the time. The survey consisted of 27 questions that corresponded to each learning indicator as per the protocol by Shea et al. (2014). We used the Likert Scale consisting of Always, Often, Sometimes, Seldom, and Never (see Appendix A). The information provided a triangulating insight into the ways the LP patterns displayed in classroom discussions reflected or did not reflect the engagement patterns reported by LLTs in the program.

To uncover the reasons for the LP presence, we undertook 40-minute individual interviews with 12 students who made themselves available to do so. However, we focused on the responses from three of the most highly engaged students. We identified the reasons provided by the students, question by question (see Appendix B for questions).

Findings

The findings from the three sources of data triangulated the information we sought to answer the study's research question on LP patterns. Thus, below we report the findings from the content analysis, the survey, and the interviews.

Content Analysis Findings

Using Shea et al. (2014) framework (see Table 1), the content analysis enabled us to trace LP patterns in the classroom discussions. From the discussion segment of the class, 1,326 out of

1,614 segments (82.2%) were coded using the framework. In descending order, the coding demonstrated LP categories in the following manner: *Strategy Use* (605); *Monitoring* (566); *Forethought and Planning* (100); and *Reflection* (55).

Table 2
Classroom-Based Content Analysis Findings

Categories	Indicators	Indicator Total	%	Category Total	%
Forethought & Planning	Goal setting	35	2.64	100	7.54%
	Planning	53	4.00		
	Coordinating tasks	12	0.90		
	Checking for understanding	31	2.34		
	Identifying problems	56	4.22		
Monitoring	Noting completion of tasks	8	0.60	566	42.68%
	Evaluating quality	88	6.64		
	Taking corrective action	13	0.99		
	Appraising engagement	272	20.51		
	Recognizing learning behaviors	12	0.90		
	Advocating effort	69	5.20		
	Noting the use of strategies	17	1.28		
Strategy Use	Seeking or offering help	60	4.53	605	45.63%
	Recognizing knowledge gap	60	4.53		
	Reviewing	8	0.60		
	Noting outcome expectations	14	1.05		
Reflection	Seeking/ offering information	463	34.92	55	4.15%
	Change in thinking	46	3.47		
	Causal attribution	9	0.68		

In *Strategy Use*, LLTs focused predominantly on “Seeking/Offering Information” (463 segments). This indicator is defined by learners going beyond classroom materials for more information to deepen understanding. Edward’s quote below is illustrative in that he was offering information on materials that he had read elsewhere:

I feel that the work of psychology researchers and others in the field are necessary to complete the picture and do a much better job explaining such non-cognitive factors and how it relates to student language learning. (Edward, First Quarter, 2019–2020 Academic Year)

Monitoring was the next category coded most frequently, particularly pertaining to the indicator of “Appraising Engagement” (272 segments) whereby the LLTs commented or expressed reactions to their own or that of their classmates’ input and participation. Yvette’s quote below demonstrated that she appraised and assessed her classmate’s contribution in terms of its value:

I now see value in approaching power and privilege through your way of combining a critical cosmopolitan theoretical framework with critical literacy pedagogical practices. Where U.S. students have opportunities to view, consider, unpack, and critique the experiences of students in countries outside the U.S. they will be more likely to engage in higher levels of empathy and 'conscientization'... (Yvette, Second Quarter, 2019–2020, Academic Year)

Within the category of *Forethought and Planning*, the “Planning” (53 segments) indicator is exemplified by the following quote that demonstrates that “observation” was the planned action:

I am trying to make connections between ZPD and a learner’s motivations for learning a language. How much of language learning motivations are fully taken into account in Lantolf et al’s position, is what I am trying to observe through this week’s readings. (Rose, Second Quarter, 2019–2020 Academic Year)

Shea et al.’s *Reflections* category and its indicators were also coded in the discussions portion of the class with 55 segments. Of these, 46 segments were coded for “Change in Thinking” and the rest for “Causal Attribution” (9 segments). In the following quote, the LLT could be seen attributing the discussions with peers and his own efforts to his increased understanding:

I had an “aha” moment after reading and discussing about narratives this week.... On top of that, going through 12 years of photos for the multimodality aspect deepened my reflection, and ultimately, my understanding of the multi-literacies experience. (Cormac, Second Quarter, 2019–2020 Academic Year)

The content analysis of classroom discussions demonstrated that although all categories were reflected in the LLTs’ discussions, *Strategy Use* (605 segments) and *Monitoring* (566 segments) were the categories defining their LP patterns. They constituted 88.31% of the learning engagement.

Survey Findings

To situate findings in a larger context, we administered a survey to the LLTs in the online program at the time of the study. We focused on responses in the “Often” column, where the highest responses were found. We considered, thus, the responses in this column to be the most representative of the surveyed students’ opinions as a whole.

Table 3
Survey Responses of Students in the Online Doctoral Program

Categories	Indicators	Participants Reporting “Often”	Percentage of Respondents
Forethought & Planning (FOR)	FOR-Goal setting	7	20.59%
	FOR-Planning	7	20.59%
	FOR-Coordinating tasks	6	17.65%
	All FOR Indicators	20	19.61%
Monitoring (MON)	Checking for understanding	16	47.06%
	Identifying problems	15	44.12%
	Noting completion of tasks	5	14.71%

	Evaluating quality	16	47.06%
	Taking corrective action	12	35.29%
	Appraising engagement	12	35.29%
	Recognizing learning behaviors	12	35.29%
	Advocating effort	10	29.41%
	Noting the use of strategies	13	38.24%
	All MON Indicators	111	36.27%
Strategy Use (SU)	Seeking or offering help	7	20.59%
	Recognizing knowledge gap	16	47.06%
	Reviewing	13	38.24%
	Noting outcome expectations	19	55.88%
	Seeking/ offering information	14	41.18%
	All SU Indicators	69	40.59%
Reflection (RF)	Change in thinking	8	3.85%
	All RF Indicators	8	3.85%

Similar to the classroom-based findings, *Monitoring* and *Strategy Use* ranked high in the “Often” column of the survey. The findings, however, showcased that different indicators were ranked differently in the survey and classroom-based findings (see Table 5). For example, under the *Strategy Use* category, in the survey and under the “Often” column, “Noting Outcomes” and “Recognizing Knowledge Gaps” ranked highest, whereas “Seeking or Offering Information” and “Seeking or Offering Help” were most frequently identified in the content analysis in the classroom-based findings. Under the category of *Monitoring*, “Checking for Understanding” was ranked first in the survey, while that was the case for “Appraising Engagement” in classroom discussions.

Table 4
Comparison of Most Frequent Survey Responses and Coding of Classroom-Based Discussions

LP Categories	Program Survey	Classroom discussions
Strategy Use	1. Noting Outcomes 2. Recognizing Knowledge Gaps	1. Seeking or Offering Information 2. Seeking or Offering Help
Monitoring	1. Checking for Understanding 2. Evaluating Quality	1. Appraising Engagement 2. Evaluating the Quality
Forethought & Planning	1. Planning 2. Goal Setting	1. Goal Setting 2. Planning
Reflection	1. Change in Thinking	1. Change in Thinking

Interview Findings

We report here the responses from the three students (see Appendix B for interview questions). Questions 1 and 2 asked students to indicate why their LP primarily consisted of seeking/providing information and monitoring/appraising their own and that of others' participation. In response to Question 1, the LTTs interviewed indicated that seeking and offering information were the ways they learned as expressed by Valerie (September 2020) who had the following to say:

This is the way we learn... We are all together...my classmates, my professor, and the fishbowl guests we all join in. I am reading and responding to their stuff and vice versa.

On his part, Donovan pointed out this way of learning was of mutual benefit to him and his classmates:

When I contribute, I also learn. I make connections I did not make before and come up with something new. (August 2020)

In response to question 2 regarding their pattern of appraising engagement, the following LLTs' responses indicated two reasons, namely, to check for connections to their area of study and the other, the connections to their work.

In the class, the information is always available. I am looking to find information that contextualizes my understanding of the concepts...By following discussions, I am collecting theories I can use for my research. (Edward, August 2020)

Donovan, on his part, had the following to say:

I look for ways that others can help me to draw out my understanding of the things we talked about. (August 2020)

The quotes below, on their part, reflect that the LLTs were looking for ideas to inform their practice:

Because we are in our settings...are from everywhere, Egypt, Afghanistan, Japan, Korea, and Alabama...no matter...we can test our ideas immediately in our own classrooms. (Donovan, August 2020)

Valerie's quote below shows that she was using the discussions to go beyond her practice and to find ways to continue to serve in her immediate environs:

I am getting help from others for teaching ideas. Everybody in the class has been there like me. The discussions help me move beyond my "practice shell" ...Teachers are socio-professionals as you said...we look for ways to be able to connect and give back to our community. (Valerie, September 2020)

Discussions and Implications

In this section, we discuss the significance of the findings and their implications to teacher professional development in the online environment. The significance relates to the findings' demonstration of the ways the affordances in the online medium reinforced student-driven "epistemic engagement." The affordances also enabled the juxtaposition of "professionalization and professionalism." In terms of the implications, the findings suggested a reconceptualization of existing teacher professional development (PD) models.

The prominence of the *Strategy Use* category, specifically its "Seeking/Offering Information" indicator in both the classroom discussion and the survey, demonstrated the nature of the students' online engagement at the doctoral level. The "Seeking and Offering Information"

indicators helped to showcase specifically how the LLTs sustained the socio-constructivist group knowledge building or “epistemic engagement” as defined by Larreamendy-Joerns and Leinhardt (cited in Shea & Bidjerano, 2010, p. 1722). In that sense peer-to-peer learning defined engagement at this advanced level and involved doctoral students relying on each other as “learning partners” (Flores-Scott & Nerad, 2012, p. 74) in a horizontal heterarchical process (Hedlund, 1986) of peer apprenticeship based on reciprocity. As Donovan indicated in the August 2020 interview, it was through that approach that he enacted his LP; when he contributed to others, he learned in return.

The online medium served to reinforce this type of student-driven engagement as it enabled the LLTs themselves to witness learning unfolding in a deliberative, and “public way” (Smith & MacGregor, 1992, p. 11) as they worked together. This transparency, afforded by the medium, engaged LLTs in a collaboration that enabled them to follow, contribute to and support each other as they moved toward the same goal of uncovering, making sense of, validating, transforming, and creating knowledge. Also, the prevalence of LP patterns in the findings on “Seeking/Offering information,” resonated with research on the value professionals place in using the online medium to update their knowledge. For example, Milligan et al.’s (2014) research demonstrated that the medium is useful when it can facilitate the “4C” stages that take professionals beyond merely consuming pre-structured information to a collaborative stage where they can partake in connecting, creating, and contributing to the learning of others.

The prominence of the Monitoring LP category in the classroom discussion and the survey findings reflects the reality that the online medium enabled the LLTs to straddle professionalization and professionalism goals. Crandall (1993) defined the former as experiences over a specified amount of time, at the end of which, individuals are formally credentialed, such as receiving an EdD in the case of this study’s LLTs. The latter, professionalism, refers to the process of life-long learning that individuals engage in to sustain and improve their expertise to serve needs in their context, for as long as they are in their profession. As online doctoral students, the LLTs’ LP enactment reflected them processing information for their own individual purposes of obtaining the doctorate (i.e., their professionalization goal). On the other hand, as teachers, they were also engaged in connecting their classroom learning to their local practice in order to remain relevant and to be able to serve their immediate teaching population well (i.e., their professionalism goal). Pursuing their online education, thus enabled them to undertake both goals simultaneously. For example, in terms of the professionalization goals, Edward’s response quoted earlier (Edward, August, 2020), suggested that the monitoring helped to connect the “theory dots.” Professionalism as a goal was evident in Donovan’s quote from August 2020, in that the monitoring was a means for him and his classmates to immediately test ideas in their own classrooms.

We further reflected on how the research findings helped us to modify existing professional development (PD) models. We specifically referred to three models demonstrated in three concentric circles in Figure 2. The central circle consists of features in Darling-Hammond et al.’s (2017) effective PD model; the second ring contains those in Richardson and Diaz Maggioli’s (2018) model for English language teachers (ELTs) specifically. Finally, the third ring is the Mokko and Pawan’s (2021) model that emerged from their two-year research on the informal PD of the TESOL who identified PD features that led them to consistently pursue informal learning by means of online Personal Learning Networks. Although our research using Shea et al.’s LP framework, did not lead to a comprehensive reconceptualization of the models,

its place in them was evident. Additionally, the framework enabled us also to refine our thinking about specific PD features in the models and those to include in future formal online PDs.

The *Strategic Use* LP category, and in particular, the “Seeking/Offering Information” reiterated that peer-to-peer collaboration was an important component, because it was present across the three models. The indicator made transparent the heterarchical nature of the collaboration in terms of how the LLTs in this research took turns as temporary “more knowledgeable others” (MKO) (Johnson, 2006) in jointly making sense and processing ideas. In that regard, findings in the current study suggested a move beyond Darling-Hammond et al.’s (2017) assertion that effective PDs should have the standard feature of being “expert-coached and supported.” The findings suggested that it was more important that the experience was mediated regardless of who undertook the mediation.

Similarly, the prevalence of the indicator in the research suggested refinements to the feature of “Active Learning” in Darling-Hammond et al.’s (2017) in which hands-on experiences were prioritized. Milligan et al.’s (2014) 4C stages resonated in the current study’s findings as well in the Mokko and Pawan’s (2021) study. The Connection and Contribution stages could be seen as prominent in statements such as that by Naomi, one of the LLTs, in which she said, “sharing is learning” (personal communication, July, 2020). Online formal PD programs at this level, thus, should prioritize similar types of engagement.

On its part, the *Monitoring* LP category, and in particular, “Appraising Engagement,” findings in the study, demonstrated that the LLTs searched for and were attuned to the connections between their work in class (professionalization goal) and to their local practice (professionalism goal). Rather than the content-focused component in Darling-Hammond et al.’s model, those monitoring connections were one of the key components of their learning. (In the Mokko and Pawan’s (2021) study, an experienced teacher exclaimed that finding the connections made him feel “smarter” after 30 years of teaching). In this sense, there was a heightened awareness on the LLTs’ part regarding monitoring their own and that of their classmates’ actions toward the achievement of the two goals. Thus, this awareness added the new component of connections to the discipline, to the local situatedness feature that was identified in Richard and Diaz Maggioli’s (2018) and in that of Mokko and Pawan’s (2021) model.

Such awareness is defined by Candy (2019) and Ponton and Rhea (2006), as autonomy that complements self-directed learning. In this regard, it connects directly to the LP category of *Forethought and Planning* in which learners enacted their LP in setting goals for themselves and in planning their next steps. The findings suggested “autonomy” as a necessary addition to the Mokko and Pawan’s (2021) self-directed learning feature. Autonomy also further refined a PD feature in Richardson and Diaz Maggioli’s (2018) model that focused on the need for PD developers to specifically target teachers’ expressed needs. The current study’s findings suggest that the developers should instead enable teachers to enact their autonomy rather than taking charge of addressing the needs. The LP indicators in Shea et al.’s (2014) *Forethought and Planning* category can serve as guides for helping teachers decide on specific actions and outcomes, strategies, and methods to achieve them, and in helping them to coordinate the tasks needed in their online PD experiences.

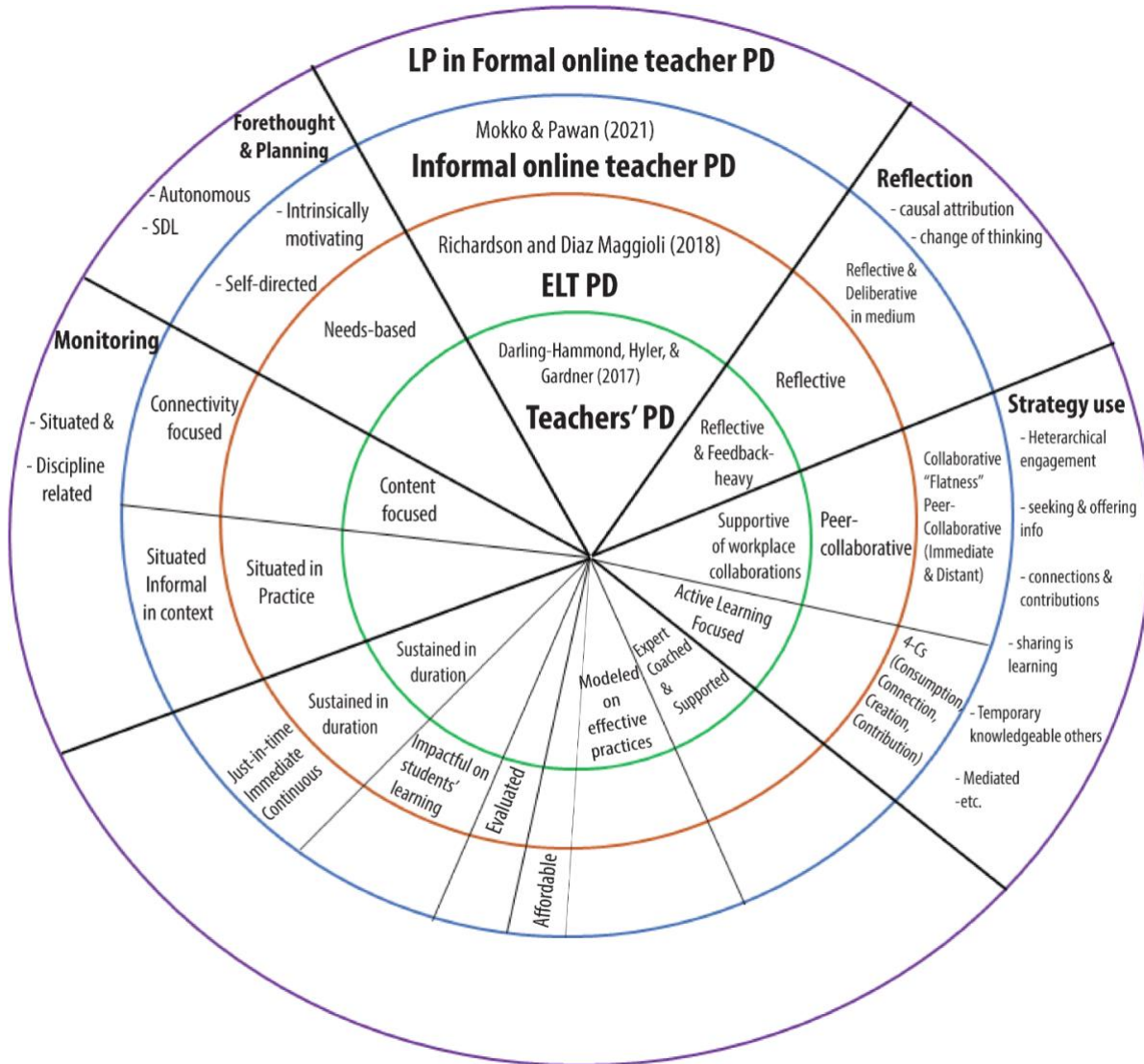
Finally, similar to the existing three models, the LP category of *Reflection* was also evident in the data and thus important as a component in formal online PDs. The reflections pertained to indicators of “Change and Thinking” and “Causal Attribution.” In conclusion, Shea et al.’s (2014) LP framework enabled us to trace the patterns of learning amongst our teachers

and the reasons for them. With that information, we hope to serve our teachers and doctoral students in ways that complement the LP they find important to maintain in their formal online classroom. In the meantime, we are encouraged by Naomi's (July, 2020) comment and enthusiasm for learning in the medium:

I love being an online grad student. If I could be paid to do so, I would make it my career.

Figure 2

The place of LP in the reconceptualization of formal online teacher professional development



Limitations and Suggested Next Steps

In this section, we discuss the research’s limitations pertaining to the way it was structured, including its instruments and their implementation, as well as the constraints of the LP framework itself. Accordingly, we also suggest the next steps to address the limitations.

It could be argued that the LP patterns that emerged were due to the way the instructor had set up the classroom. From a sociocultural perspective, however, teachers do not have a “causal” relationship but instead a “relationship of influence” with students (Johnson, 2006, p. 245). This means that teachers create conditions for learning but students themselves must transform the conditions into their own actions and abilities. From this perspective also, although the study’s findings did not enable us to arrive at a definitive conclusion as to the place of LP in the CoI framework (and nor were they intended to do so), we argue that our findings suggested that LP, and in particular, the aspect of learner agency, was an essential mediating factor in transforming learning in the online classroom studied. Learners clearly took charge of transforming their learning and understanding, not as an isolated action, but rather in tandem

with their own capacities, interactions with others, and the resources available to them (Lantolf & Thorne, 2006). Thus, rather than justifying LP's place in CoI, we suggest that the next steps for research should be tracing, describing, and enhancing these learning transformations.

The differences between the findings from the classroom-based discussions and from the survey, require deliberation (see Tables 2 and 3). These differences could perhaps be explained by the survey questions, which might not have achieved full equivalency with Shea et al.'s (2014) indicators. Also, the differences suggested the presence of Schön's (1983) distinction of reflections-on-action from reflections-in-action. In the former, reports are evaluations of completed action, and in the latter, they are descriptions of actions as they are happening. Thus, in completing the survey, the LLTs in the program, for example, looked back at their engagement in completed coursework. In doing so, "Noting Outcomes" in Strategy Use and "Identification of Knowledge Gaps" were more salient in the survey data as they were involved conclusive judgments. The classroom-based findings, in contrast, reflected the latter (reflections-in-action) and were descriptions of ongoing and day-to-day engagements in the classroom as the LLTs were engaging in them ("Seeking or Offering Information" and "Seeking or Offering Help"). Finally, the discrepancies between the two sets of findings could also be due to the particularities of the different courses taken by the students who were surveyed and the LLTs in the study. Their respective encounters with different content, instructor teaching styles, and length of online exposure, might have led to differences in the responses.

In both the survey and the classroom-based discussion findings, there were few instances of indicators in the logistical categories of *Fore-Planning* and *Goal Setting* identified in the course discussion and the survey (see Tables 2 and 3). This was because the researchers focused on data during weeks in which there were no projects or assignments for the class to complete collaboratively, which would have required planning and coordination. Perhaps, however, the findings were also suggesting the limited applicability of Shea et al.'s (2014) framework to describe LP patterns in open-ended discussions beyond those in task-oriented online engagements.

In a similar vein, the *Reflection* category in Shea et al.'s framework was limited by two indicators of "Change of Thinking" and "Causal Attribution." As we reported in the findings, using the categories, we were only able to code 4.15% of classroom discussion data and 3.85% of the survey responses in the category). The indicators were not able to capture the multiple types of reflections we saw in the data. For example, we had to rely on Du Bois's (2004) framework to notice stance-taking reflections in Donovan's example below:

In my view, we natives are good at "doing" English more than really understanding the underlying framework, and the experience of learning an L2 is completely different (unless you're raised bilingual). In my view, the L2 experience has far more parallels with classroom learning than natives learning at home as soon as they are born. (Second Quarter, 2019–2020 Academic Year).

We hope to show through our subsequent research, other reflective aspects in online engagements. The incorporation of other elements from existing frameworks into the *Reflection* category could also enrich the category. Given the importance of reflective teaching in teacher learning and Garrison's (2003) reminder that asynchronous online engagement is akin to deliberative reflections, future LP research could focus on online engagements, supported by a more expanded *Reflection* category.

Declarations

The author(s) declare that there is no conflict of interest in this study.

The authors received approval from the ethics review board of Indiana University, USA for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Bamforth, E. (2021, April 29). *Online college enrollment growth outpaces real-world institutions*. EdScoop. <https://edscoop.com/online-institutions-enrollment-outpaces-real-world-college-thanks-part-time-students/>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs.
- Batardière, M. T. (2015). Promoting critical thinking in online intercultural communication. *The EUROCALL Review*, 23(1), 3–10. <https://doi.org/10.4995/eurocall.2015.4562>
- Bauer, M. (2000). Classical content analysis: A review. In M. Bauer & G. Gaskell (Eds.), *Qualitative researching with text, image and sound* (pp. 131–151). Sage Publications. <https://doi.org/10.4135/9781849209731.n8>
- Blaine, A. M. (2019). Interaction and presence in the virtual classroom: An analysis of the perceptions of students and teachers in online and blended Advanced Placement classes. *Computers & Education*, 132, 31–43.
- Candy, L. (2019). *The creative reflective practitioner: Research through making and practice*. Routledge. <https://doi.org/10.4324/9781315208060>
- Cho, M. H., Kim, Y., & Choi, D. (2017). The effect of self-regulated learning on college students' perceptions of community of inquiry and affective outcomes in online learning. *The Internet and Higher Education*, 34, 10–17. <https://doi.org/10.1016/j.iheduc.2017.04.001>
- Crandall, J. (1993). Professionalism and professionalization of adult ESL literacy. *Tesol Quarterly*, 27(3), 497–515. <https://doi.org/10.2307/3587479>
- Darling-Hammond, L., Hyler, M. E. & Gardner, M. (2017). Effective teacher professional development. *Learning Policy Institute Research Brief*. https://learningpolicyinstitute.org/sites/default/files/product-files/Effective_Teacher_Professional_Development_BRIEF.pdf
- Du Bois, J. W. (2007). The stance triangle. In R. Englebretson (Ed.), *Stancetaking in discourse: Subjectivity, evaluation, interaction* (pp. 139–182). John Benjamins Publishing Co. <https://doi.org/10.1075/pbns.164.07du>
- Elverici, S. E., & Karadeniz, Ş. (2018). The effects of social media on social presence in teaching a foreign language. *The Journal of International Lingual Social and Educational Sciences*, 4(2), 174–185. <https://doi.org/10.34137/jilses.432263>
- Flores-Scott, E. M., & Nerad, M. (2012). Peers in doctoral education: Unrecognized learning partners. *New Directions for Higher Education*, 157, 73–89. <https://doi.org/10.1002/he.20007>

- Fornara, F., & Lomicka, L. (2019). Using visual social media in language learning to investigate the role of social presence. *Calico Journal*, 36(3), 184–203. <https://doi.org/10.1558/cj.37205>
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7–23. <https://doi.org/10.1080/08923640109527071>
- 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., & Akyol, Z. (2015). Toward the development of a metacognition construct for communities of inquiry. *The Internet and Higher Education*, 24, 66–71. <https://doi.org/10.1016/j.iheduc.2014.10.001>
- González Miy, D., & Herrera Díaz, L. E. (2015). Tracking the path of communities of inquiry in TEFL: A literature review. *HOW Journal*, 22(1), 80–94. <http://dx.doi.org/10.19183/how.22.1.83>
- Gunter, G. A., Braga, J. D. C. F. B. F., & Reeves, J. L. (2019). Examining social, cognitive and teaching presences in an online teacher development course using WhatsApp and community of inquiry. *FDLA Journal*, 4(1).
- Hechinger, J., & Lorin, J. (2020, March 19). *Coronavirus forces \$600 billion higher education industry online*. Bloomberg Businessweek. <https://www.bloomberg.com/news/articles/2020-03-19/colleges-are-going-online-because-of-the-coronavirus>
- Hedlund, G. (1986). The hypermodern MNC—A heterarchy? *Human Resource Management*, 25, 9–35. <https://doi.org/10.1002/hrm.3930250103>
- Henri F., & Rigault C. R. (1996) Collaborative distance learning and computer conferencing. In T. T. Liao (Eds.), *Advanced Educational Technology: Research Issues and Future Potential*. NATO ASI Series (Series F: Computer and Systems Sciences), vol 145. Springer. https://doi.org/10.1007/978-3-642-60968-8_3
- Johnson, K. E. (2006). The sociocultural turn and its challenges for L2 teacher education. *TESOL Quarterly*, 40 (1), 235–257. <https://doi.org/10.2307/40264518>
- Kang, M., Liew, B. T., Kim, J., & Park, Y. (2014). Learning presence as a predictor of achievement and satisfaction in online learning environments. *International Journal on E-Learning*, 13(2), 193–208.
- Konstantinidis, A., & Goria, C. (2016). Cultivating a community of learners in a distance learning postgraduate course for language professionals. In S. Papadima-Sophocleous, L. Bradley & S. Thouëсны (Eds.), *CALL communities and culture—short papers from EUROCALL* (pp. 230–236). Research-publishing.net. <https://doi.org/10.14705/rpnet.2016.eurocall2016.567>

- Kurek, M., & Müller-Hartmann, A. (2019). The formative role of teaching presence in blended virtual exchange. *Language Learning & Technology*, 23(3), 52–73.
<http://hdl.handle.net/10125/44696>
- Lantolf, J. P., & Thorne, S. L. (2006). *Sociocultural theory and the genesis of second language development*. Oxford.
- Ma, Z., Wang, J., Wang, Q., Kong, L., Wu, Y., & Yang, H. (2017). Verifying causal relationships among the presences of the Community of Inquiry framework in the Chinese context. *The International Review of Research in Open and Distributed Learning*, 18(6).
<https://doi.org/10.19173/irrodl.v18i6.3197>
- Milligan, C., Littlejohn, A., & Margaryan, A. (2014). Workplace learning in informal networks. *Journal of Interactive Media in Education*, 1(6). <http://oro.open.ac.uk/42257/1/325-2585-1-PB.pdf>
- Mokko, M., & Pawan, F. (2021). Working toward a reconceptualization of effective TESOL teachers' professional development through "Personal Learning Networks." *Journal of Global Literacies, Technologies, and Emerging Pedagogies*, VII, (1), 1335–1349.
- 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: the Journal of EUROCALL*, 30(3), 375–398.
<https://doi.org/10.1017/S0958344017000349>
- Oleson, A., & Hora, M. T. (2014). Teaching the way they were taught? Revisiting the sources of teaching knowledge and the role of prior experience in shaping faculty teaching practices. *Higher Education*, 68(1), 29–45. <https://doi.org/10.1007/s10734-013-9678-9>
- Omohundro, A. (2019). *A teacher's perceptions of language learning and social presence in a blended learning community college ESL course* (Publication No. 27663900) [Doctoral dissertation, George Mason University]. ProQuest Dissertations Publishing.
- Ozbek, C., Comoglu, I., & Baran, B. (2017). Turkish foreign language learners' roles and outputs: Introducing an innovation and role-playing in Second Life. *Contemporary Educational Technology*, 8(3), 280–302. <https://doi.org/10.30935/cedtech/6201>
- Ponton, M. K., & Rhea, E. R. (2006). Autonomous learning from a social cognitive perspective. *New Horizons in Adult Education & Human Resource Development*, 20 (2), 38–49.
<https://doi.org/10.1002/nha3.10250>
- Pool, J., & Reitsma, G. (2017). Revised Community of Inquiry framework: Examining learning presence in a blended mode of delivery. *Online Learning*, 21(3) (2017), 153–165
<https://doi.org/10.24059/olj.v21i3.866>

- Popescu, E., & Badea, G. (2020). Exploring a community of inquiry supported by a social media-based learning environment. *Educational Technology & Society*, 23 (2), 61–76.
- Richardson, S., & Díaz Maggioli, G. (2018). *Effective professional development: Principles and best practice*. Cambridge University Press. https://www.cambridge.org/elt/blog/wp-content/uploads/2018/04/Whitepaper_TD_72dpi-FINAL-ONLINE-VERSION.pdf
- Rodriguez, M. E. (2016). *Effective pedagogical practices in online English language teacher education* (Publication No. 10111587) [Doctoral dissertation, The University of Arizona]. ProQuest Dissertations Publishing.
- Rubio, F., Thomas, J. M., & Li, Q. (2018). The role of teaching presence and student participation in Spanish blended courses. *Computer Assisted Language Learning*, 31(3), 226–250. <https://doi.org/10.1080/09588221.2017.1372481>
- Sarieva, I., & Badrinathan, V. (2016). Asynchronous online language learning: Some considerations. In G. Chamblee & L. Langub (Eds.), *Society for Information Technology & Teacher Education International Conference* (pp. 2322–2329). Association for the Advancement of Computing in Education (AACE).
- Schön, D. A. (1983). *The reflective practitioner*. Basic Books.
- Schumann, A. A. (2019). *Developing language learning and cultural awareness by sharing “Lived experiences” in technology* (Publication No. 27548951) [Doctoral dissertation, New Mexico State University]. ProQuest Dissertations Publishing.
- Scott, K. S., Sorokti, K. H., & Merrell, J. D. (2016). Learning “beyond the classroom” within an enterprise social network system. *The Internet and Higher Education*, 29, 75–90. <https://doi.org/10.1016/j.iheduc.2015.12.005>
- 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 & Education*, 55(4), 1721–1731. <https://doi.org/10.1016/j.compedu.2010.07.017>
- Shea, P., & Bidjerano, T. (2012). Learning presence as a moderator in the community of inquiry model. *Computers & Education*, 59(2), 316–326. <https://doi.org/10.1016/j.compedu.2012.01.011>
- Shea, P., Hayes, S., Uzuner-Smith, S., Gozza-Cohen, M., Vickers, J., & Bidjerano, T. (2014). Reconceptualizing the community of inquiry framework: An exploratory analysis. *The Internet and Higher Education*, 23 (10), 9–17. <https://doi.org/10.1016/j.iheduc.2014.05.002>
- Shin, J. K. (2016). Building a sustainable community of inquiry through online TESOL professional development. In J. Crandall & M. Christison (Eds.), *Teacher education and professional development in TESOL: Global perspectives* (pp. 143–160). Routledge. <https://doi.org/10.4324/9781315641263-9>

Smith, B. L. & MacGregor, J. T. (1992). What is Collaborative Learning? In A. S. Goodsell, M. R. Maher & V. Tinto (Eds.), *Collaborative learning: A sourcebook for higher education*, (pp. 10–29). National Center on Postsecondary Teaching.

Singer, N. (2021, April 11). Online schools are here to stay, even after the pandemic. *The New York Times*. <https://www.nytimes.com/2021/04/11/technology/remote-learning-online-school.html>

Sugarman, J., & Lazarin, M. (2020). Educating English learners during the COVID-19 pandemic: Policy ideas for states and school districts. Migration Policy Institute. <https://www.migrationpolicy.org/sites/default/files/publications/mpi-englishlearners-covid-19-final.pdf>

Sun, Y., Franklin, T., & Gao, F. (2017). Learning outside of classroom: Exploring the active part of an informal online English learning community in China. *British Journal of Educational Technology*, 48(1), 57–70. <https://doi.org/10.1111/bjet.12340>

Toyoda, E. (2015). Collaborative video blended learning for exercising higher-order thinking-evaluation using community of inquiry framework. *International Journal of Social Media and Interactive Learning Environments*, 3(2), 126–141. <https://doi.org/10.1504/IJSMILE.2015.070763>

Tunceren, L. L. (2017). *Community college second language students' perspectives of online learning: A phenomenological case study* (Publication No. 10643256) [Doctoral dissertation, University of South Florida]. ProQuest Dissertations Publishing.

U.S. Department of Education (2021, June 9). Education in a pandemic: The disparate impacts of COVID-19 on America's students. <https://www2.ed.gov/about/offices/list/ocr/docs/20210608-impacts-of-covid19.pdf>

Vinson, D. (2020). The rise of distance learning and the online PhD: Is there cause for concern? *PUPN Magazine*. <https://www.pupnmag.com/article/the-rise-of-distance-learning-and-the-online-phd-is-there-cause-for-concern/>

Witthaus, G. (2018). Findings from a case study on refugees using MOOCs to (re)enter higher education. *Open Praxis*, 10(4), 343. <https://doi.org/10.5944/openpraxis.10.4.910>

Woods, L., Priest, H., & Roberts, P. (2002). An overview of three different approaches to the interpretation of qualitative data. Part 2: Practical illustrations. *Nurse Researcher*, 10(1), 43–51. <https://doi.org/10.7748/nr2002.10.10.1.43.c5878>

Zimmerman, B. (2011). Motivational sources and outcomes of self-regulated learning and performance. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 49–64). Routledge.

Appendix A

Survey #1 Patterns of Online Engagement Survey

[Questions based on Shea et al. (2014)]

1. Do you set goals beforehand in online discussions?
2. Do you plan on specific methods or strategies to use to discuss?
3. Do you coordinate (delegate, assign, distribute, sequence, etc.) tasks for yourself and/or for others in the discussions?
4. Do you check or verify your understanding (e.g., of readings/postings etc.) during discussions?
5. Do you identify problems or issues (e.g., in the readings/postings etc.) during discussions?
6. Do you indicate/note when certain tasks/activities/goals have been accomplished?
7. Do you evaluate the quality of your contributions to the discussion?
8. Do you evaluate the quality of your classmates' contributions to the discussion?
9. Do you monitor the discussions AND suggest/make corrections based on feedback and reflections?
10. Do you appraise/comment on your own engagement, interest, commitment, and participation?
11. Do you appraise/comment on classmates' engagement, interest, commitment, and participation?
12. During the discussions, do you appraise/comment on your reactions to tasks or materials used?
13. During the discussions, do you appraise/comment on classmates' reactions to tasks or materials used?
14. Do you recognize and acknowledge your own strengths, weaknesses & preferences in learning & engaging?
15. Do you recognize and acknowledge other peoples' strengths, weaknesses & preferences in learning & engaging?
16. Do you advocate or encourage others to contribute & participate?
17. Are you aware of the methods or strategies you use in discussions?
18. Do you offer help to others during online discussions?
19. Do you seek help during online discussions?
20. Do you become aware of knowledge gaps you might have (e.g. to complete a task/to understand readings) during online discussions?

21. Do you see the need to or engage in a review of course materials/content during online discussions?
22. Are you able to make connections between discussions to a future outcome (in your studies, research, work, training, etc.)?
23. Do you seek additional information (e.g., new material, personal experiences) beyond the course content & materials to deepen understanding?
24. Do you offer additional information (e.g., new material, personal experiences, etc.) beyond the course content & materials to deepen understanding?
25. Do the online discussions result in a change in your thinking?
26. Do the discussions impact how you plan, monitor, or use strategies in online discussions?
27. Do you see the discussions impacting how your classmates plan, monitor, or use strategies in online discussions?

Appendix B

Interview Questions

1. The analysis showed that most of your engagements were seeking and providing information. Discuss this move and how it reflects on what you feel needed to be done in this class and the doctoral program as a whole.
2. The analysis also showed that you were monitoring and appraising your own and the engagement of others. Discuss this move and how it reflects on what you feel needed to be done in this class and the doctoral program as a whole.

Faculty Perceptions of Using Synchronous Video-based Communication Technology

Patrick R. Lowenthal
Boise State University, USA

Richard E. West
Brigham Young University, USA

Leanna Archambault
Arizona State University, USA

Jered Borup
George Mason University, USA

Eric S. Belt
University of Maryland, Baltimore, USA

Abstract

Online learning has traditionally relied on asynchronous text-based communication. The COVID-19 pandemic, though, has provided many faculty members with new and/or additional experience using synchronous video-based communication. Questions remain, though, about how this experience will shape online teaching and learning in the future. We conducted a mixed method study to investigate faculty perceptions of using synchronous video-based communication technology. In this paper, we present the results of our inquiry and implications for future research and practice.

Keywords: Synchronous learning, synchronous teaching, synchronous video, synchronous video-based communication, web-conferencing, asynchronous video

Lowenthal, P., West, R.E., Archambault, L., Borup, J., & Belt, E. S. (2021). Faculty perceptions of using synchronous video-based communication technology. *Online Learning, 25*(4), 74-103. DOI: 10.24059/olj.v25i4.2890

The COVID-19 pandemic forced colleges and universities to move in-person courses online (Hodges et al., 2020). With little time, few resources, and often limited experience teaching at a distance, many faculty members opted to replace in-person class sessions with synchronous online meetings using web conferencing tools like Zoom (Lederman, 2020a, 2020b). This is not surprising. Over the last few years, faculty members increasingly attended or facilitated online meetings or webinars, familiarizing them with web conferencing tools like Zoom (Liu & Alexander, 2017). Further, replacing an in-person class with a synchronous online meeting requires little extra preparation. Research has also identified affordances of using synchronous meetings in blended and online courses such as improving immediacy, social presence, and a sense of community (Lowenthal et al., 2017; McDaniels et al., 2016; Martin & Parker, 2014; Park & Bonk, 2007). However, despite the convenience and possible benefits, there are constraints with the use (and overuse) of synchronous meetings. These include finding a convenient time, dealing with broadband and technical issues, and the tendency for synchronous meetings to turn into long lectures (Flaherty, 2020; Lederman, 2020b; Lowenthal et al., 2020).

Prior to COVID-19, many online educators, likely aware of some of the benefits and constraints, were resistant to using synchronous meetings in their online courses (Liu & Alexander, 2017; Themelis, 2014). Among others, Themelis (2014) and Liu and Alexander (2017) found that a lack of institutional support and training on synchronous communication technologies created barriers to teaching from a distance, including reducing online educators' confidence, self-efficacy, and motivation related to synchronous technology. However, COVID-19 and the requirement to teach and work from a distance, introduced faculty members to synchronous video-based communication technology for the first time and/or gave many others opportunities to experience it in new ways (Flaherty, 2020; Stewart, 2021). Questions remain, however, about how teaching and working from home might influence the ways faculty members will work and teach in the future, especially in regards to their communication and interaction with students and colleagues (see de Oliveira Dias et al., 2020; Kim, 2020; Pokhrel & Chhetri, 2021). Given this, we set out to investigate faculty perceptions of synchronous video-based communication technology. In this paper, we present the results of our study and implications for future research and practice. The research questions driving our inquiry were:

1. What are faculty *perceptions of using* synchronous video-based communication for personal use, teaching and learning, and for non-teaching work purposes?
2. Have faculty *perceptions of using* communication technologies *changed* as a result of the COVID-19 pandemic?

Literature Review

Evolution of Distance Education

While many instructors and students were first introduced to online learning as a result of COVID-19, distance education dates to the 1800s in the form of correspondence study where students worked through lessons on their own and then mailed them to be corrected (Bower & Hardy, 2004). In these early days, distance education focused on enabling learners to learn at any place and time. However, as technology advanced, educators increasingly used broadcasting methods, such as radio in the 1920s and television in the 1950s, for distance education (Casey, 2008; Saba, 2011). Broadcasting forms of distance education still focused on enabling people to

learn from anywhere (i.e., assuming they had access to the broadcast), but did not center on learning at any time. Learner-instructor interactions were thus limited by few, if any, opportunities for learners to interact with their peers.

During the 1980s educators began exploring how to use computer networks and the internet to help people, even at a distance, learn together in ways previously unavailable in terms of more immediate communication between instructor and learner and new opportunities for learner-learner interactions (Harasim, 2000; Moore, 1989). By the 1990s, distance education had moved predominantly online. While the term “online learning” is used to describe the mode of communication, Garrison (2009) stressed that online learning and distance education have different core values. Specifically, distance education core values are access and flexibility while online learning’s core values are collaborative learning and other constructivist approaches to learning.

These early online courses relied heavily, if not solely, on asynchronous text-based communication (i.e., email and discussion boards) and were often described as asynchronous learning networks (see Mayadas, 1997). Proponents highlighted the ability of people to learn from anywhere at any time while maintaining contact with other learners. While asynchronous online learning continued to grow and has since become the most common form of learning online, educators have continued to use broadcast methods as well as other forms of synchronous methods of communication (e.g., instant messaging, web conferencing) to teach and learn online (Finkelstein, 2006). Recently, Florence et al. (2020) defined the practice of combining synchronous and asynchronous online learning as bichronous learning. Online educators, though, need to understand the affordances and constraints of asynchronous and synchronous online communication and how best to strategically combine the two.

Asynchronous vs. Synchronous Communication

Various forms of online learning are often distinguished by how frequently instructors and students meet in person as well as the degree to which they rely on asynchronous or synchronous communication. For instance, Allen and Seaman (2007) distinguished between traditional, web facilitated, blended/hybrid, and online courses. A few years later, Sener (2015) described seven types of courses: (1) classroom course, (2) synchronous distributed course, (3) web-enhanced course, (4) blended classroom course, (5) blended online course, (6) online course, and (7) flexible mode course. COVID-19 helped popularize a distinction between remote courses, where an instructor and students meet regularly online at a certain day and time (e.g., in synchronous sessions) and online courses designed to be completed primarily in an asynchronous format (Craig, 2020; Roe, 2020).

Affordances and Constraints of Asynchronous and Synchronous Communication

No communication medium is perfect but researchers spent the 1990s comparing various learning media for any inherent superiority. Those studies ultimately suggested that asynchronous and synchronous communication each have affordances and constraints, and that it matters more what one does with a communication medium than any inherent constraints (Hrastinski, 2008; Oztok et al., 2013). However, asynchronous communication was, and still is, the dominant form of communication in online courses (Oztok et al., 2013; Peterson et al., 2018). Asynchronous communication enables instructors and students to interact and communicate from any place or time. The flexibility in time inherent in asynchronous communication also affords the ability of time-independent access, equal opportunities to participate, improved peer interaction and participatory learning, time for reflection, and the ability to have in depth discussions over time (Garrison et al., 2000; Graham, 2006; McDonald, 2016; Oztok et al.,

2013). Despite these benefits, asynchronous text-based communication has been criticized for the time it takes conversations to develop, its lack of spontaneity, being too task-based, offering insufficient opportunities for social interactions, creating a sense of isolation or separation between participants, and delaying communication and feedback (Graham, 2006; Hrastinski, 2008; Huang & Hsiao, 2012; Romero-Hall & Vicentini, 2017). Further, criticisms of online learning often focus on the absence of body language and visual cues in asynchronous text-based communication (Lowenthal, 2010).

Educators have been attracted to synchronous communication, and specifically synchronous video-based communication, because it most closely resembles in-person communication (Lowenthal et al., 2020; Romero-Hall & Vicentini, 2017). More specifically, researchers have argued that synchronous sessions help improve teacher immediacy, improve interaction and student participation, and enable spontaneity (Hrastinski, 2008; Olson, 2015; Park & Bonk, 2007; Parker & Martin, 2010). However, synchronous communication also has constraints, many of which were identified long before COVID-19. For example, it can be difficult in synchronous meetings to enable equal participation. Such meetings are prone to distraction, can be plagued by technical difficulties, and often have privacy and security issues (Bali, 2016; West & Borup, 2021; Means & Neisler, 2021). Bali and Meier (2014) even argue that synchronous meetings can be biased and culturally unaware, and can favor those with flexible time schedules, who live in popular time zones, have reliable wifi, and possess linguistic capital. These constraints have been amplified in various ways during COVID-19 with the increased day-to-day use of synchronous meetings. However, this increase has also resulted in people suffering from “Zoom fatigue” (Caines, 2020; Schulman, 2020).

Changes in Perceptions and Use Over Time

Perceptions of asynchronous and synchronous communication have evolved over time. During the late 1990s and early 2000s, online educators often questioned the need and value of synchronous communication (see Palloff & Pratt, 1999). But by the mid-to-late 2000s, as web conferencing applications and broadband improved, a growing group of online educators began experimenting more with using synchronous communication, often in primarily asynchronous online courses (Hrastinski, 2008; Hrastinski et al., 2010; Park, & Bonk, 2007). By 2014, Cornelius (2014) and Martin and Parker (2014) both noted the increased use of synchronous meetings in higher education. More recently, Lemos dos Santos and Cechinel (2019) found that instructors and students had a clear preference for asynchronous communication tools but synchronous communication tools also received high rankings. Following these perceived preferences, educators have increasingly used synchronous meetings as a supplement to asynchronous learning activities, although perhaps not as much as some might have predicted, considering their widespread availability. This lack of widespread use, prior to COVID-19, could have been due in part to a lack of opportunities and training to learn how to effectively use synchronous meetings (Grant & Cheon, 2007; Martin & Parker, 2014). However, Ertmer’s (1999) framework on obstacles to change highlights that the lack of training is only one of several reasons why instructors fail to adopt new teaching practices, even when those practices have the potential to positively impact course outcomes and that a more deeply rooted obstacle is faculty’s beliefs, attitudes, and dispositions that can make them especially resistant to new ways of teaching and learning.

Faculty Resistance to Online Learning and Unintended Consequences of COVID-19

Enrollments in online courses and programs in higher education continued to grow during the last decade (Allen & Seaman, 2017). Before COVID-19, a third of students took at least one

online course each year (Allen & Seaman, 2018; Lederman, 2018). Despite the growth in online learning, the majority of faculty remained skeptical of online learning and even resisted teaching online (Jaschik & Lederman, 2016; Lloyd et al., 2012). The literature suggests that faculty may resist teaching online because of concerns about interaction and student outcomes, lack of institutional support, training requirements, workload concerns, and fear of losing control (Allen et al., 2012; Lloyd et al., 2012; McGee, et al., 2017; Ubell, 2017). At the same time, research also suggests that these concerns are less prevalent with faculty members who have prior experience teaching in blended and online learning formats (Hunt et al., 2014; Lloyd et al., 2012).

While COVID-19 has been disruptive to the field of education, it forced nearly every educator to gain some general experience with digital instruction, if not specifically with remote or online teaching. Before COVID-19, instructors like Christopher Schaberg (2018) boldly claimed “I’ll never teach online.” However, during COVID-19, many instructors like Schaberg (2020) chose to teach online even when they could teach in-person. And still others, such as Eric Mazur, an “active-learning evangelist” and “teaching celebrity,” now question whether teaching online might even be better than teaching in-person (McMurtie, 2021).

In summary, distance education has evolved over the years. Even before COVID-19, colleges and universities offered several types of blended and online courses. While these blended and online courses tended to rely on asynchronous text-based communication, instructors have used synchronous sessions in various ways. During the pandemic, nearly every faculty member had an opportunity to work and teach from a distance, often using synchronous sessions in unprecedented ways. These new experiences may change online learning and the nature of faculty work in the future. However, additional research is needed to find out how these experiences might have influenced faculty perceptions of synchronous meetings as well as their perceptions of blended and online learning.

Method

After receiving Institutional Review Board approval (protocol 101-SB20-103), we conducted an explanatory, two-phased, sequential, mixed-methods study (Onwuegbuzie & Leech, 2005). This research design was used so that follow-up interviews could help explain or elaborate on the results from the first phase of the study. We were interested in a better understanding of faculty perceptions of synchronous video-based communication technology.

Data Collection

We created an online survey using Qualtrics to collect data during the first phase of the study. The survey included a series of Likert-style questions (on a 5-point scale) as well as open-ended questions that provided an opportunity for participants to explain their responses and to take part in a follow-up interview (a copy of the survey and interview questions are in the Appendix). The survey was administered via Facebook, Twitter, and various professional organizations (e.g., WCET, EDUCAUSE, AERA AECT, SITE), as well as to all faculty members at two Colleges of Education where two of the researchers work. A total of 336 people completed the survey.

The second phase of the study involved follow-up interviews. A total of 40 participants agreed to be interviewed. From this list, we randomly selected 15 participants to interview but added 3 additional interviews (for a total of 18) due to delays in setting up the original interviews. The semi-structured interviews were conducted by Belt and recorded in Zoom.

Data Analysis

Descriptive statistics were calculated for the quantitative survey questions. The qualitative data from the open-ended survey questions were analyzed using a constant comparative technique (Leech & Onwuegbuzie, 2007) which essentially involved using a multistage coding process of descriptive and pattern coding to code and analyze the data (Saldana, 2016). Descriptive coding “summarizes in a word or short phrase—most often as a noun—the basic topic of a passage of qualitative data” (Saldana, 2013, p. 88). Pattern coding is a way of grouping those summaries into a smaller number of sets, themes, or constructs (Miles & Huberman, 1994). Then the recordings from the follow-up interviews were transcribed and coded following the same multistage coding process.

Positionality, Trustworthiness, and Credibility

The first author, Lowenthal, initially conceived of the study. While he collaborated with his co-authors to create the survey and interview questions, conduct the study, and write up the results, he oversaw qualitative data analysis. He is an experienced researcher and an online educator since 2003. He has interest in, and experience with, various teaching and learning communication technologies. However, he also believes that no communication technology is inherently better than another, and that video is not a panacea and should be used intentionally and selectively (see Belt & Lowenthal, under review; Belt & Lowenthal, 2021; Lowenthal, under review; Lowenthal, 2021; Lowenthal et al., 2020; Lowenthal et al., 2022; Lowenthal & Moore, 2020). He approached this study with an interest in better understanding how faculty experiences during COVID-19 might influence their perceptions and future use of synchronous video-based communication technology and, in turn, its influence on the future of online learning.

Lowenthal initially analyzed the qualitative data from surveys and interviews after Belt conducted the interviews. He compared the data and themes that emerged from both the surveys and the interviews as a form of triangulation. Then, following the advice of Elo et al. (2014), who explained that “a good qualitative researcher cannot avoid ... returning again and again to the data, to check whether the interpretation is true to the data and the features identified are corroborated by other interviews” (p. 5), he returned to the data three months after the initial analysis, and with questions prompted by his co-authors, to double-check his analysis and in turn improve the reliability and credibility of the initial analysis.

Findings

Phase One: Survey Results

Part One: Demographics

Participants’ teaching experience in higher education ranged from 1 to 30 years, with an average of 12.7 years ($SD=8.1$); their experience teaching blended or online courses in higher education ranged from 1 to 26 years, with an average of 8.12 years ($SD=6.0$). We asked participants how frequently they used synchronous video-based communication before COVID-19 in other parts of their lives (see Table 1). We found that participants who might be described as “regular users” (i.e., those who use it daily, weekly, or monthly) used synchronous meetings more for work not focused on teaching as well as for their personal life and less for teaching. However, over 28% had rarely or never used it for work not related to teaching and over 45% had not used it when teaching a blended or online course prior to COVID-19.

Table 1

Synchronous Video-based Communication Use Before COVID-19

Before COVID-19, how frequently did you use synch. comm.	Daily	Weekly	Monthly	1-2 times a semester	Rarely	Never	n
Personal life	16 (4.8%)	68 (20.5%)	61 (18.4%)	32 (9.7%)	102 (30.8%)	52 (15.7%)	331
For work not teaching	32 (9.6%)	95 (28.6%)	68 (20.5%)	43 (13%)	66 (19.9%)	28 (8.4%)	332
Teaching a blended or online	18 (6.4%)	66 (20.2%)	38 (11.6%)	54 (16.51%)	50 (15.3%)	98 (30.0%)	324
When teaching F2F	6 (1.9%)	13 (4.1%)	10 (3.1%)	36 (11.3%)	85 (26.7%)	168 (52.8%)	318

Part Two: Satisfaction

Once we knew how often participants used synchronous meetings in different aspects of their life, we wanted to know how satisfied they were teaching blended and online courses before COVID-19 and specifically how satisfied they were with using synchronous video-based communication during the pandemic. Overall, 76% of participants (who had taught blended or online courses before COVID-19) were somewhat or extremely satisfied with teaching blended or online courses. Similarly, 76% of participants reported that they were either somewhat satisfied or extremely satisfied with using video-based communication in their personal life, 77% were either somewhat satisfied or extremely satisfied with using it for teaching and learning, and 85.5% were either somewhat satisfied or extremely satisfied with using it for work not related to teaching and learning (see Table 2).

Table 2

Satisfaction With Teaching Blended / Online Courses Before COVID-19 and Use of Synchronous Video-based Communication During COVID-19

	1 Extremely dissatisfied	2 Somewhat dissatisfied	3 Neither satisfied nor dissatisfied	4 Somewhat satisfied	5 Extremely satisfied	M	SD	n
Before COVID-19, how satisfied were you teaching blended/online?*	7 (2.4%)	31 (10.4%)	34 (11.4%)	114 (38.4%)	111 (37.8%)	3.98	1.06	297
<i>Currently, how satisfied are you with synchronous video-based communication...</i>								
in your personal life	6 (1.8%)	20 (6%)	53 (15.9%)	136 (40.7%)	119 (35.6%)	4.02	0.96	334
for teaching and learning	6 (1.8%)	29 (8.7%)	42 (12.6%)	178 (53.5%)	78 (23.4%)	3.88	0.93	333
for work not related to teaching	2 (0.6%)	12 (3.6%)	35 (10.4%)	141 (42%)	146 (43.5%)	4.24	0.82	336

*Note: 38 or 10% of participants had not taught blended or online prior to COVID

We then asked participants to explain their responses related to their current use (see Table 2). Six themes were identified from the data from this question (see Table 3). We briefly discuss each below and include some verbatim quotations from various respondents.

Convenience and Flexibility. Participants reported that they were happy with the convenience and flexibility of using synchronous video-based communication. They specifically

liked not having to drive to campus for meetings and the convenience and flexibility this type of communication can provide.

I honestly love working from home and not...traveling...to attend things in person. This has made my work life far less taxing.

The way synchronous time is used makes a huge difference. Shorter synchronous time is better...

Overuse and Fatigue. Participants consistently commented on the overuse of synchronous video-based communication and the fatigue that they can feel from spending hours at a time in meetings.

I actually have more meetings now over Zoom than I used to when working in the office. I think we've adopted the mentality that since we can't pop in and talk in the office, we need to schedule extra meetings, but it's left me...exhausted and Zoomed out (something that's no doubt exacerbated by having two small children at home).

I'm definitely feeling Zoom fatigue in both my professional and personal life.... I don't feel eager to use it in my personal life largely because I'm using it so much for work...it beats the alternative of not being able to work/collaborate remotely...my beef is with the pandemic more than with Zoom.

Personal video calls are becoming tiring due to doing so many of them in the pandemic. I wish that we didn't have to do them and could just meet in person. My distaste is emotional, not technical; the technology is fine, I just tire of it.

User Interaction, Engagement, and Multi-tasking & Distraction. Another theme focused on the lack of user interaction, engagement, and multitasking, and the distraction that takes place in these meetings. Participants pointed out problems and the frustration of being in meetings where group members have their cameras off, seem disengaged, and appear to be doing other things. This theme is illustrated in the following quotes:

*It's not bad, but I miss actually SEEING the people...I am frustrated with students not turning on their cameras (even though I completely understand why, and I respect their right to *not* turn them on). But still, I don't like that, to be honest. In committee meetings: I don't mind online meetings. Saves time. I have a hate on for admin work recently.*

One-on-one or small group video chats with friends and family work well—everyone is happy to participate, we get to see each other.... With teaching, the students mostly have black screens and are reluctant to participate. For work, it's fine...where I am not expected to participate, I often turn off video and fold laundry or go for a walk (I realise [sic] my students may think of video classes in these terms)—there are a few questions after such lectures, but it might almost just as well have been pre-recorded.

Learning Curve and Technical Issues. Consistently, participants identified a learning curve, both in terms of comfort with the technology and with its effective use. In addition, participants described how institutions must continue to find ways to support faculty and student use of this type of communication because, regardless of one's skills and abilities with the technology, technical problems arise (sometimes due to students' lack of knowledge) that can derail a lesson and even be emotionally taxing. Here are several perspectives:

I still feel like I lack the skills to effectively foster quality discussions where everyone feels involved in class (teaching). Similar feelings for hosting large- and medium-sized family/personal groups. It always feels just a bit awkward and like there are some who are not speaking up. Also, I'd like to learn how to use various other tools...but I feel like I just don't have the time or energy.

In a research collaboration context, it's easier to navigate minor technical hiccups, and because there are fewer of us, they don't happen very often. In a teaching context, it's very stressful to manage the experience of 20-50 students...technical glitches are emotional. They mean missing important parts of the story or key events. It's worse to have a bad connection than to not have participated remotely in the first place.

With family it's even worse. God bless my in-laws and their complete inability to remember how to log on from one weekend to the next. By the time we are all connected, I'm so irritated I don't even want to be online anymore.

Context, Purpose, People, and Technology. The last theme focused on how many things can impact the effectiveness of a synchronous meeting. Participants pointed out how they thought synchronous meetings worked better for smaller groups and shorter meetings than larger groups and longer meetings. They also mentioned that they thought they worked better when people wanted to be there, wanted to participate and contribute (e.g., committee work), and had a previously established relationship with other attendees. And finally, the effectiveness of synchronous meetings can be impacted by the platform, as some participants clearly preferred some platforms over others. The following quotes capture some of these ideas:

I find it very difficult to...connect to my students, especially those I have not met in face-to-face contexts. For research & admin purposes—these are...people I have likely met before and already have a connection to.

I think meeting online is necessary but not ideal for building relationships.”

Zoom works well for small meetings or large webinars, but the middle ground of classroom-like gatherings isn't perfect. It takes so much energy to corral more than seven people on a Zoom meeting, and it ends up being less discussion, more presentation.

Zoom works well for small meetings with colleagues that are both interested in the subject matter and willing participants in the meeting.... From my limited experience,

Zoom synchronous online teaching (any class over 20 students) with tools like Zoom is a dark pit where students just sit there zoning out; not participating and generally wasting their time.

Table 3
Themes of Factors That Influenced Satisfaction

Convenience and Flexibility	Participants repeatedly reported that they like how video-based synchronous technology enables them to work from a distance, especially during a pandemic, and the ability to connect with friends, family, and colleagues from all over the world.
Overuse and Fatigue	Participants mentioned how the convenience and flexibility of video-based synchronous technology has resulted in more meetings, with many faculty being required to add synchronous meetings to their “remote” courses. The increasing number of synchronous meetings has resulted in what many referred to as “Zoom fatigue.”
User Interaction, Engagement, and Multi-tasking & Distraction	Participants pointed out challenges of ensuring every participant is able to interact and are engaged during video-based synchronous meetings or classes; common practices of turning one’s camera off or multitasking during work meetings or class can lead to distraction or the instructor’s inability to check student understanding.
Learning Curve	Participants noted that there is a learning curve to effectively using video-based synchronous technology and that faculty and students, as well as friends and family, need time, experience, and resources to be able to effectively use these communication tools.
Technical Issues	Participants repeatedly pointed out how technical issues, whether they be due to bandwidth issues (including audio and visual latency issues), platform technical glitches, or user error, can influence how satisfied they are with video-based synchronous technology.
Context, Purpose, People, and Technology	Participants also pointed out that the context (e.g., group size, length), the purpose (e.g., socializing vs. committee work; office hours vs. full class), the people (e.g., with a previously established relationship), and the technology influenced their level of satisfaction with using video-based synchronous technology.

Part Three: Satisfaction with Other Communication Technologies

Once we had an idea about how satisfied participants were with synchronous video-based communication, we wanted to better understand how satisfied they were with using other communication technologies when teaching blended or online courses. Not surprisingly, participants expressed highest satisfaction with email ($M=4.06$) but synchronous meetings/discussions were a close second ($M=3.96$). Phone calls ($M=3.40$), text messaging ($M=3.50$), and group messaging ($M=3.50$) received the lowest ratings (see Table 4).

Table 4
Satisfaction With Different Types of Communication Technology When Teaching Blended and Online Courses

	1	2	3	4	5	M	SD	n
	Extremely dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Extremely satisfied			
How satisfied are you with using when teaching blended or online courses?								
Email	10 (3.2%)	12 (4%)	39 (12.4%)	143 (45.5%)	110 (35%)	4.05	0.96	314
Phone call	22 (8.5%)	36 (14%)	80 (30.9%)	64 (24.7%)	57 (22.0%)	3.38	1.21	259
Text message (to one person)	19 (8%)	26 (11%)	66 (27.7%)	76 (31.9%)	51 (21.4%)	3.48	1.18	238
Group text or messaging (e.g., Slack)	15 (6.7%)	18 (8%)	74 (33.2%)	77 (34.5%)	39 (17.5%)	3.48	1.08	223
Asynchronous text-based discussions (e.g., in an LMS)	12 (3.8%)	40 (13%)	36 (11.4%)	144 (45.7%)	83 (26.3%)	3.78	1.09	315
Asynchronous video-based discussions (e.g., Flipgrid)	4 (1.7%)	13 (6%)	75(32.8%)	92 (40.2%)	45 (19.7%)	3.70	0.91	229
Synchronous video-based discussions (e.g., Zoom)	6 (1.9%)	25 (8%)	27 (8.7%)	175 (56.1%)	79 (25.3%)	3.95	0.91	312

Part Four: COVID’s Influence

We then investigated how participants experienced social distancing and how working and teaching at home might influence their future use of synchronous video-based communication. Participants overall reported that they were more likely to use video-based technology in all facets of their life after COVID-19 (see Table 5). However, there was even stronger agreement when asked about using it for work not related to teaching ($M=4.19$) and when teaching a blended or online course ($M=4.06$).

Table 5
Likelihood of Future Use of Video-based Communication

	1	2	3	4	5	M	SD	n
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree			
To what degree do you agree with the following: Once the COVID-19 pandemic ends, I’m more likely to use synchronous video-based communication (e.g., Zoom, WebEx)... than before the pandemic								
- in my personal life (e.g., talking with friends or family)	23 (6.9%)	44 (13.2%)	59 (17.7%)	113 (33.9%)	94 (28.2%)	3.63	1.22	333
- for work not related to teaching and learning (e.g., research collaboration, advising, committee work)	6 (1.8%)	13 (4%)	44 (13.4%)	114 (34.8%)	151 (46%)	4.19	0.94	338
- when teaching a blended or online course	11 (3.4%)	21 (6.4%)	51 (15.6%)	99 (30.4%)	144 (44.2%)	4.06	1.08	326

- when teaching a traditional face-to-face course	45 (14.5%)	41 (13.2%)	78 (25.1%)	93 (29.9%)	54 (17.4%)	3.23	1.29	311
---	------------	------------	------------	------------	------------	------	------	-----

We then asked participants to explain their answers about their future use. We identified five themes, listed in Table 6, discussed briefly here.

More Likely to Use for Work. Echoing the results in Table 5 and certain themes from earlier, some participants described how they were more likely to use video-based technology for work that was not focused on teaching. As participants gained more experience with synchronous meetings at work, they grew to appreciate the increased comfort and/or efficiencies of attending work or advising meetings online. The following quotes capture this sentiment:

Previous beliefs that working and collaborating face-to-face were more effective...have shifted dramatically. We have learned that online, synchronous communications are just as effective. We can...can accomplish the same, if not more, working...online instead of spending time to commute. Additional benefits...less pollution, less time wasted in traffic...less overhead...

For work, I will continue to use synchronous video-based communication for everything—as much as I can. I find it effective and flexible. Also considering the state of the world, I do not feel comfortable venturing out into public anytime soon.

Now that more people are familiar with Zoom and WebEx, I will likely recommend using it, especially when busy schedules and geographic differences impede meeting in person.

More Likely to Use for Teaching. Other participants expected to use more video-based technology for teaching in the future, citing immediacy, flexibility, and the ability to check-in as needed as reasons.

Zoom has proven to be an effective tool. As such, I am considering using it in conjunction with traditional face-to-face classes.

My online asynchronous students are demanding the use of synchronous instruction--I imagine my F2F students will seek more of this as well.

I asked my 100% online students if they would like me to hold an optional synchronous hour each week and they said yes. So, I am implementing this for the first time in the fall.

Unsure or Undecided About Future Use. Some participants expressed uncertainty about future use since they were unsure of what their university, colleagues, and/or students will expect in the future. and when the pandemic will end.

Well...it depends on many factors. So, we'll have to see.

These decisions are not ours to make. It was not up to us to shift everything online...and it will not be up to us...how things will work once the crisis ends, if such a day ever comes.

I think it will depend on how the structure of the university and the expectations of students change as a result of the pandemic.

No Change. Some participants had been using synchronous meetings long before COVID-19. They therefore claimed that their experiences using it during the pandemic will not likely change how they use it after COVID-19. They highlighted the importance of taking a balanced approach as captured below:

I don't foresee anything changing with my use of video conferencing. I use it regularly already and will continue to do so.

I have used synchronous teaching for my courses since 2013. I will not be using this technology any more or any less.

Likely Less Use. Some participants clearly expressed a desire to either take a break from video-based technology or to perhaps never have to use it again. They preferred to be back in the classroom and teaching in ways that they think do not require synchronous meetings:

These tools work well, but I look forward to using them less.

I am very uncomfortable with the technology; my students' access has been unreliable and inconsistent, and I simply do not like it.

*I will only use Zoom for work when I 100% have to. I *will not* use video conferencing solutions if I can teach or meet in-person for better experiences.*

Remote/online learning are manifestly inferior ways to teach my subject. I will not do so once classroom instruction is available again.

Table 6
Themes About Future Use of Video-based Communication

More likely to use more for work not directly focused on teaching	Many participants explained that they were likely to use synchronous video-based communication more for meetings, committees, and student advising than before COVID-19 either because of people's increased comfort and/or the increased efficiencies (e.g., flexibility, less commuting, more efficient).
More likely to use more for teaching	Other participants explained how they were likely to use synchronous video-based communication specifically more for teaching, whether that be with face-to-face, blended, or online courses due to its advantages.
Unsure or undecided about future use	Some participants stated that they were unsure about their future use either because they were unsure about future pandemics, university requirements, subjects taught or class size, or people's general need to take a break from video-based communication.

No change on use	Some participants reported that they plan to use it just like before as needed, taking a balanced and intentional approach or because they are heavy users.
Likely less use	Some participants stated that they plan to use it less because they simply dislike it, they prefer in-person communication, and/or that they simply need a break.

The last question on the survey asked participants about how their experience working and teaching from home during COVID-19 influenced or changed their perceptions of using communication technologies for teaching at a distance. Three themes emerged from the data (see Table 7). While this question was specifically focused on using various communication technologies when teaching at a distance, most participants focused on whether using synchronous meetings had changed their perceptions. A few faculty members mentioned their increased concerns regarding communication technologies

Improved Perceptions. Many participants reported that working and teaching from home forced them to learn how to use various technologies almost overnight. While many still faced challenges and expressed a need to learn more, the experience helped build their confidence. They were surprised at how flexible and convenient certain teaching and learning tasks were and were inspired with how they might teach differently moving forward.

I see these tools as a real blessing! Is it 'the same' as being in the same room with my students? No. But...continuing learning in these flexible ways has been pretty incredible. I've become convinced that breathing the same air should not be the measure of a high-quality learning experience.

It's easier and more efficient than I imagined.

*Improved my likelihood of teaching courses online in the future and learning more."
"I am much less opposed to online learning than before because Zoom allows for a better online experience*

Conflating online courses with asynchronous delivery was a mistake. From now on, all my courses, regardless of delivery method, will include synchronous, and likely, online video conferencing.

It has massively broadened my horizon as to the options and advantages, and I will keep using these new tools I learned about.

Did not change perceptions. At the same time, other experienced educators familiar with various communication technologies as well as those who already had strong feelings about the superiority of face-to-face communication reported that COVID-19 did not really change how they thought about using communication technologies for teaching and learning.

Absolutely not. These tools are identical now as they were in January 2020.

Pretty much the same but I like to see that ... others are more open to using tech for meetings.

I still believe that online teaching, while sometimes necessary, is never as good as the real thing.

Increased concerns. Finally, a small group reported that they now have increased concerns about the use of communication technology for teaching and learning. They found that rather than bring people together, these tools can be divisive and highlight issues of equity and access.

The pandemic has highlighted for me the inequities that face our students and the need for us as faculty to accommodate our students needs to create more equitable learning environments. Reliable internet, adequate hardware and adequate computer skills are just some of the basic areas that students need more support.

Makes me realize how poor they are.

Synchronous learning disadvantages female staff...[with] caring responsibilities...and disadvantages students who live in multi-generational households and have caring responsibilities. Asynchronous learning is fairer and more equitable as it enables all parties involved to participate at a time that suits them—which is often late in the evening when other members of the household are in bed.

Table 7

Themes About How COVID Changed Perceptions About Communication Technologies

Experience improved their perceptions of communication technologies	Participants explained how being forced to work and teach in a distant format improved their perceptions of communication technologies for multiple reasons, the most popular being: (a) providing needed experience and practice to build confidence, (b) general ease, convenience, and flexibility, (c) inspiration and possibilities for new ways to teach regardless of format, (d) for providing options for continuity during emergencies / pandemics, and (e) increased acceptance and adoption.
Experience did not change their perceptions of communication technologies	Other participants reported how their experience working and teaching from home during COVID did not change their perceptions either because they were already regular users of various communication technologies when they teach or because they still believe face-to-face / in-person communication cannot be replicated and/or because they believe learning at a distance is never as good as learning in person.
Experience increased concerns with communication technologies	Some participants reported how their experience working and teaching from home during COVID led to increased concerns about issues of inequity, access, and support or their general dislike for teaching at distance.

Phase Two: Interview Results

We conducted semi-structured interviews with 18 participants. The interviews were meant to elaborate on the survey questions and to provide additional insight into faculty perceptions of synchronous video-based communication technology. In many ways, the interviews simply supported the results and the themes that emerged from the survey. Below, we highlight the main themes that emerged from the interviews.

Changes in Use of Synchronous Video-based Communication Technology During COVID-19

Participants' use of synchronous video-based communication technology prior to COVID-19 varied greatly. While many described using it occasionally in their personal life (e.g., video chat with friends) or for work (e.g., collaborating with colleagues in another country), some described using it rarely or never. But all participants described how their use of it had increased during COVID-19, whether to talk to family, take part in meetings, hold office hours, or teach a course. Even veteran online teachers talked about adding additional synchronous meetings because as one described it, "students really like the opportunity [to connect] ...we still have this human desire to speak [to each other]." Others also expressed their excitement about the increased use of synchronous meetings at work. One participant explained how "it's no longer something that I am having to encourage my fellow faculty to be able to use."

Strengths and Weaknesses of Synchronous Video-based Communication

Participants all recognized and had experienced some strengths and weaknesses with synchronous video-based communication (many that were discussed earlier in this article). In terms of strengths, participants pointed to flexibility/convenience/accessibility. They also mentioned that it can improve interaction and promote community building (including getting to know each other's pets, for instance). Participants also indicated other benefits, such as being able to provide a "face-to-face" experience in real-time, facilitate meetings with varying group sizes, and improve group work/collaboration across the university or even the world. They also noted that these online meetings can usually be recorded for future reference or for those who could not attend, and that they can enable people to continue working even during a disaster or a pandemic. Some quotes stood out:

Gives us the ability to have the face-to-face real time communication that closely approximates the way that we would normally have conversations.

Helpful for people to learn names and a new organization because I've noticed, even from my now virtual book club, seeing everyone's names on the screen has been a helpful visual cue.

There is a humanization that happens that you can't get when you're not talking directly to somebody or speaking directly to somebody. It doesn't happen as well, or as much with asynchronous interaction. So, you get that real time interaction, you get the humanization.

However, participants were quick to identify some weaknesses of this type of communication. These included technical issues, dead silences/awkward pauses, access issues (broadband/technology), lack of body language as well as tendencies to keep webcams off, distraction, privacy issues, time zone constraints, lack of experience and familiarity with the tool,

fatigue, and an intrusion on work life balance (which was exacerbated with entire families working from home together). The following remarks capture some of these ideas:

You just lose attention...

The kids talk less, they interact a lot less, so it requires a teacher to be so much more energetic and manipulative of technology...

I keep looking at my own video feed instead of staring at that camera which doesn't look like an eye to me, you know, and I think that can make it hard to pick up on social cues.

Most...use their mobile phone and the quality is totally different. While they're on the phones, they normally don't turn on their cameras. So, it's totally different in terms of how they learn and...the conversation.

Experiences With and Strategies to Combat “Zoom Fatigue”

A relatively new, yet widely experienced, side effect of taking part in synchronous meetings is what is now often referred to as “Zoom fatigue” or experiencing a “Zoom hangover”—that is, the feeling of being exhausted after a long synchronous meeting or back-to-back shorter synchronous meetings. When fatigue came up as a weakness of synchronous video-based communication, we asked participants about their experiences with it and how they addressed it. Most participants acknowledged that they had, in fact, experienced Zoom fatigue. However, there was little consensus about the length of time required to experience this fatigue; it took just 1 hour for some to experience it and up to 11 hours for another. At the same time, a few participants had never experienced it. Participants noted that they proactively blocked off time before and after scheduled meetings, incorporated breaks or “stretch time” in longer pre-scheduled meetings, added interactivity (e.g., practice XYZ off-screen and come back to the meeting), observed a meeting moratorium day to recharge, extended the workday to accommodate breaks, turned off webcams, and prioritized some meetings over others. The following quotes capture some these sentiments:

Some people were very proud that they brought down their lecture from two hours to one hour, but for Zoom that's still quite a long time to be sitting and staring at a screen.

I think turning off that camera is helpful, because in some ways it functions in the same way...like in some meetings to people be like it's totally okay if you get up and walk around...it feels like being able to turn the camera off is a way of alleviating that zoom fatigue in some ways.

Here are, I think, some other ways that some of these providers are...helping you not to see your face as much because that we know that self-monitoring your own facial expressions can be really distracting.

Synchronous Video-based Communication Technology Influencing Future Work

Finally, we asked participants to reflect on how their experience using synchronous communication technology will influence how they do their job in the future. Nobody saw this

technology drastically changing their job overnight. However, many did talk about how they expected more freedom and flexibility and research collaborations moving forward but also more synchronous meetings with colleagues and students. Others, though, also talked about how their experiences (and others) will likely help all of us use it more responsibly, in part by balancing our use of it but also by being aware of different aspects of netiquette as well as access. The following are quotations from various respondents on this topic.

I have a feeling we're going to have a lot more zoom based meetings in the future. I think it's going to give people more freedom and flexibility when it comes to meetings because we've seen that we can still do our work.

I'm expecting that the overall experience with zoom, not just mine, but in general. Will leave more flexibility for people to actually use it when it's appropriate... to really balance.

Our students lives even after the pandemic's over...will not be any less hectic than it was before.... So, this will be a convenient way to do office hours and hopefully connect with some more students that might be intimidated to come into one's office or just the office hours are not convenient for them.

I've discovered that I need to have more conversations like this with my students, I need to make the opportunity available.

Discussion

We began this study during the summer of 2020. At that point, while we were unsure what the future might bring, many signs suggested that the 2020-2021 academic year was going to be far from normal. As researchers of learning design and technology, we were interested in, and perhaps even a little nervous about, the sudden increased use of blended, remote, and online learning. There was a lot of initial press highlighting issues with using synchronous video-based communication (e.g., Lederman, 2020b; Setera, 2020; Strauss, 2020). Also, as mentioned earlier, many faculty members entered the pandemic with skeptical, if not completely critical, feelings about online learning. Given all of this, we were curious how faculty experiences working and teaching in these new formats might change not only how they teach but how they do other parts of their job moving forward.

The first research question focused on faculty perceptions of using synchronous video-based communication for personal use, teaching and learning, and for non-teaching work purposes. The data from this study were in some ways mixed. When specifically asked, participants reported being highly satisfied with synchronous video-based technology in their personal and work life and especially for work not focused on teaching (e.g., committee work, advising, research). This differed from many popular media stories that painted a much grimmer picture as well as previous research which suggested mixed or negative perceptions of using synchronous video-based communication technology (see Liu & Alexander, 2017; Martin et al., 2020; Park & Bonk, 2007).

However, when asked to explain their answers, the only consistent positive theme was that they liked the convenience and flexibility of synchronous video-based technology to connect with family, friends, students, and colleagues during the pandemic. On the other hand, they

pointed out several problems they found with synchronous meetings, including overuse and fatigue, lack of engagement and distraction, a learning curve for many, technical issues, and overall misuse of the technology which align with previous research (Liu & Alexander, 2017; Olson & McCracken, 2015). Online educators also need to be aware that research suggests that challenges like these can be more common for students of color and lower-income students (Means & Neisler, 2021).

The second research question focused on how faculty perceptions of communication technologies changed as during the COVID-19 pandemic. Most participants reported being the most satisfied with using email ($M=4.05$), which is a little surprising given how often faculty members, in our experience, like to complain about email. Research has confirmed that email comprises a sizable portion of online teachers' workload and the perceived need to respond quickly to email can leave educators feeling "that there is no 'down' time for online teaching" (Payne McLain, p. 54, 2005). Students, however, reported that emails positively impacted their learning and motivation, even more so than other forms of communication, such recorded video messages (Conklin & Garrett Dikkers, 2021).

After email, participants reported being more satisfied with synchronous meetings ($M=3.95$) than they were with asynchronous text-based discussions ($M=3.78$), thus, suggesting that faculty preference is not simply due to the asynchronous or synchronous nature of a communication technology but likely more how each is commonly used by faculty members. Most participants also reported that they were more likely to use synchronous video-based communication for work not related to teaching ($M=4.19$) and for teaching a blended or online course ($M=4.06$) than they were before the pandemic, thus suggesting that faculty perceptions of using synchronous sessions are improving.

Many described how being introduced to new communication technologies and/or gaining more experience during COVID-19 helped improve their confidence and comfort using communication technologies. Some even described how it inspired them to explore new ways of teaching and learning. Many, though, also pointed out that faculty members and students still have a lot to learn about how to effectively use this technology and therefore need additional training and support moving forward, which aligns with previous research like Olson and McCracken (2015). Future research and professional development should explore how online teachers can effectively blend synchronous and asynchronous learning activities (Olson & McCracken, 2015). For instance, Olson and McCracken (2015) found that simply adding synchronous sessions to an asynchronous course is unlikely to improve learning outcomes; instructors need support on how to strategically blend synchronous and asynchronous learning activities. When providing faculty members with professional development opportunities it is important to consider not only the topics but also how the professional development will be facilitated. Professional development is more effective when facilitators are modeling what is being taught so that participants can experience the strategies as a student (Borup & Evmenova, 2019). Universities—especially colleges of education—should also work to prepare their teacher education and doctoral students to teach online (Bishop-Monroe et al., 2021).

Limitations

The results from this study should not be generalized to all faculty. The majority of participants in this study taught in the field of education. The participants also self-selected to participate in this study, which could suggest that they either had very positive or negative experiences with synchronous video-based communication technology and/or teaching blended

or online courses. The data for this study were collected early in the pandemic. Faculty perceptions could have changed, and still might change over time. Further, our findings are limited by the questions asked as well as limitations due to the qualitative data being analyzed by only one researcher.

Conclusion

The first online course was offered over 30 years ago (Harasim, 1987). However, despite the decades that have passed and advances in technology since, instructors and students largely interact in online courses in the same ways today as they did then, with asynchronous text-based communication. There is a good reason for this; asynchronous text-based communication has effectively enabled millions of students to learn online. The COVID-19 pandemic forced nearly every faculty member to work and teach from a distance and specifically to use a variety of communication technologies, including synchronous meetings, in ways they might not have before. We questioned how these new experiences might change faculty perceptions and, in turn, change online learning.

Our results suggest that faculty will use synchronous meetings more at work, both for teaching and nonteaching duties. Faculty members also will likely continue to explore additional ways to use synchronous meetings in their face-to-face, blended, and fully online courses, thus further blurring the lines between traditional face-to-face and online learning. However, additional research is needed to find out whether faculty in other disciplines as well as students share these same perspectives and desire for change. Consistent with our findings, the recently published Chloe Report suggests that synchronous video-based communication technology is gaining ground and is here to stay. Therefore, it is incumbent upon learning technologists like us to help guide, support, and study faculty members' use of it.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received approval from the ethics review board of Boise State University, USA for this study.

The authors received no financial support for the research, authorship, and/or publication of this article.

References

- Allen, E. I., & Seaman, J. (2007). *Online nation: Five years of growth in online education*. Sloan-C.
- Allen, I. E., & Seaman, J. (2017). *Digital compass learning: Distance education enrollment report 2017*. Babson Survey Research Group.
- Allen, E. I., Seaman, J., Lederman, D., & Jaschik, S. (2012). *Conflicted: Faculty and online education, 2012*. Inside Higher Ed, Babson Survey Research Group and Quahog Research Group.
- Bali, M. (2016). Bringing out the human in synchronous and asynchronous media for learning. In W. Kilgore (Ed.), *Humanizing online teaching and learning*. <https://humanmooc.pressbooks.com/chapter/bringing-out-the-human-in-synchronous-and-asynchronous-media-for-learning/>
- Bali, M., & Meier, B. (2014, March 4). An affinity for asynchronous learning. *Hybrid Pedagogy*. <https://hybridpedagogy.org/affinity-asynchronous-learning/>
- Belt, E. & Lowenthal, P. R. (2021). Video use in online and blended courses: A qualitative synthesis. *Distance Education*, 42(3), 410-440. <https://doi.org/10.1080/01587919.2021.1954882>
- Bishop-Monroe, R., Di Paulo Harrison, B., Knight, M. E., Corritore, C., Rybarczyk, B. J., & Stewart York, A. (2021). Preparing doctoral students to teach in an increasingly virtual world: A response to COVID-19 and beyond. *Online Learning*, 25(1), 166-181. <http://dx.doi.org/10.24059/olj.v25i1.2446>
- Bolliger, D. U., & Martin, F. (2018). Instructor and student perceptions of online student engagement strategies. *Distance Education*, 39(4), 568–583. <https://doi.org/10.1080/01587919.2018.1520041>
- 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), 1-20. <https://doi.org/10.24059/olj.v23i2.1468>
- Bower, B. L., & Hardy, K. P. (2004). From correspondence to cyberspace: Changes and challenges in distance education. *New Directions for Community Colleges*, 2004, 5-12. <http://dx.doi.org/10.1002/cc.169>
- Caines, A. (2020, December). The Zoom Gaze. <https://reallifemag.com/the-zoom-gaze/>
- Casey, D. M. (2008). A journey to legitimacy: The historical development of distance education through technology. *TechTrends*, 52, 45-51. <https://doi.org/10.1007/s11528-008-0135-z>
- Clark, C., Strudler, N., & Grove, K. (2015). Comparing asynchronous and synchronous video vs. text-based discussions in an online teacher education course. *Online Learning*, 19(3), 48–70. <http://dx.doi.org/10.24059/olj.v19i3.668>

Conklin, S., & Garrett Dikkers, A. (2021). Instructor social presence and connectedness in a quick shift from face-to-face to online instruction. *Online Learning*, 25(1), 135-150. <http://dx.doi.org/10.24059/olj.v25i1.2446>

Cornelius, S. (2014). Facilitating in a demanding environment: Experiences of teaching in virtual classrooms using web conferencing. *British Journal of Educational Technology*, 45(2), 260-271. <https://doi.org/10.1111/bjet.12016>

Craig, R. (2020, April). What students are doing is remote learning, not online learning. There's a difference. *EdSurge*. <https://www.edsurge.com/news/2020-04-02-what-students-are-doing-is-remote-learning-not-online-learning-there-s-a-difference>

de Oliveira Dias, M., Lopes, R. D. O. A., & Teles, A. C. (2020). Will virtual replace classroom teaching? Lessons from virtual classes via Zoom in the times of COVID-19. *Journal of Advances in Education and Philosophy*, 4(05), 208-213. <http://dx.doi.org/10.36348/jaep.2020.v04i05.004>

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE Open*. <https://doi.org/10.1177/2158244014522633>

Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development*, 47(4), 47–61. <https://doi.org/10.1007/BF02299597>

Finkelstein, J. E. (2006). *Learning in real time: Synchronous teaching and learning online*. Jossey-Bass.

Flaherty, C. (2020, April). Zoom Boom. *Inside HigherEd*. <https://www.insidehighered.com/news/2020/04/29/synchronous-instruction-hot-right-now-it-sustainable>

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *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, R. (2009). Implications of online learning for the conceptual development and practice of distance education. *Journal of Distance Education*, 23(2), 93–104.

Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 3–21). Pfeiffer Publishing.

Grant, M. M., & Cheon, J. (2007). The value of using synchronous conferencing for instruction and students. *Journal of Interactive Online Learning*, 6(3), 211-226.

Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *NCPEA International Journal of Educational Leadership Preparation*, 11(1), 98–119.

Harasim, L. (1987). Teaching and learning on-line: Issues in computer-mediated graduate courses. *Canadian Journal of Educational Communication*, 16(2), 117-135.
<http://dx.doi.org/10.21432/T2TK6K>

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *Internet and Higher Education*, 3, 41-61. [http://dx.doi.org/10.1016/S1096-7516\(00\)00032-4](http://dx.doi.org/10.1016/S1096-7516(00)00032-4)

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March). The difference between emergency remote teaching and online learning. *EDUCAUSE Review*.
<https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>

Hrastinski, S. (2008). The potential of synchronous communication to enhance participation in online discussions: A case study of two e-learning courses. *Information & Management*, 45(7), 499-506. <http://dx.doi.org/10.1016/j.im.2008.07.005>

Hrastinski, S., Keller, C., & Carlsson, S. A. (2010). Design exemplars for synchronous e-learning: A design theory approach. *Computers & Education*, 55(2), 652-662.
<http://dx.doi.org/10.1016/j.compedu.2010.02.025>

Huang, X., & Hsiao, E. L. (2012). Synchronous and asynchronous communication in an online environment: Faculty experiences and perceptions. *Quarterly Review of Distance Education*, 13(1), 15-30.

Hunt, H. D., Davies, K., Richardson, D., Hammock, G., Akins, M., & Russ, L. (2014). It is (more) about the students: Faculty motivations and concerns regarding teaching online. *Online Journal of Distance Learning Administration*, 17(2), 62-71.
https://www.westga.edu/~distance/ojdla/summer172/Hunt_Davies_Richardson_Hammock_Akins_Russ172.html

Jaschik, S., & Lederman, D. (2016). *The 2016 Inside Higher Ed survey of faculty attitudes on technology*. Inside Higher Ed & Gallup. <https://www.insidehighered.com/booklet/2016-survey-faculty-attitudes-technology>

Kim, J. (2020, April). Teaching and learning after COVID-19. *Inside HigherEd*.
<https://www.insidehighered.com/digital-learning/blogs/learning-innovation/teaching-and-learning-after-covid-19>

Lederman, D. (2018, November). Online education ascends. *Inside Higher Ed*. <https://www.insidehighered.com/digital-learning/article/2018/11/07/new-data-online-enrollments-grow-and-share-overall-enrollment>

- Lederman, D. (2020a, March). The shift to remote learning: The human element. *Inside HigherEd*. <https://www.insidehighered.com/digital-learning/article/2020/03/25/how-shift-remote-learning-might-affect-students-instructors-and>
- Lederman, D. (2020b, March). Will shift to remote teaching be boon or bane for online learning? *Insider HigherEd*. <https://www.insidehighered.com/digital-learning/article/2020/03/18/most-teaching-going-remote-will-help-or-hurt-online-learning>
- Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative data analysis tools: A call for data analysis triangulation. *School Psychology Quarterly*, 22(4), 557-584. <https://doi.org/10.1037/1045-3830.22.4.557>
- Lemos dos Santos, H., & Cechinel, C. (2019). The final year project supervision in online distance learning: assessing students and faculty perceptions about communication tools, *Behaviour & Information Technology*, 38(1), 65-84. <https://doi.org/10.1080/0144929X.2018.1514423>
- Liu, J. C., & Alexander, R. (2017). Factors affecting faculty use of video conferencing in teaching: A mixed-method study. *Journal of Educational Technology Development and Exchange*, 10(2), 37-54. <http://dx.doi.org/10.18785/jetde.1002.03>
- Lloyd, S. A., Byrne, M. M., & McCoy, T. S. (2012). Faculty-perceived barriers of online education. *Journal of online learning and teaching*, 8(1). https://jolt.merlot.org/vol8no1/lloyd_0312.pdf
- Lowenthal, P. R. (under review). Does video improve social presence? Exploring student perceptions of asynchronous video in online courses.
- Lowenthal, P. R. (2010). The evolution and influence of social presence theory on online learning. In T. T. Kidd (Ed.), *Online education and adult learning: New frontiers for teaching practices* (pp. 124-139). IGI Global.
- Lowenthal, P. R. (2021). Video feedback: Is it worth the effort? A response to Borup et al. *Educational Technology Research and Development*, 63, 161–184. <https://doi.org/10.1007/s11423-020-09872-4>
- Lowenthal, P. R., Borup, J., West, R. E., & Archambault, L. (2020). Thinking beyond Zoom: Using asynchronous video to maintain connection and engagement during the COVID-19 pandemic. *Journal of Technology and Teacher Education*, 28(2), 383-391.
- Lowenthal, P. R., Dunlap, J. C., & Snelson, C. (2017). Live synchronous web meetings in asynchronous online courses: Reconceptualizing virtual office hours. *Online Learning*, 21(4), <http://dx.doi.org/10.24059/olj.v21i4.1285>
- Lowenthal, P. R., Fiock, H. S., Shreaves, D., & Belt, E. (under review). Investigating students' perceptions of screencasting style of video feedback in online courses.

- Lowenthal, P. R., & Moore, R. (2020). Exploring student perceptions of Flipgrid in online courses. *Online Learning*, 24(4), 28-41. <https://doi.org/10.24059/olj.v24i4.2335>
- Olson, J. S., & McCracken, F. E. (2015). Is it worth the effort? The impact of incorporating synchronous lectures into an online course. *Online Learning*, 19(2), <http://dx.doi.org/10.24059/olj.v19i2.499>
- McDaniels, M., Pfund, C., & Barnicle, K. (2016). Creating dynamic learning communities in synchronous online courses: One approach from the Center for the Integration of Research, Teaching and Learning (CIRTL). *Online Learning*, 20(1), 110-129. <http://dx.doi.org/10.24059/olj.v20i1.518>
- McDonald, D. (2016). *Asynchronous vs. synchronous communication in the online classroom*. Wiley Educational Services. <https://ctl.wiley.com/asynchronous-vs-synchronous-communication-in-the-online-classroom/>
- McGee, P., Windes, D., & Torres, M. (2017). Experienced online instructors: Beliefs and preferred supports regarding online teaching. *Journal of Computing in Higher Education*, 29(2), 331-352. <http://dx.doi.org/10.1007/s12528-017-9140-6>
- McMurtie, B. (2021, May). Online, everyone is in the front row. *The Chronicle of Higher Education*. <https://www.chronicle.com/newsletter/teaching/2021-05-27>
- Mansbach, J., & Austin, A. E. (2018). Nuanced perspectives about online teaching: Mid-career and senior faculty voices reflecting on academic work in the digital age. *Innovative Higher Education*, 43(4), 257-272. <http://dx.doi.org/10.1007/s10755-018-9424-4>
- Martin, F., & Parker, M. A. (2014). Use of synchronous virtual classrooms: Why, who, and how. *Journal of Online Learning and Teaching*, 10(2), 192-210.
- Martin, F., Polly, D., & Ritzhaupt, A. (2020, September). 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>
- Mayadas, F. (1997). Asynchronous learning networks: A Sloan Foundation perspective. *Journal of Asynchronous Learning Networks*, 1(1), 1-16. <http://dx.doi.org/10.24059/olj.v1i1.1941>
- Means, B., & Neisler, J. (2021). Teaching and learning in the time of COVID: The student perspective. *Online Learning*, 25(1), 8-27. <https://doi.org/10.24059/olj.v25i1.2496>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.

- Moore, M. G. (1989). Three types of interaction. [Editorial]. *American Journal of Distance Education*, 3(2), 1–6.
- Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same? *Internet and Higher Education*, 14(2), 129-135. <http://dx.doi.org/10.1016/j.iheduc.2010.10.001>
- Norton, P., & Hathaway, D. (2015). Teachers' online experience: Is there a covert curriculum in online professional development? *Journal of Technology and Teacher Education*, 23(4), 509-533.
- Olson, J., & McCracken, F. (2014). Is it worth the effort? The impact of incorporating synchronous lectures into an online course. *Online Learning*, 19(2). <http://dx.doi.org/10.24059/olj.v19i2.499>
- Onwuegbuzie, A. J., & Leech, N. L. (2005). Taking the “Q” out of research: Teaching research methodology courses without the divide between quantitative and qualitative paradigms. *Quality & Quantity*, 39, 267-296. <http://dx.doi.org/10.1007/s11135-004-1670-0>
- Oztok, M., Zingaro, D., Brett, C., & Hewitt, J. (2013). Exploring asynchronous and synchronous tool use in online courses. *Computers & Education*, 60(1), 87-94. <https://doi.org/10.1016/j.compedu.2012.08.007>
- Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom*. Jossey-Bass.
- Park, Y. J., & Bonk, C. J. (2007). Synchronous learning experiences: Distance and residential learners' perspectives in a blended graduate course. *Journal of Interactive Online Learning*, 6(3), 245-264.
- Parker, M., & Martin, F. (2010). Using virtual classrooms: Student perceptions of features and characteristics in an online and a blended course. *Journal of Online Learning and Teaching*, 6(1), 135–147.
- Payne McLain, B. (2005). Estimating faculty and student workload for interaction in online graduate music courses. *Online Learning*, 9(3), 47-56. <http://dx.doi.org/10.24059/olj.v9i3.1784>
- Peterson, A., Beymer, P., & Putnam, R. (2019). Synchronous and asynchronous discussions: Effects on cooperation, belonging, and affect. *Online Learning*, 22(4). <http://dx.doi.org/10.24059/olj.v22i4.1517>
- Poll, K., Widen, J., & Weller, S. (2014). Six instructional best practices for online engagement and retention. *Journal of Online Doctoral Education*, 1(1), 56–72.
- Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*, 8(1), 133-141.

Roe, D. (2020, May) Why remote learning and online learning are not the same. CMS Wire. <https://www.cmswire.com/learning-development/why-remote-learning-and-online-learning-are-not-the-same/>

Romero-Hall, E., & Vicentini, C. R. (2017). Examining distance learners in hybrid synchronous instruction: Successes and challenges. *Online Learning Journal*, 21(4). <http://dx.doi.org/10.24059/olj.v21i4.1258>

Schaberg, C. (2018, March). Why I won't teach online. *Inside HigherEd*. <https://www.insidehighered.com/digital-learning/views/2018/03/07/professor-explains-why-he-wont-teach-online-opinion>

Schaberg, C. (2020, September). Why I'm teaching online. *Insider HigherEd*. <https://www.insidehighered.com/views/2020/09/11/professor-who-asserted-hed-never-teach-online-explains-why-hes-opting-do-so-now>

Schulman, C. (2020, April). I used to shut my windows to New York's noise. Now I long for a honking horn. *Washington Post*. <https://www.washingtonpost.com/outlook/2020/04/09/new-york-silent-coronavirus/>

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Babson Survey Research Group.

Sener, J. (2015, July). Updated e-learning definitions. *OLC Insights*. <https://onlinelearningconsortium.org/updated-e-learning-definitions-2/>

Setera, K. (2020, March). FBI warns of teleconferencing and online classroom hijacking during COVID-19 Pandemic. FBI. <https://www.fbi.gov/contact-us/field-offices/boston/news/press-releases/fbi-warns-of-teleconferencing-and-online-classroom-hijacking-during-covid-19-pandemic>

Stewart, W. (2021). A global crash-course in teaching and learning online: A thematic review of empirical Emergency Remote Teaching (ERT) studies in higher education during Year 1 of COVID-19. *Open Praxis*, 13(1), 89-102. <http://dx.doi.org/10.5944/openpraxis.13.1.1177>

Strauss, V. (2020, April). School districts, including New York City's, start banning Zoom because of online security issues. *Washington Post*. <https://www.washingtonpost.com/education/2020/04/04/school-districts-including-new-york-citys-start-banning-zoom-because-online-security-issues/>

Themelis, C. (2014). Synchronous video communication for distance education: The educators' perspective. *Open Praxis*, 6(3), 245-256. <http://dx.doi.org/10.5944/openpraxis.6.3.128>

Saba, F. (2011). Distance education in the United States: Past, present, future. *Educational Technology*, 51, 11-18.

Ubell, R. (2017, January). Why faculty still don't want to teach online. *OLC Insights*.
<https://onlinelearningconsortium.org/faculty-still-dont-want-teach-online/>

West, R., & Borup, J. (2021, February). The power of asynchronous video. *EDUCAUSE Review*.
<https://er.educause.edu/blogs/2021/2/the-power-of-asynchronous-video>

Appendix A

Survey and Instrument Questions

Phase One Survey Questions

Demographic Questions

How many years have you taught in higher education?

How many years have you taught blended or online courses in higher education?

Prior to the COVID-19 pandemic, how satisfied were you with teaching blended or online courses in higher education?

Prior to the COVID-19 pandemic, how frequently did you with using live synchronous video-based communication:

[Daily -- Never]

-Personal life

-Teaching traditional face-to-face courses

-Teaching and learning blended and online courses

-Work not related to teaching and learning (e.g., research collaboration, advising, committee work)

Survey Questions

1. Currently, how satisfied are you with using synchronous video-based communication (e.g., Zoom, WebEx) in your personal life (e.g., talking with friends or family)?
[(1) Very Dissatisfied --- Very Satisfied (5)]
2. Currently, how satisfied are you with using synchronous video-based communication (e.g., Zoom, WebEx) for teaching and learning?
[(1) Very Dissatisfied --- Very Satisfied (5)]
3. Currently, how satisfied are you with using synchronous video-based communication (e.g., Zoom, WebEx) for work not related to teaching and learning (e.g., research collaboration, advising, committee work)?
[(1) Very Dissatisfied --- Very Satisfied (5)]
4. Please briefly explain why you answered these three previous questions the way that you did.
5. Currently, how satisfied are you with using the following communication methods when teaching blended or online courses?
[Don't currently used - Extremely dissatisfied --- Extremely satisfied]
 - Email
 - Phone call
 - Text message (to one person)
 - Group text or message (e.g., Slack)
 - Asynchronous text-based discussions (e.g., Learning Management System like Blackboard or Canvas)

- Asynchronous video-based discussions (e.g., Flipgrid, VoiceThread)
- Synchronous video-based discussions (e.g., Zoom, WebEx)

6. To what degree do you agree with the following, once the COVID-19 pandemic ends:
[(1) Strongly Disagree --- Strongly Agree (5)]
 - If it is up to me, I am more likely to use synchronous video-based communication (e.g., Zoom, WebEx) for meetings at work?
 - If it is up to me, I am more likely to use synchronous video-based communication (e.g., Zoom, WebEx) when teaching a fully online course?
 - if it is up to you, I am more likely to use synchronous video-based communication (e.g., Zoom, WebEx) for teaching a traditional face-to-face course?
7. Please briefly explain why you answered these three previous questions the way that you did.
8. How has your experience working and teaching from home during the COVID-19 pandemic influenced or changed your perceptions of using communication and learning technologies in general for teaching at a distance (e.g., emergency remote learning, distance learning, online learning)?

Additional Comments

Phase Two Interview Questions

1. What are the strengths and weaknesses of using this type of communication technology?
2. Describe how you used synchronous communication technology (e.g., Zoom) prior to the COVID-19 pandemic and has your use changed during the COVID-19 pandemic?
3. Have you ever experienced “Zoom fatigue” or something similar? How have you adjusted your work/teaching to address this?

Do you expect your experience using synchronous communication technology (e.g., Zoom) will influence how you do your job, whether teaching or non-teaching, in the future?

Coaching from a Distance: Exploring Video-Based Online Coaching

Cynthia Carson

Jeffrey Choppin

Warner School of Education, University of Rochester, USA

Abstract

This study explored an innovative coaching model termed *video-based online video coaching*. The innovation builds from affordances of robot-enabled videorecording of lessons, accompanied by built-in uploading and annotation features. While in-person coaching has proven effective for providing sustained support for teachers to take up challenging instructional practices, there are constraints. Both logistical and human capacity constraints make in-person coaching difficult to implement, particularly in rural contexts. As part of an NSF-funded project, we studied nine mathematics coaches over four years as they engaged in video-based coaching with teachers from geographically distant, rural contexts. We adapted a content-focused coaching model that involved a collaborative plan-teach-reflection cycle with synchronous and asynchronous components. The planning and debriefing sessions were done synchronously via Zoom, while the teaching and initial video reflection on teaching via annotations were done asynchronously. We focused on the coaches' practices in each part of the coaching cycle by analyzing interviews, surveys, annotations of the video, and transcripts of the planning and debriefing sessions. We found that: features of the online environment enabled the coach-teacher pairs to collaboratively discuss the mathematics and how students engaged with the mathematics; the coach used video and annotations to help teachers reflect on specific aspects of their practice; and the coach-teacher pairs formed trusting and productive relationships despite not having met in-person during the duration of their work together. Our findings showed that the online platform is not only an effective implementation for coaching, but also affords new opportunities for teacher reflection and evidence-based discussions.

Keywords: Video-based online coaching, content-focused coaching, annotations

Carson, C., & Choppin, J. (2021). Coaching from a distance: Exploring video-based online coaching. *Online Learning*, 25(4), 104-124. DOI: 10.24059/olj.v25i4.2881

This study explores an innovative coaching model that we termed *video-based online coaching*. The innovation builds from affordances of robot-enabled videorecording of lessons, accompanied by built-in uploading and annotation features. Mathematics coaching provides an individualized and sustained approach to support teachers; in-person coaching has been effective in supporting teachers to take up challenging instructional practices (Gibbons & Cobb, 2017; Russell et al., 2020). However, in-person coaching entails logistical constraints and a level of human capacity that makes it difficult to implement, particularly in rural contexts. The considerable literature on online learning is limited in terms of the nature and efficacy of online video-based coaching. The literature on online video-based coaching is situated primarily in medical education and sports, fields that emphasize mastery of advanced technical skills. Mathematics teaching, by contrast, involves complex interactions among students, content, and context (Cohen & Ball, 1999), making it a substantively different environment in which to conduct and research video-based online coaching.

As part of an NSF-funded project, we studied nine mathematics coaches over four years as they engaged in video-based online coaching with teachers from rural contexts who were located in areas geographically distant from the coaches. We adapted a content-focused coaching model that involved a collaborative plan-teach-reflection cycle with synchronous and asynchronous components (see Choppin et al., (in press) for a fuller description of the broader project and the video based online coaching model).

Literature Review

We begin by offering a broad overview of the research on online learning, followed by a focus on the research pertaining to online video coaching in fields outside of mathematics education and, finally, a summary of the research on online coaching in mathematics education, including the use of annotations as a tool for reflection.

Online Learning and Professional Development Teacher Education

A dearth of research exists on synchronous online professional development in mathematics education, despite the emergence of online platforms and learning environments (Johnson et al., 2018; Keengwe & Kang, 2012; Means et al., 2009). Furthermore, there is a lack of online professional development contexts that involve teachers in sustained, intensive reflection on their practices; this has contributed to weak positive outcomes in terms of changing teachers' practices (cf. Fishman et al., 2013). Furthermore, Sing and Khine (2006) found factors that make it difficult for teachers to engage in complex forms of learning in an online context, such as teachers' roles as implementers rather than producers, cultural norms where disagreement is seen as confrontational, and the cognitive demands of teaching.

Online Video Coaching

A recent development in several fields, including sports and, more recently, medicine, is video-based coaching (Knight et al., 2012). In medicine, video-based review helps doctors improve their practice in such areas as surgery and trauma resuscitation (Hu et al., 2012; Pradarelli et al., 2021; Scherer et al., 2003). Hu and colleagues reported that surgeons of varying levels of experience found video coaching helpful to reflect on and improve their practice, and that video coaching was much more aligned with a continuous improvement model than traditional forms of professional development in medicine. Furthermore, they explained that recent advances make it easier to notate video data to document and reflect on performance, making video coaching scalable. Elite athletes have a longer history of engaging in reflective

practices involving coaching that integrates video-based review. The use of video feedback as part of coaching has been used to improve the performance of athletes in sports such as gymnastics and swimming (Boyer et al., 2009; Wilson, 2008).

Correnti et al. (2021) studied an online coaching model consisting of an online workshop followed by online content-focused (literacy) coaching cycles. In this study, teachers first engaged in an online course focused on developing and introducing teachers with models for enacting dialogic text discussions in their classrooms. Following the course, teachers engaged in coaching cycles consisting of planning phone calls, video-recorded instruction, analysis of the videos, and post-lesson phone calls. Correnti and colleagues reported that teachers were able to develop more effective discussion facilitation practices, resulting in increased student engagement. Correnti and colleagues claimed these findings suggest that the model was effective in developing teachers' adaptive expertise through an online coaching model.

The literature on coaching in mathematics has mostly focused on the impact of coaching on teachers' practices (Kraft & Hill, 2020) or student achievement (Campbell & Malkus, 2011), leading to calls to focus more on the details of the interactions between coaches and teachers (Gibbons & Cobb, 2016). Online coaching models have emerged in conjunction with the increased access to online platforms and expanded interest in coaching (Francis & Jacobsen, 2013; Vrasides & Zembylas, 2004). Online coaching models have the potential to address persistent logistical and resource challenges that arise with in-person coaching, such as scheduling meetings at mutually convenient times, observing lessons in person, and accessing the requisite material and human resources, especially in rural contexts (Choppin et al., 2020; Dede et al., 2009). Online coaching models utilize video to engage teachers in coach-guided reflection on instructional practices (Correnti et al., 2020; Kraft & Hill, 2020). However, there is limited research on online coaching in mathematics education.

In mathematics education, Kraft and Hill (2020) developed an online coaching model that utilized the Mathematical Quality of Instruction (MQI) observational instrument and video to support teachers developing ambitious mathematics instruction. This model consisted of iterative cycles where coach and teacher view and analyze video clips of the teachers' instruction, as well as exemplar clips. Kraft and Hill reported that the coach-guided analysis of the video clips was effective in supporting teachers to shift their own instructional practices to align with the MQI framework. Furthermore, Kraft and Hill reported that online coaching is a less expensive and scalable alternative to in-person coaching and provides a way to connect teachers with coaches with expertise in their content area and grade level.

Use of Video Annotations as a Tool for Reflection in Teacher Education

Our focus on video annotations builds from research in which video has emerged as a prominent medium to develop teachers' capacity to reflect on their own practice (Borko et al., 2008; Calandra et al., 2007; Gaudin & Chalise, 2015; Rich & Hannifan, 2008; van Es & Sherin, 2002). The use of video is typically accompanied by activities in which the viewer records their reflections in writing and often includes tagging or annotating the video (Prusak et al., 2010; Stockero et al., 2017; Walkoe, 2015). Users stop the video when they notice something relevant to their goals for viewing; these moments have been termed "call outs" (Frederiksen et al., 1998), "stopping points" (Jacobs & Morita, 2002), or "critical incidents" (Calandra et al., 2009). We use the term "annotations" to label the artifacts of this practice; furthermore, we see annotations as a bridge between asynchronous reflection and synchronous coaching interactions.

In this study, we addressed two concurrent gaps in the literature. First, we addressed the need to further elaborate how coaches interact with teachers during a coaching cycle (Gibbons & Cobb, 2016, Stein et al., 2021). Second, we addressed the need to study how online coaching models afford or constrain coaching practices, particularly with respect to content-focused coaching. The questions we posed were:

1. What are the coaching practices related to planning mathematics lessons in online video coaching?
2. What are the coaching practices related to reflecting on enacted mathematics lessons in online video coaching?

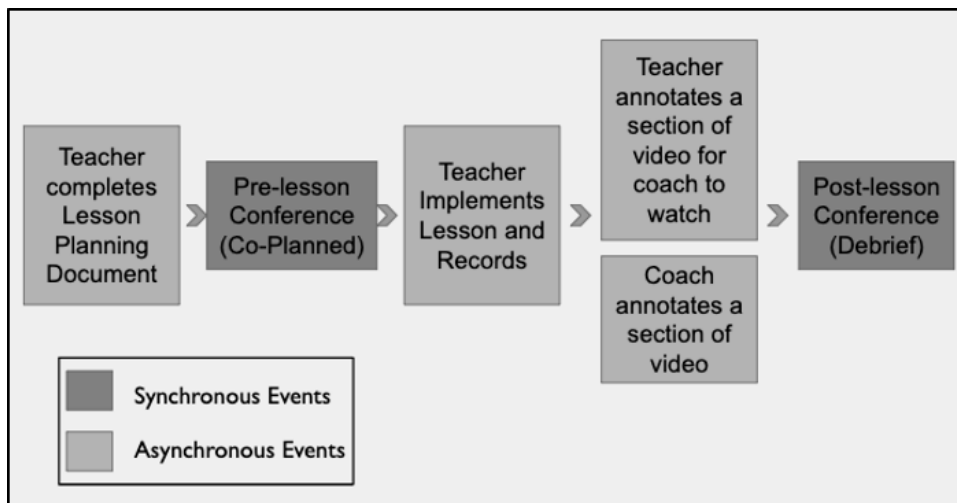
In the discussion section, we address how the coaching practices explored in the two research questions were afforded or constrained by the online environment.

Our Video-based Online Coaching Model

We adapted an in-person version of a content focused coaching model (West & Staub, 2003) that we conducted online so that we could work with teachers in rural areas. Content-focused coaching prioritizes mathematical content knowledge and student understanding of the content throughout three phases of a coaching cycle: co-planning, enactment of the co-planned lesson, and a post-lesson discussion.

In our online model, the coach and teacher co-planned a lesson using Zoom, after which the teacher enacted the lesson using a Swivl robot and iPad to video-record the lesson, and then the coach and teacher met via Zoom to reflect on the lesson. Using the Swivl software, a video of the lesson was uploaded automatically to a shared library, where coach and teacher viewed and annotated the video before the post-lesson Zoom reflection meeting. See Figure 1 for a visual of the model.

Figure 1
Online Video Coaching Model



Methods

We studied nine coaches working with 18 middle grade mathematics teachers who worked in rural contexts. Seven of the coaches had no experience with online coaching prior to this project, though eight of the coaches had experience with in-person coaching. Coaches were selected based on their past experiences as in-person coaches. Coaches who had in-person coaching experience had coached for the same organization and were well known to the project personnel. The ninth coach, who was also well known to the project personnel, was selected based on her previous experience as a professional development provider. The ninth coach was beginning her first year as a coach in her current school district at the start of the study. Coaches were thus a convenience sample. See Table 1 for an overview of the coaches.

Table 1
Coach Experience at the Start of the Study

Coach Name	Years of Experience Coaching in Mathematics	Years of Online Coaching in Mathematics Experience	Years of Experience Teaching Mathematics
Bishop	2	1	28
Hale	1	0	10
Riess	0	0	15
Whilton	4	0	15
Alvarez	3	0	28
Lowrey	6	1	14
Lenore	10	0	6
McFarland	4	0	4
Braithewhite	24	0	36

We based our analysis on two data sources related to pre-lesson activities and two data sources related to post-lesson activities. Data sources for pre-lesson activities were transcripts from the planning sessions and interviews with coaches regarding their coaching practice. Data sources for post-lesson reflection were annotations made by the teachers and coaches, and interviews with coaches about their annotation practices. Below, we divide the discussion of our analysis into two sections, with one section focused on coaching practices that occurred before the teaching of the lesson and the second focused on the post-lesson reflection process.

Analysis of Pre-Lesson Coaching Practices

To characterize coaches' practices, we analyzed interviews with coaches about their practices related to specific coaching cycles. In the interviews, coaches described their preparation for the coaching cycle and how they structured their interactions with the teacher.

We identified common practices across the set of coaches and how these practices were afforded or constrained by working in a fully online environment.

To analyze the interviews, we initially parsed interviews into stanzas (Miles et al., 2014) that typically contained a question and the participant response. Stanzas were then sorted into four categories based on the content of the text: practices related to the pre-lesson conference; practices related to the post-lesson conference; differences between online and face-to-face coaching, and coaching resources. The first category, practices related to the pre-lesson conference, is the focus of the analysis and findings in this paper. Stanzas pertaining to this category were further divided according to three themes: coaching practices; challenges coaches faced when enacting these coaching practices; and purposes that coaches identified for their actions.

Analysis of Post-Lesson Coaching Practices

For the post-lesson reflection, we focused on annotations and coaches' interviews around them. First, we describe our analytical process for coach interviews, which were parsed into stanzas of roughly paragraph length by two members of the project. These two researchers generated a consensus summary of the stanzas; these summaries, in turn, were parsed into themes related to the coaches' annotation processes and their purposes for the annotations. A third researcher then refined those themes and grouped them into the following categories: *purpose of the annotations for the debriefing discussion* and *nature of content of the annotations*. These two broad categories were then broken into subcategories, as reported in the results in Table 1. Categories and subcategories were associated with the principles of content-focused coaching in addition to emergent themes.

We coded annotations by content and stance. To code for stance for the teacher, we used the codes *report*, *describe*, *evaluate*, and *interpret*. These themes were adapted from the literature on noticing (cf. van Es & Sherin, 2008). Report, describe, and evaluate represent lower-level noticing, where the teacher primarily marks a moment; by contrast, interpretation involves higher-level noticing, because it makes a connection between the moment and a pedagogical principle. In terms of coaches' annotations, we analyzed the stance according to two broad categories. One category included the themes *describe*, *evaluate*, and *interpret*, similar to themes used for teachers. The second category characterized whether the coach's suggestion was in the form of direct assistance (suggest or explain) or invitational (elicit) (see Gillespie et al., 2019 and Ippolito, 2010, for a fuller description of this distinction). Two coders initially coded annotations according to content and stance as described above. These coders met and arrived at a consensus. Subsequently, a third researcher revisited the codes, making a small number of changes that represented a refinement of the categories. These changes were then shared with the original coders, who agreed with the revised codes.

Results

We organized results based on the two research questions. We begin with findings related to coaches' practices regarding lesson planning with the teacher, and then discuss findings pertaining to the post-lesson reflections between coach and teacher.

Coaching Practices Related to Planning the Lesson

We identified three sets of practices coaches used to support teachers in planning the lesson and which reflect content-focused coaching. Content-focused coaching focuses on the mathematical goals of the lesson, the ways the design of the lesson addresses those goals, and the

ways the lesson design will support students to engage with the mathematics. The first two sets of practices, *getting familiar with the lesson* and *creating a roadmap for the pre-lesson conference*, describe how coaches prepared themselves for the planning meeting with teachers. The third set of practices, *conducting the pre-lesson conference*, involved what the coach did during the planning meeting.

Getting Familiar with the Lesson

All nine coaches familiarized themselves with the lesson in advance of the planning meeting. One coach, Reed (all names are pseudonyms), explained that getting familiar with the lesson helped her to collaborate with the teacher as a planning partner and to engage the teacher in nuanced discussions of lesson content. Getting familiar with the lesson entailed two practices: reviewing lesson materials and unpacking the mathematics of the lesson. These practices entailed the use of digital materials provided by the teacher using a template designed to compensate for the lack of face-to-face meetings. We describe the template in more detail below.

Reviewing lesson materials. All nine coaches reviewed lesson materials in advance of the planning meeting. Given that our coaches did not have in-person access to the teachers, they created a digital lesson plan template to gather information about the upcoming lesson from the teacher. The template included descriptions of students' prior experiences with the topic, the mathematical content of the lesson, student learning goals, lesson activities, desired evidence of student understanding, challenges teachers anticipated during the lesson, and teachers' personal pedagogical goals for the lesson. Hansen explained how the template familiarized him with the teacher's intention for the lesson: "The lesson planning document really changed things because now you have this very clear insight into the mathematics goals, the lesson they were planning, their own goals" (Coach Interview). Harper described the usefulness of the lesson planning document, stating "the shared Google lesson plan was really helpful because, since we are online, it gave us a common document to look at" (Harper, Coach Interview). Harper further described the necessity of having these materials in order to conduct a productive meeting, explaining that it provided a means to review the lesson and goals, stating:

I get a chance to review the lesson and think about some of the things, in terms of the mathematics goals. Is the goal going to be more procedural or conceptual? Think about what opportunities will students have for thinking, reasoning, and engaging in problem-solving? (Harper, Coach Interview)

Unpacking the mathematics of the task. Six coaches explicitly mentioned that they solved the task themselves in order to understand the mathematics and to anticipate potential student strategies and challenges the teacher was likely to encounter. This preparation helped them engage the teacher in a productive discussion of the lesson. Mason stated:

The first thing I do is the task that was given to me by the teacher as-is. However, they gave it to me, so whether it be a module lesson or it's an actual more high-cognitive, one-question task, I sit and do it for myself. Then I also try to anticipate ways kids might approach it or misconceptions. (Mason, Coach Interview)

Brown shared how doing the mathematics of the task helped her think through ways students might approach the task.

I always do all of the mathematics first. I ask them to send me their lesson plan and any materials, any problem sets that they think they're going to use, or whatever, the exit ticket that they're thinking of using. The first thing I always do is just dive right into the mathematics, and as I'm doing the mathematics I already start to think about different ways kids might approach it or think about—just anticipate [student approaches].
(Coach Interview)

The coaches felt their familiarity with the mathematics and tasks in the lesson materials was essential to prepare for the planning meeting with the teachers, especially given their goal to create a shared lesson plan.

Creating a Roadmap for the Planning Meeting

The second set of practices focused on the coaches developing a blueprint to guide the planning meeting. Coaches prepared prompts to push teachers' thinking about the mathematical goals, the design of the lesson, anticipated student strategies, and challenges the teacher was likely to encounter. These prompts included questions around the *what*, *why*, *who*, and *how* of the lesson. Turner described building a set of questions based on the teacher's goals:

There are questions I want to ask. Like, what is important about this particular lesson? How does this relate to big ideas? Those may not happen every time, but how that starts to happen. I think it's some basic questions, but then a lot of it goes back to what it is that the teachers are trying to get out of the coaching. (Turner, Coach Interview)

Reed used the lesson plan template to guide her preparation for the meeting, saying the document grounded the planning discussion in the teachers' ideas rather than what the coach thought should happen.

These two sets of practices—getting familiar with the lesson and creating a roadmap for the planning meeting—relied heavily on the teacher providing information using the digital lesson planning template. Though in-person coaching models have similar protocols, the development of this particular protocol was necessitated by the lack of in-person contact between teacher and coach. The digital template provided an efficient way for the teacher to share lesson information with the coach in advance of the planning meeting. In the planning meeting, teacher and coach viewed the document simultaneously, which resulted in more specific and productive conversations about the lesson goals, student strategies, and possible teacher responses. Similar to other aspects of the model, we found no loss in the robustness of the planning discussions and coach-teacher interactions by operating in a strictly online context.

Conducting the Pre-Lesson Conference

The third set of practices entailed the ways coaches engaged teachers during the pre-lesson conference. This involved two practices, *developing goals for student understanding* and *anticipating student thinking and teacher responses*, that represent core principles in content focused coaching. Adapting to the online environment was an initial concern for coaches as they engaged in developing goals and anticipating student strategies with teachers, and they developed ways in the online environment to compensate for the lack of face-to-face interaction.

Developing Mathematical Goals for Student Understanding

A key feature of content-focused coaching is supporting the teacher to articulate mathematical goals that involve connections between the mathematical content, the task or activity planned for the lesson, and the big mathematical ideas embedded in the mathematical goals. Brooks described the conversations with the teacher as an opportunity to explore teachers' thinking about goals and their connection to learning:

It [the lesson planning document] does give you some insight about where they [the teacher] are. You can get some ideas in advance and think, “:Okay, well, their goals really aren't very clear, so I really want to focus on what it is you're really trying to accomplish in this particular lesson?” If they have some pretty decent goals, they may not be expressed well, but we can work on them. We can work on changing how we express them in terms of knowing and understanding. (Brooks, Coach Interview)

Coaches indicated that teachers often wrote goals that were too broad and conflated action (e.g., completion of a task) with understanding. Teachers often relied on curriculum materials to identify lesson goals rather than write their own goals. Coaches indicated that by pushing teachers to consider various student strategies and intended learning outcomes they were able to support teachers to think more explicitly and productively about goals. Coaches stated that doing so helped teachers understand the difference between a performance goal (e.g., being able to perform a specific algorithm) and a learning goal. Coaches found that discussion around goals in the planning meeting was largely unaffected by conducting it via Zoom given the practice of simultaneously viewing the planning documents and other lesson artifacts during the meeting.

Anticipating Student and Teacher Responses

Coaches pushed teachers to describe anticipated student approaches and what those approaches revealed about students' understanding of the big mathematical ideas. These discussions consisted of anticipating various solution strategies as well as misconceptions the students might have. Displaying and discussing student strategies were initially challenging in the online environment; when coaches and teachers meet face-to-face, they can quickly generate student strategies on paper. However, coaches referenced their pencil and paper drawings of possible solutions by holding up their mathematics work up to the camera for the teacher to see. On other occasions, coaches and teachers shared their math drawings through Google Draw files, which allowed for collectively generated drawings that both coach and teacher could add to, edit, and discuss in the pre-lesson meeting.

Coaching Practices Related to Reflecting on the Enacted Lesson

We begin by summarizing the multiple purposes we observed regarding the annotations that emerged from our analysis. We then describe in more detail the findings from coach interviews and teacher and coach annotations that support these purposes.

Purposes for the Annotations

We observed multiple and important purposes in terms of (1) allowing teachers to reflect on their own practice; (2) allowing coaches to understand teacher reflection on the lesson; (3) providing an asynchronous opportunity for the coach to respond to the teacher; and (4) providing a list of topics and questions for the debriefing meeting. We discuss these purposes in detail below.

First, a critical facilitator for teacher reflection was the video of the lesson. One of the most notable aspects of the Swivl technology was the ease of access to the video and the ability

to annotate it with a minimal learning curve. Two aspects of the annotations provided opportunities for teachers to reflect on their lessons. First, they annotated as they viewed the video; this served to mark moments the teacher felt were notable or productive for subsequent discussion with the coach. Second, before the debriefing meeting, they read the annotations made by the coach; this yielded additional insights into the lesson that were taken up in the debriefing session. Video allowed the teacher to view the moment referenced by the coach to gain a better understanding of the coach's observation and ensuing suggestion/question/wondering.

Second, annotations provided a window for coaches into teachers' thinking with regard to lesson implementation. Coaches typically read teachers' annotations of the video before making their own annotations. They commented that reading the annotations helped them to assess the teacher's noticing skills and to gauge the teacher's perceptions of the lesson.

Third, annotations provided an opportunity for asynchronous interaction between coach and teacher. Coaches and teachers would read, and sometimes respond to, each other's annotations in advance of the debriefing meeting.

Fourth, annotations served to structure debriefing meetings. Coaches and teachers frequently referenced the annotations during debriefing meetings, with questions posed by coaches in the annotations often a driving force. These purposes are described in more detail below, where we describe findings from interviews with coaches and from analysis of the annotations.

Findings from Analysis Around Annotations

Our analysis of coaches' annotations emerges from two distinct data sources. The first source entailed interviews of the coaches about the nature and purpose of their annotations and the second source was the annotations themselves. These two sources of data revealed patterns in the annotations and how they served the purposes noted above. We begin by describing five themes that emerged from the interviews, and then discuss patterns we noticed in our analysis of the annotations.

Themes from Interviews with the Coaches

Five primary themes emerged from interviews with coaches about their annotations. First, reading teachers' annotations provided insights into their thinking. Second, annotations provided an opportunity to interact with teachers in a way similar to a conversation. Third, coaches commented on the nature of their annotations. Fourth, coaches discussed how annotations structured the debriefing conversations. Fifth, coaches described the use of the notice-wonder pattern in their annotations and, similarly, how they used questions or wonderings as a means to push teachers to reflect on the lessons. We describe these themes in detail below.

Coaches described how reading teachers' annotations provided them insight into teachers' thinking around the lesson. Reiss described the annotation process as "an ongoing commentary" between teacher and coach. Hale explained how even a lack of annotation in a crucial moment helped her to understand the teacher's thinking. Whilton noted that annotations helped him to formatively assess a teacher, stating that an annotation "really, really illuminates where a teacher is at in their own development" and is "a real a good moment to recognize either it's a content knowledge thing or perhaps it's a that listening for, versus listening to, idea." Hale noted that annotations also provided insights into what the teacher wanted to discuss during the debriefing meeting.

The second theme was focused on annotations as an opportunity for coach and teacher to interact. McFarland explained that she used annotations to invite the teacher to elaborate on a

moment of practice when they met for the debriefing discussion. Three coaches described how they crafted annotations in response to teachers' annotations. Hale and McFarland noted that they only annotated sections that the teacher had annotated. Whilton calibrated his annotations according to the tenor of the teacher's annotations. If the teacher was overly critical, he tried to find positive things to say, and he celebrated good moments.

The third theme involved the identification by coaches of moments they chose to annotate and how they chose to annotate them, particularly with respect to taking on an evaluative stance. Four coaches commented on their use of evaluative language. Reiss stated that she refrained from using evaluative language, saying she tries not to use language like "I really liked this," or, "really didn't like this." Lowrey stated that she tries to ask about the impact of a teacher action rather than evaluating it: "Not just saying good job, or great question here, but the impact the question actually had." Alvarez similarly described how annotations provided an opportunity for non-evaluative feedback. She stated:

[the annotations] really have helped me to capture my thinking in a way that is not judgmental. I tried to not be judgmental, in terms of my conversation with them. I don't want to start things with, "I really liked when your blah, blah, blah." Trying to get away from, you know, "like" or "not like" as opposed to the noticings and wonderings help me think about, "I thought it was really impactful when you asked that question because then I noticed the students went back to work and were able to get further."

Alvarez, like many of the coaches, emphasized that those annotations were a place not to evaluate but to pose questions to teachers. Bishop, by contrast, stated that:

The first thing I look for is places where I can give some very positive feedback around something that I really liked and explain why I liked it, what it did for the lesson, what it did for a given student, whatever it happens to be.

Two coaches reported that they annotated the video when they noticed missed opportunities. Bishop stated "I look for places where a student did something really interesting, but maybe the teacher didn't notice it or the teacher ignored it or didn't use it to their advantage." Both Reiss and Bishop noted that they followed up on these annotations by asking the teacher what she would have done if they noticed what the coach did. Reiss stated:

Putting it back on the teacher and having that what-if out there. What would you have done? What could you have asked differently? What could you have done in that moment that might've changed the course of how that conversation went so that opens up and invites that conversation in our debriefing?

Coaches' description of the content of their annotations was evident in the annotations themselves. In particular, coaches' emphasis on using annotations to pose questions to the teacher based on something that they noticed, as summarized above, was clear in our analysis of the annotations, described below. See Table 2 for description of the themes and sub-themes.

Table 2

Themes Generated from the Coaches' Interviews Regarding Annotations

Category	Sub-category	Description	Quote
Purpose of the annotations for the debriefing discussion	Annotations provide insights into teacher thinking	The teachers' annotations help the coaches understand what teachers notice about their teaching	What I get is that it's like an ongoing commentary on what they—what they're seeing. The teachers, their annotations, I've found, the teachers I've worked with, to just be pointing something out to me, like, "Oh, so-and-so wasn't getting it." Or, "Oh, I can't believe they're working off task."
	Annotations are a source of dialogue between the teacher and the coach	The annotations allow for some give-and-take between the coach and teacher	I wonder what they were thinking when they used this strategy because then those are all talking points when we do have our debrief of going through the footage of the tagging and annotation of, hey, let's talk about this section. I was really curious about this. Tell me what you were thinking when this happened
	Annotations provide structure for the debriefing discussion	The coaches directly reference the annotations in the debriefing meetings to guide the discussion	In our final session, too, we kind of went through together looking at the annotations and comments and kind of use those as a guide to the discussion.
Nature of content of the annotations	Use of notice-wonder pairings to provoke teacher reaction to specific moments of practice	The coach remarks on a specific moment of practice and then poses a question to push the teacher to reflect on that moment of practice	I would start, in a way, like this, like with a factual statement about what I see and then a push versus just a push. I tried to let it be a—even if I felt like it was an area for growth or an opportunity, I started to find something positive out of it. I've noticed this is happening, yet also how could we push for this to happen, too?
	Use of questions to push teacher to reflect on aspects of practice	Similar to the notice-wonder pairing, the teachers posed questions to get teachers to think about their instructional practices	I will tend to say, "What could you have asked in this situation that may have changed what the student was thinking?" Putting it back on the teacher and having that what-if out there. What would you have done? What could you have asked differently? What could you have done in that moment that might've changed the course of how that conversation went so that opens up and invites that conversation in our debriefing?
	Use of praise or criticism	The coaches described how the refrained from or purposefully used evaluative language.	Highlighting what they're doing, that's effective. Not just saying good job, or great question here, but what the question actually the impact the question actually had. Being able to encourage and also provide clarification around that, or elaboration on that.

Remarking on missed opportunities	The coaches remarked on instances when the teacher missed an opportunity to recognize and build from student thinking	Then, I go back and I look for missed opportunities, in a way. I look for places where, gee, a student did something really interesting, but maybe the teacher didn't notice it or—which obviously, can happen to all of us—or the teacher ignored it or didn't use it to their advantage.
-----------------------------------	---	--

Patterns in the Anno We found patterns in coaches' annotations that reflected their purposes as well as coaching style. One of the stylistic patterns we observed emanated from the coaches' face to face experiences. Coaches engaged in notice-wonder pairing as discussed above. This pattern was evident to some degree across most of the coaches. Braithewhite wrote:

I think you were looking for the easiest area being the area of the *wholes*, students didn't seem to understand the question. Can you think of another way to ask? Is it an important question? Why or why not?

Braithewhite first noted that students had difficulty understanding one of the questions posed by the teacher during the lesson, and then provided a “wonder” in the form of several questions. Similarly, Bishop wrote:

You end the independent think time here and ask students to start talking to their group members. I was wondering about ways to structure the beginning small group discussions so that all students have a voice.

Bishop noted that the teacher transitioned from independent think time to group work without explicit instructions; she then posed a “wonder” about how to provide some initial structure to ensure that all students had an opportunity to participate. The “wonder” here bordered on a suggestion, as occurred in other cases that represented subtle variations on the notice-wonder pattern. McFarland, for example, wrote: “I like how you're trying to engage all of the learners. Maybe a turn and talk would help spark the conversation between smaller groups of students?” The notice statement is more of an evaluation and the wonder is more of a suggestion than a question. Another variation included a notice-question pattern, such as when Lowrey wrote:

I notice that you valued his input and connected it to a previous statement about fractions. What else would you like to know about Eric's thinking about his idea? It was recognized then a different conjecture became the focus.

After the noticing statement, Lowrey posed a question to provoke teacher reflection around an instructional practice.

All of the variations in the notice-wonder pattern entailed an observation from the coach about a specific moment of practice, with the “wonder” part serving as a stimulus for the ensuing conversation between the coach and the teacher. During the debriefing sessions, a substantive part of the discussion revolved around the annotations, particularly questions posed by the teachers in the form of a “wonder.”

In addition to the notice-wonder pattern, there were stylistic differences between coaches. Alvarez and Reiss, for example, had relatively more annotations coded as *elicit* than other coaches. By contrast, Bishop's annotations were more frequently coded as *suggest* or *evaluate* than other coaches; this difference was also evident in other aspects of the professional development project, suggesting that annotations provided a window into the coach's personal style.

In addition to finding differences between coaches' annotations, we also found differences between coaches' and teachers' annotations, particularly with respect to the valence of annotations we coded as *evaluation*. For the most part, when teachers' annotations were coded as evaluation, the teacher was highly critical of their practice. Conversely, the majority of coaches' annotations coded as *evaluation* were positive, praising particular aspects of the lesson, such as a productive question posed by the teacher, an insightful strategy from a student, or the timely use of a participation structure (e.g., turn and talk).

Concluding Thoughts on Annotations

The themes and findings regarding annotations demonstrate how the accessibility afforded by the Swivl system facilitated a set of interactions between coach and teacher that were not available in face-to-face coaching. The Swivl made it feasible to video-record lessons when the coach was physically distant from a teacher; furthermore, the ease of uploading and annotating facilitated highly productive interactions between coach and teacher.

A number of coaches commented on the affordances of having the video to facilitate reflection on the lesson. Hale stated:

I think having the video was really helpful because you're not relying on either the coach's or the teacher's recollection or interpretation of what happened. I also think having the opportunity to read the teacher's annotations and them having the opportunity to read my annotations allowed us potentially to start a little bit ahead in terms of a post-conference than I would be able to in-person

McFarland similarly commented on the affordances of having video to focus the conversations with the teacher:

I think the video aspect of having that enhances those deeper conversations because you can both pull up the video, or you've already flagged the video, or you both have watched that again. That really connects you back to the work. I think that that's a huge plus to having the online coaching is to have that video to refer back to.

Having the opportunity to reflect asynchronously on the lesson provided opportunities for more deliberate use of language, particularly non-evaluative language, and for coaches to pose questions to teachers. The opportunity to craft language asynchronously and to be able to connect comments to specific moments of practice facilitated the development of teacher noticing and productive teacher-coach discussions. Based on our post-coaching interviews with teachers, doing content-focused coaching online led to a meaningful and trusting professional relationship with the coach.

Discussion

We explored how a video-based online coaching model impacted coaches' ability to support teachers and to gauge the ways that features of the online environment afforded new opportunities for coaches and teachers to work together. We focused on two broad phases of coaching: planning the lesson and reflections on the enacted lesson. In the planning phase, we highlighted multiple practices employed by coaches and how those practices were revised to compensate for, or take advantage of, the online environment. In the reflection phase we focused on the nature and impact of annotations made by teachers and coaches on the video of the lessons stored in the Swivl library.

In terms of how the online environment afford new opportunities for coaches and teachers to work together, in the planning phase, coaches compensated for the lack of in-person contact by creating and relying on a digital template to gather information about lessons; this template structured the ensuing pre-lesson conference with the teacher. In addition, the template, and other lesson artifacts, were used by coaches to preview the mathematics and tasks to anticipate potential student responses and challenges. Furthermore, certain aspects of the online environment enhanced coaching, such as being able to share screens and collaboratively edit documents, providing more clarity in discussions.

In the reflection phase, we found that annotations structured the post-lesson reflection between coach and teacher, including the synchronous interactions between coach and teacher that took place in the post-lesson reflection meeting. Annotations served as an opportunity for formative assessment, as a place for asynchronous interaction between coach and the teacher, as a means to anticipate important topics in the post-lesson conference, and then as a means to structure the post-lesson conversation.

Prior research showing the effectiveness of online coaching primarily involved technical disciplines such as medicine and athletics (cf. Boyer et al, 2009, Hu et al., 2012), whereas prior research on online professional development for teachers showed limitations with respect to complex (e.g, non-technical) forms of learning (cf. Sing & Khine, 2006). Our study, however, demonstrates that video-based coaching provided opportunities for coaches to engage teachers in complex practices related to planning and reflecting on mathematics lessons. The teachers in our study developed mathematical goals for student understanding, anticipated student strategies, and reflected on specific moments of lessons.

Similarly, prior studies of coaching had done little to document fine-grained accounts of practice (Gibbons & Cobb, 2016, Stein et al., 2021). The online context provided an opportunity for us to explore interactions in all aspects of a coaching cycle in ways that would be difficult to accomplish in in-person settings. As a result, we documented a comprehensive set of planning practices that mirrored in-person coaching practices. Additionally, we found that video annotations were particularly valuable for structuring post-lesson reflections; there is no parallel to the annotations in settings that are in person.

As a final point of discussion, we note that the use of the Swivl robot was a particularly notable innovation. The robot allowed the teacher to video-record a lesson without assistance and upload the video with minimal effort. The coordination of the video file with the annotation system in Swivl facilitated the annotation process described above. The asynchronous nature of the reflection process allowed teachers time and repeated opportunities to reflect on specific moments in the lesson, which allowed for more deliberate identification of critical moments and use of evidence to guide reflections.

Conclusion

Findings from this analysis yielded a set of coaching practices that coaches employed at various stages of the coaching cycle. These practices reveal what coaches *do* in each part of the coaching cycle as well as *why* they believe these practices will support teacher learning in a content-focused approach to coaching. Coaches' descriptions also give insight into the affordances and challenges of engaging in content-focused coaching in an online environment. Our findings showed that the online platform is not only an effective implementation for coaching, but also affords new opportunities for teacher reflection and evidence-based discussions. These findings are intended to inform professional development researchers and designers, mathematics coaches, and school administrators in making better decisions utilizing the online environment for coaching and how to scale up these programs to reach more teachers. In addition, the ability to conduct content-focused coaching online made it possible for coaches to work with teachers who were geographically distant; this enabled mathematics teachers who work in remote rural areas to have access to experienced coaches.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received approval from the ethics review board of the University of Rochester, USA for this study.

This research was supported in part by the National Science Foundation under Grant DRL-1620911.

References

- 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*, 417-436. <https://doi.org/10.1016/j.tate.2006.11.012>
- Boyer, E., Miltenberger, R., Batsche, C., & Fogel, V. (2009). Video modeling by experts with expert feedback to enhance gymnastics skills. *Journal of Applied Behavior Analysis, 42*, 855-860. <https://doi.org/10.1901/jaba.2009.42-855>
- Calandra, B., Brantley-Dias, L., Lee, J. K., & Fox, D. L. (2009). Using video editing to cultivate novice teachers' practice. *Journal of Research on Technology in Education, 42*(1), 73-94. <https://doi.org/10.1080/15391523.2009.10782542>
- Campbell, P. F., & Malkus, N. N. (2011). The impact of elementary mathematics coaches on student achievement. *Elementary School Journal, 111*(3), 430-454. <https://doi.org/10.1086/657654>
- Choppin, J., Amador, J., Callard, C., Carson, C., Gillespie, R., Kruger, J., Martin, S., & Foster, G. (in press). A three-part synchronous online model for middle grades mathematics teachers' professional development. In K. Hollebrands, R. Anderson, & K. Oliver (Eds.), *Online learning in mathematics education*. Springer.
- Choppin, J., Amador, J., Callard, C., Carson, C., & Gillespie, R. (2020). Synchronous online model for mathematics teachers' professional development. In S. Keengwe (Ed.), *Handbook of research on online pedagogical models for mathematics teacher education*. (pp. 176-202). IGI Global.
- Cohen, D. K., & Ball, D. L. (1999). Instruction, capacity, and improvement (RR-43).
- Correnti, R., Matsumura, L. C., Walsh, M., Zook-Howell, D., Bickel, D. D., & Yu, B. (2021). Effects of online content-focused coaching on discussion quality and reading achievement: Building theory for how coaching develops teachers' adaptive expertise. *Reading Research Quarterly, 56*(3), 519-558. <https://doi.org/10.1002/rrq.317>
- Davidson-Shivers, G. V., Muilenburg, L. Y., & Tanner, E. J. (2001). How do students participate in synchronous and asynchronous online discussions? *Journal of Educational Computing Research, 25*(4), 351-366. <https://doi.org/10.2190/6DCH-BEN3-V7CF-QK47>
- Dede, C., Ketelhut, D. J., Whitehouse, P., Breit, L., & McCloskey, E. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education, 60*(1), 8-19. <https://doi.org/10.1177/0022487108327554>
- Fishman, B. J., Konstantopoulos, S., Kubitskey, B., Vath, R., Park, G., Johnson, H., & Edelson, D. C. (2013). Comparing the impact of online and face-to-face professional development in the context of curriculum implementation. *Journal of Teacher Education, 64*(5), 426-438.

- Francis, K., & Jacobsen, M. (2013). Synchronous online collaborative professional development for elementary mathematics teachers. *International Review of Research in Open and Distance Learning*, 14(3), 319–343. <https://doi.org/10.19173/irrodl.v14i3.1460>
- Frederiksen, J. R., Sipusic, M., Sherin, M., & Wolfe, E. W. (1998). Video portfolio assessment: Creating a framework for viewing the functions of teaching. *Educational Assessment*, 5(4), 225-297. https://doi.org/10.1207/s15326977ea0504_1
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23.
- Gaudin, C., & Chalias, S. (2015). Video viewing in teacher education and professional development: A literature review. *Educational Research Review*, 16, 41-67. <https://doi.org/10.1016/j.edurev.2015.06.001>
- Gibbons, L. K., & Cobb, P. (2016). Content-focused coaching: Five key practices. *The Elementary School Journal*, 117(2), 237-260. <https://doi.org/10.1086/688906>
- Gillespie, R., Amador, J., & Choppin, J. (2019). Exploring the discursive differences of mathematics coaches within online coaching cycle conversations. In S. Otten, A. G. Candela, Z. de Araujo, C. Haines, & C. Munter (Eds.), *Proceedings of the forty-first annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 442-450). University of Missouri.
- Haythornthwaite, C. (2000). Online personal networks: Size, composition, and media use among distance learners. *New Media & Society*, 2(2), 195-226. <https://doi.org/10.1177/14614440022225779>
- Haythornthwaite, C. (2001). Exploring multiplexity: Social network structures in a computer-supported distance learning class. *The Information Society*, 17, 211-226. <https://doi.org/10.1080/01972240152493065>
- Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Quarterly*, 31(4), 51-55.
- Hu, Y., Peyre, S., Arriaga, A., Osteen, R., Corso, K., Weiser, G., Swanson, R., Ashley, S., Raut, C., Zinner, M., Gawande, A., & Greenberg, C. (2012). Postgame analysis: Using video-based coaching for continuous professional development. *Journal of the American College of Surgeons*, 115-124.
- Ippolito, J. (2010). Three ways that literacy coaches balance responsive and directive relationships with teachers. *The Elementary School Journal*, 111(1), 164-190. <https://doi.org/10.1086/653474>

Jacobs, J. K., & Morita, E. (2002). Japanese and American teachers' evaluations of videotaped mathematics lessons. *Journal for Research in Mathematics Education*, 33(3), 154-175. <https://doi.org/10.2307/749723>

Johnson, C., & Lock, J. (2018, March). Making multimedia meaningful: Outcomes of student assessment in online learning. In *Society for Information Technology & Teacher Education International Conference* (pp. 1542-1549). Association for the Advancement of Computing in Education (AACE).

Keengwe, J., & Kang, J. J. (2012). Blended learning in teacher preparation programs: A literature review. *International Journal of Information and Communication Technology Education (IJICTE)*, 8(2), 81-93. <https://doi.org/10.4018/jicte.2012040107>

Knight, J., Bradley, B. A., Hock, M., Skrtic, T. M., Knight, D., Brasseur-Hock, I., Clark, J., Ruggles, M., and Hatton, C. (2012). Record, replay, reflect: Videotaped lessons accelerate learning for teachers and coaches. *Journal of Staff Development*, 33(2), 18-24.

Kraft, M. A., & Hill, H. C. (2020). Developing ambitious mathematics instruction through web-based coaching: A randomized field trial. *American Educational Research Journal*, 57(6), 2378-2414. <https://doi.org/10.3102/0002831220916840>

Marra, R. M., Moore, J. L., & Klimczak, A. K. (2004). Content analysis of online discussion forums: A comparative analysis of protocols. *Educational Technology Research and Development*, 52(2), 23-40.

McCreary, E. K. (1990). Three behavioral models for computer-mediated communication. In L. M. Harasim (Ed.), *Online education: perspectives on a new environment* (pp. 117-130). New York: Praeger.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Project Report. Centre for Learning Technology.

Miles, M., Huberman, A., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook*. Sage.

Pradarelli, J. C., Quamme, S. R. P., Yee, A., Faerber, A. E., Dombrowski, J. C., King, C., & Greenberg, C. C. (2021). Surgical coaching to achieve the ABMS vision for the future of continuing board certification. *The American Journal of Surgery*, 221(1), 4-10. <https://doi.org/10.1016/j.amjsurg.2020.06.014>

Prusak, K., Dye, B., Graham, C., & Graser, S. (2010). Reliability of pre-service physical education teachers' coding of teaching videos using Studiocode analysis software. *Journal of Technology and Teacher Education*, 18(1), 131-159.

Rich, P., & Hannafin, M. (2008). Decisions and reasons: Examining preservice teacher decision-making through video self-analysis. *Journal of Computing in Higher Education*, 20(1), 62-94. <https://doi.org/10.1007/BF03033432>

Russell, J. L., Correnti, R., Stein, M. K., Thomas, A., Bill, V., & Speranzo, L. (2020). Mathematics coaching for conceptual understanding: Promising evidence regarding the Tennessee math coaching model. *Educational Evaluation and Policy Analysis*, 42(3), 439-466. <https://doi.org/10.3102/0162373720940699>

Scherer, L. A., Chang, M. C., Meredith, W., & Battistella, F. D. (2003). Videotape review leads to rapid and sustained learning. *The American Journal of Surgery*, 185, 516-520. [https://doi.org/10.1016/S0002-9610\(03\)00062-X](https://doi.org/10.1016/S0002-9610(03)00062-X)

Sing, C. C., & Khine, M. S. (2006). An analysis of interaction and participation patterns in online community. *Educational Technology & Society*, 9(1), 250-261.

Sotillo, S. M. (2000). Discourse functions and syntactic complexity in synchronous and asynchronous communication. *Language Learning & Technology*, 4(1), 82-119.

Stein, M. K., Russell, J. L., Bill, V., Correnti, R., & Speranzo, L. (2021). Coach learning to help teachers learn to enact conceptually rich, student-focused mathematics lessons. *Journal of Mathematics Teacher Education*, 1-26. <https://doi.org/10.1007/s10857-021-09492-6>

Stockero, S. L., Rupnow, R. L., & Pascoe, A. E. (2017). Learning to notice important student mathematical thinking in complex classroom interactions. *Teaching and Teacher Education*, 63, 384-395. <https://doi.org/10.1016/j.tate.2017.01.006>

Van Es, E. A., & Sherin, M. G. (2002). Learning to notice: Scaffolding new teachers' interpretations of classroom interactions. *Journal of Technology and Teacher Education*, 10(4), 571-596.

Van Es, E. A., & Sherin, M. G. (2008). Mathematics teachers' "learning to notice" in the context of a video club. *Teaching and Teacher Education*, 24(2), 244-276. <https://doi.org/10.1016/j.tate.2006.11.005>

Vrasidas, C., & Zembylas, M. (2004). Online professional development: Lessons from the field. *Education + Training*, 46(6/7), 326-334. <https://doi.org/10.1108/00400910410555231>

Walkoe, J. (2015). Exploring teacher noticing of student algebraic thinking in a video club. *Journal of Mathematics Teacher Education*, 18(6), 523-550.

Warschauer, M. (1995). Comparing face-to-face and electronic discussion in the second language classroom. *CALICO Journal*, 13(2), 7-26.

West, L., & Staub, F. C. (2003). *Content-focused coaching: Transforming mathematics lessons*. Heinemann.

Wilson, B. D. (2008). Development in video technology for coaching. *Sports Technology, 1*(1), 34-40. <https://doi.org/10.1080/19346182.2008.9648449>

Supporting Holistic Student Development Through Online Community Building

Katrina Borowiec
Deoksoon Kim
Lizhou (Jo) Wang
Julie Kim
Stanton Wortham
Boston College, USA

Abstract

Faculty members abruptly transitioned to online course delivery during the COVID-19 public health crisis. Unfortunately, the isolation of learning online had the potential to damage students' well-being during an already stressful pandemic. Furthermore, many faculty members had little experience with online modes of instruction and few effective strategies for building community online. This exploratory sequential mixed methods study uses data from 37 individual interviews with faculty across diverse disciplines, course evaluations from 13 of the 37 interview participants, and survey data from 347 faculty to answer the following research question: *How did faculty foster a sense of community online to support students' holistic well-being during the COVID pandemic? What strategies can faculty use to create community and foster well-being in online courses?* Results show that successful strategies centered around intentional and purposeful course design, establishing clear expectations for faculty and students, and fostering supportive and trustworthy online learning environments.

Keywords: online community, teaching presence, social presence, holistic education, student well-being, COVID-19 pandemic

Borowiec, K., Kim, D., Wang, L., Kim, J., & Wortham, S., (2021). Supporting holistic student development through online community building. *Online Learning*, 25(4), 145-155.
DOI: 10.24059/olj.v25i4.2882

Online higher education enrollment has grown substantially. The proportion of undergraduates in the United States enrolled in at least one online course increased from 8% in 2000 to 34% in 2018 (Radford, 2011; U.S. Department of Education, 2019). Online education was essential to educational continuity during the COVID-19 pandemic, when nearly all instruction was delivered online. However, only 44% of instructors had online teaching experience as of fall 2018 (Inside Higher Ed & Gallop, 2018), suggesting that most instructors taught online for the first time during the pandemic, with minimal preparation. In response to the COVID-19 crisis, most faculty did “emergency remote teaching” (Hodges et al., 2020).

Many students also studied online for the first time in Spring 2020, not by choice. Only 6.8% of students entering college in fall 2019 reported that there was a “very good chance” of taking an online course (Stolzenberg et al., 2020, p. 47). College students and their families recognize the critical role of campus environments in shaping students’ success (Astin, 1999; Museus, 2014; Pascarella & Terenzini, 2005; Tinto, 1998). When designed effectively, campus environments support students’ intellectual growth, while often supporting holistic development along moral, ethical, spiritual, social, and emotional dimensions (Grant, 2012; Wortham et al., 2020).

Attention to students’ holistic needs was particularly important during the COVID pandemic, given students’ additional challenges. In 2020, 58% of college students experienced insecurity in their basic needs, including homelessness, housing insecurity, and/or food insecurity (Goldrick-Rab et al., 2020). Many students also experienced worsening mental health (Healthy Minds Network & American College Health Association, 2020), technological barriers (Hart et al., 2021; Quezada et al., 2020), and concerns about the pandemic’s impact on job prospects (Zhai & Du, 2020).

Supportive online classrooms can help meet students’ holistic needs through an intentional focus on community building. Sense of community involves the feeling that one matters to a group of people; a feeling of social relatedness, support, and mutual contribution among individuals; and emotional connection (McMillan & Chavis, 1986). In the context of online instruction, the “group” can be a classroom community, an instructor and students engaged in learning (Garrison et al., 1999; Rovai, 2000). Given the importance of interpersonal relationships, we agree with Love and Love (1995) who argue that separating students’ intellectual needs from their social-emotional needs—and by extension, their spiritual, physical, and ethical needs (Kuh, 2018)—only serves to “break down” community (Love & Love, 1995, p. 10). The strongest classroom communities will attend to students’ holistic needs.

We recognize that prior to the COVID-19 pandemic many faculty attended to students’ holistic needs when teaching online. However, the unique circumstances of the pandemic both heightened students’ vulnerabilities and forced instructors into emergency remote/online teaching. Instructors have a pivotal role in building classroom community in online courses (Berry, 2017; Shea et al., 2005). Most faculty in our study had limited or no online teaching experience, which presents a unique opportunity to understand how faculty reacted to students’ holistic needs when they were learning how to teach online during an immensely stressful global pandemic. This study asks: *How did faculty foster a sense of community online to support students’ holistic well-being during the COVID pandemic? What strategies can faculty use to create community and foster well-being in online courses?*

This study offers successful strategies for fostering a sense of community online. Even after the COVID-19 pandemic ends, online education is here to stay, and thus these strategies will remain useful.

Literature Review

We draw from research in three areas: students' holistic needs, sense of community online, and supporting students' holistic needs online during the COVID-19 pandemic. Below we highlight relevant literature from each area.

Students' Holistic Needs

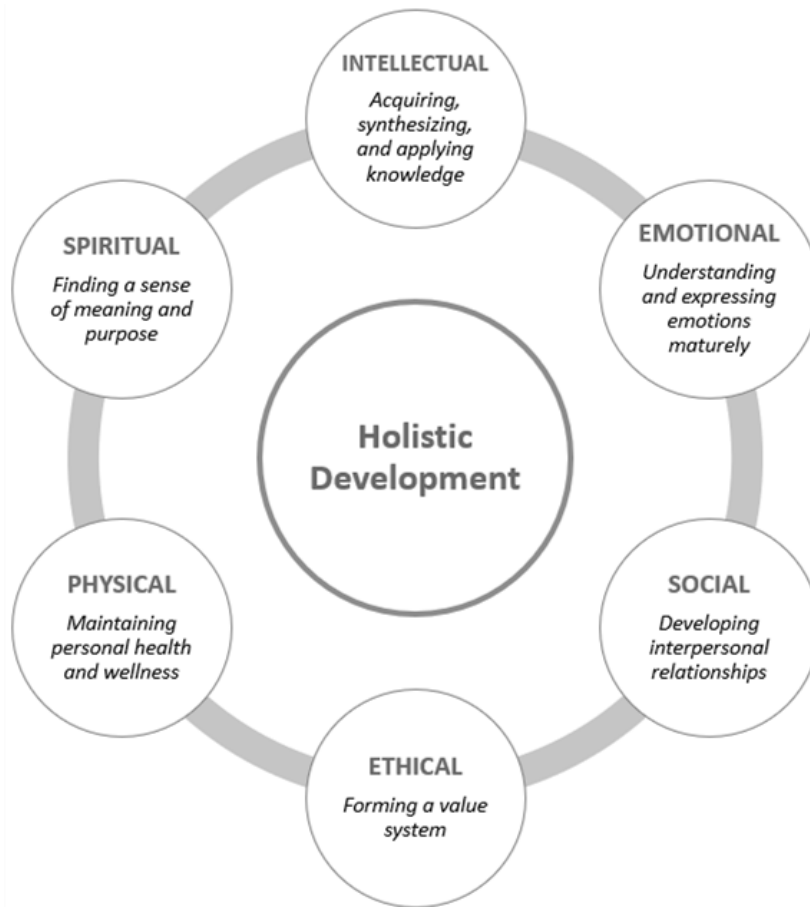
Student development theories underscore the importance of identity formation during college (Baxter Magolda, 2020; Chickering & Reisser, 1993; Patton et al., 2016). These theories envision identity as an integration along multiple dimensions. In this section, we use Chickering and Reisser's (1993) seven vectors of identity development and Baxter Magolda's (2020) self-authorship theory to illustrate these theories.

Chickering and Reisser (1993) proposed seven vectors or facets of identity development. Four of these vectors are considered foundational to the others: (1) developing competence with respect to intellectual, intrapersonal, and physical skills; (2) managing and expressing emotions appropriately; (3) moving from autonomy and accepting one's independence, toward recognizing interconnectedness; and (4) developing mature interpersonal relationships (Chickering & Reisser, 1993; Patton et al., 2016). These four vectors provide a foundation for the fifth vector, establishing identity, which involves self-acceptance across aspects of identity (e.g., gender, sexual orientation, cultural heritage). These five vectors allow for the sixth vector, developing purpose, which involves vocational goals and a sense of what is meaningful in life. The seventh vector is developing integrity, which means balancing personal values with social needs (Chickering & Reisser, 1993; Patton et al., 2016).

Baxter Magolda's (2020) theory of self-authorship holds that individuals must answer three key questions related to epistemology, intrapersonal, and interpersonal dimensions. First, "How do I know?" is answered by developing one's internal beliefs. Second, "Who am I?" is answered by determining one's values and identity. Finally, "What kind of relationships do I want to construct with others?" is answered by learning how to build interpersonal relationships that support one's needs while respecting the others' needs (p. 74).

These two theories illustrate the multidimensional nature of student development. Supporting students' development requires a holistic approach (Kuh, 2018; Mayhew et al., 2016). In 2018, Kuh argued that, although holistic student development has been viewed as essential to a liberal arts education for decades, "the need has never been greater for educating the whole student by addressing one's intellectual, social, emotional, ethical, physical, and spiritual attributes" (p. 53). At the same time, he acknowledged that intellectual growth is often seen as more important than other aspects of development. Figure 1 displays the six dimensions of holistic development that were identified by Kuh, along with a brief definition of each area.

Figure 1
Dimensions of Holistic Student Development (Kuh, 2018)



Sense of Community Online

Many students experience online courses as more isolating than in-person ones (McInnerney & Roberts, 2004). Reading body language and social cues is challenging online—especially for asynchronous courses—potentially causing miscommunication (Rovai & Jordan, 2004; Tryon & Bishop, 2009). Educators need to enhance students' feelings of social connectedness online (Kauffman, 2015; Robinson & Hullinger 2008), because community building is crucial to students' engagement in online courses (Castañeda & Selwyn, 2018; Kilgour et al., 2019; Salmon, 2011).

The Community of Inquiry Framework (CoI) describes how instructors can foster a sense of community online (Garrison et al., 2010; Garrison & Akyol, 2013). The framework has three interconnected components: teaching presence, social presence, and cognitive presence (Archibald, 2010; Berry, 2019; Shea & Bidjerano, 2009). Teaching presence refers to the instructor's role in designing learning environments and selecting content that can enhance both social and cognitive presence (Garrison et al., 2010; Garrison & Akyol, 2013). Social presence occurs when students are socially and emotionally engaged in the classroom and feel comfortable contributing. Cognitive presence involves students' engagement in critical reflection on their educational experiences (Garrison & Akyol, 2013).

Since teaching, social, and cognitive presences are interrelated, improvements in one impact the others. Effective instructional design, clear communication, clear course goals, productive time management, and comfort with online technologies are important factors in teaching presence (Oliphant & Branch-Mueller, 2016; Shea et al., 2006; Song et al., 2004). One form of clear communication is direct one-on-one video or written communication, which reminds students that they are interacting with a “real” human being despite the physical distance (Berry, 2017; Lowenthal & Dunlap, 2018). Moreover, through effective communication, instructors can improve social presence by becoming co-learners, showing empathy for students, reaching out to students who might need assistance, and addressing problems in classroom social dynamics (Ouyang & Scharber, 2017; Whipp & Lorentz, 2009). A well-designed course offers opportunities for students to collaborate through group assignments (Baker & Edwards, 2011), enhancing social presence and communal bonds. In turn, when students feel connected, they may seek assistance from their classmates or the instructor, which will improve their learning and cognitive presence (Shea & Bidjerano, 2009; Wei & Chen, 2012).

Supporting Students’ Holistic Needs Online during the COVID-19 Pandemic

Students encountered many challenges during the COVID-19 pandemic. About six out of ten college students experienced homelessness, housing insecurity, and/or food insecurity (Goldrick-Rab et al., 2020). Many students also suffered from mental health problems that were exacerbated by the pandemic (Healthy Minds Network & American College Health Association, 2020). In spring 2020, 45% of college students felt too physically or emotionally unwell to engage in their coursework (Means & Neisler, 2021). More than 50% of students reported that staying motivated, finding a quiet place to do schoolwork, and balancing coursework with family responsibilities was a problem in spring 2020 (Means & Neisler, 2021). Internet access and hardware problems impeded students’ engagement (Hart et al., 2021; Means & Neisler, 2021; Quezada et al., 2020). International students also encountered challenges with time zone differences (Goin Kono & Taylor, 2021). Pre-pandemic strategies for supporting students online and building communities were insufficient.

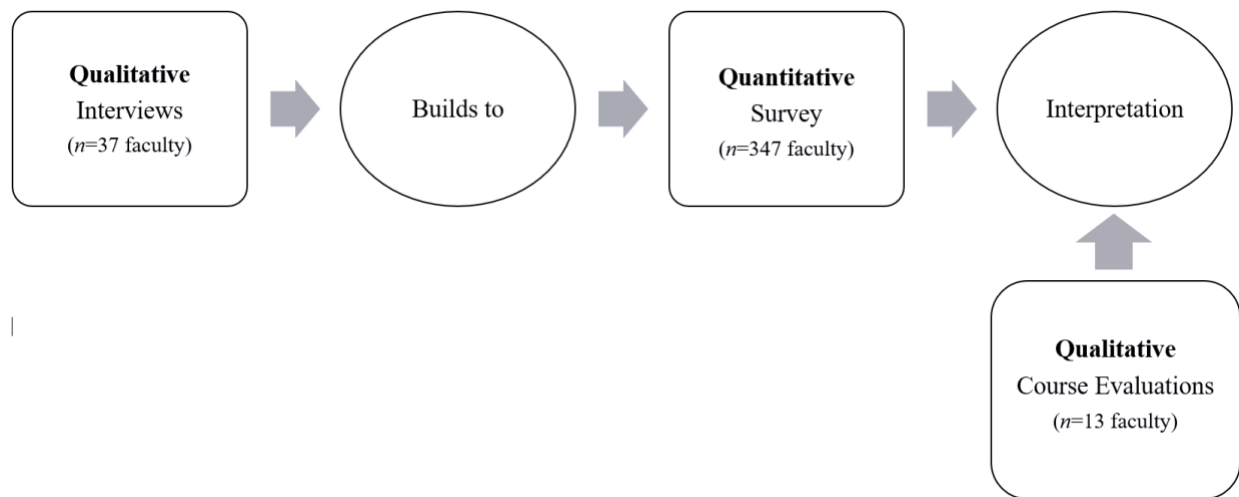
One-on-one interactions between faculty and students were critical to overcoming challenges and fostering holistic development (Goin Kono & Taylor, 2021). Empathic interactions (Conklin & Dikkers, 2021; Kim et al., 2021; Miller 2021), what Goin Kono and Taylor (2021) describe as an “ethos of care” (p. 156), were critical during the pandemic. In some cases, office hours allowed students to chat with instructors about their lives, rather than concentrating on course-related issues (Miller, 2021). Students appreciated instructors’ attention to their needs during the pandemic (Conklin & Dikkers, 2021; Means & Neisler, 2021).

All this work highlights the multifaceted nature of college student development. A holistic approach is needed to adequately support students. And the COVID-19 pandemic pushed students’ holistic needs to the forefront. Our study extends prior research by examining how online faculty fostered a sense of community online during the emergency transition to online learning during COVID-19. While most prior research has focused on students’ perceptions of online community building, the current mixed methods study focuses on faculty members’ perspectives.

Methodology

This exploratory sequential mixed methods study explores how faculty can create communities online to support students' holistic development (Creswell & Plano Clark, 2011; see Figure 2). The progression from qualitative to quantitative allowed us to ground our survey questions in the lived experiences of faculty. This is part of a larger study concerning faculty and student experiences teaching and learning online during the pandemic (see Kim et al., 2021). All participants were recruited from a private university in the northeast United States.

Figure 2
Exploratory sequential mixed methods design



Note. This figure was adapted from Creswell and Plano Clark (2011).

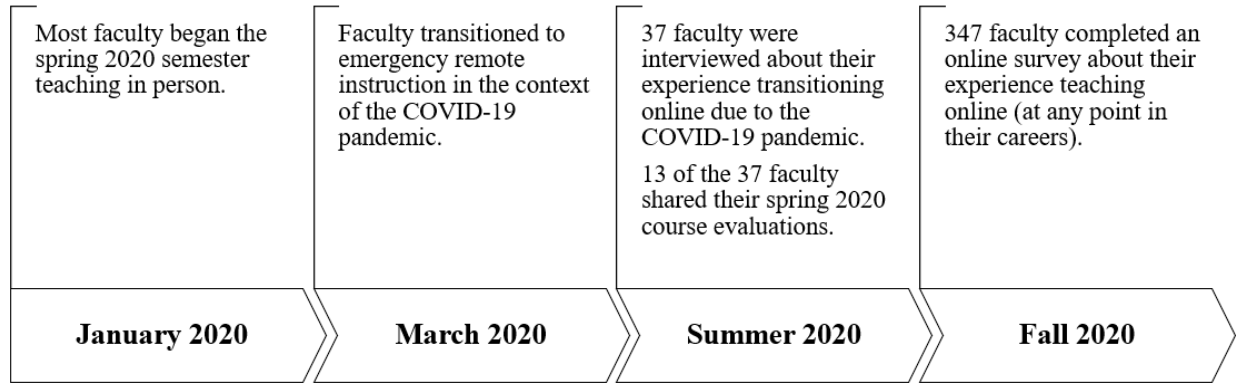
We began by conducting semi-structured interviews with 37 faculty members about their experiences transitioning to online instruction at the beginning of the COVID-19 pandemic in spring 2020. Thirteen of these 37 instructors also shared their spring 2020 course evaluations, which provided students' perspectives on some courses. The practices that faculty described were used to develop survey items. For example, faculty participants discussed checking in with students to see how they were doing during the pandemic. Survey participants were then asked how often they “offer students opportunities to share how they are doing” when teaching online. In total, 347 faculty members completed the survey in fall 2020. The survey data was used for complimenting the interview data. Figure 3 presents the research timeline.

Researchers' Positionality

We recognize that our backgrounds impact our research. We are a five-person research team, comprising three doctoral-level graduate students, one professor, and one senior administrator. Five additional faculty members and six additional graduate students offered feedback during the project as critical friends (Lincoln & Guba, 1985). The team included

experts in developmental psychology, educational psychology, curriculum and instruction, educational measurement, and higher education. Three of the five are scholars of color.

Figure 3
Research timeline



The course evaluation and survey data were used to triangulate findings from the interviews, increasing the trustworthiness of our findings (Merriam & Tisdell, 2016). For example, students described practices in the course evaluations that were mentioned by instructors. Many survey participants described “often” or “very often” engaging in the practices described by faculty interview participants, suggesting that these reflected general campus practices.

Participants

We invited two sets of participants. The primary group included 37 participants whom we interviewed. In summer 2020, we recruited these faculty participants through purposive sampling using two criteria. First, school deans nominated faculty members who flourished in online learning. Second, nominated faculty had to volunteer to participate after receiving an invitation.

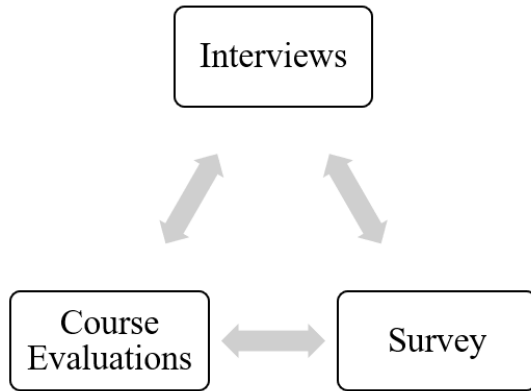
In total, 37 faculty members participated in interviews, including tenured, tenure-track, and non-tenure track faculty of varying ranks and years of experience. These faculty represented eight schools across the university. Some faculty teach undergraduates only ($n = 16$; 43%), some graduate students only ($n = 11$; 30%), or both ($n = 10$; 27%). Table A in the Appendix presents additional information about participants.

For the survey, we invited 1,865 instructors at the same university to participate in an online survey about their experiences with online teaching and learning in fall 2020; 347 instructors started the survey and passed the screening question, which asked them whether they had ever taught online or in a hybrid/blended format, resulting in an overall response rate of 18.6%. The number of participants answering each question dropped across the survey. Rather than limiting the survey to those who completed it, we used the data available for each question. In the middle of the survey, about 300 responded, and about 280 responded to the demographic questions at the end.

Data Collection

Data included interviews, course evaluations, and survey results. The interviews were conducted first, and preliminary interview findings informed survey instrument development (see Figure 4).

Figure 4
Triangulation of data sources



Interviews

Faculty participated in individual semi-structured Zoom interviews, each lasting approximately 60 minutes, conducted by one or two investigators. Questions focused on their teaching experience, including prior online teaching, the affordances of online education, how their online teaching might have changed their attitudes toward online teaching and learning, strategies to foster a sense of community online, and online teaching advice. See the Appendix for the interview questions. Interviews were recorded and transcribed. Participants were asked to review their transcripts for accuracy.

Course Evaluations

Students complete course evaluations each semester. In response to the COVID-19 pandemic, two open-ended responses were added to the spring 2020 evaluations:

- (1) What are some of the benefits or advantages of taking this course remotely?
- (2) What were some challenges in taking this course remotely?

Three additional questions are also included in the standard, pre-pandemic evaluation:

- (3) What are the strengths of this course?
- (4) How could the instructor improve the course?
- (5) Would you recommend this course to other students, majors, etc.? Why or why not?

Students' responses to these five questions, plus an open "additional comments" text box, were analyzed as part of this study. Thirteen of the 37 interview participants shared their spring 2020 course evaluations. These 13 faculties represented five of the eight schools: arts and sciences ($n = 8$; 62%); business ($n = 1$; 8%); education ($n = 2$; 15%); social work ($n = 1$; 8%); and theology and ministry ($n = 1$; 8%).

Survey

The survey was administered online using Qualtrics and took approximately 25 to 30 minutes. Two experts outside the research team reviewed the questions and provided feedback. The survey asked about prior online teaching experience; overall satisfaction with teaching online; experience with learning management systems; utilization of video conferencing; and

engagement in practices to support students' holistic development online. While most survey questions were closed-response, using Likert scales, four open-response questions were also included. All survey questions were designed for this study. As noted above, the interviews informed the survey development.

Data Analysis

Interview and course evaluation data were analyzed inductively, while survey data were analyzed using descriptive statistics.

Interviews

The semi-structured interview data were analyzed inductively and iteratively (Lincoln & Guba, 1985). Our preliminary analysis involved analytic memo writing after each interview to capture initial reflections and brainstorm codes (Merriam & Tisdell, 2016). We then transitioned to formal coding using *Dedoose*, following data analysis procedures from Miles et al. (2014): (a) reviewing a subset of data and determining initial codes (e.g., practices to increase student participation, student-student engagement, student-teacher engagement); (b) establishing definitions for all codes; (c) coding the data; (d) revising codes; (e) forming categories and subcategories from the thematic patterns (e.g., purposeful course design); (f) revising categories and subcategories; (g) repeating steps (d) through (f) iteratively; (h) renaming or shifting the categories and subcategories; and (i) conducting within- and cross-case analyses of the categories.

Course Evaluations

Open-response course evaluation questions were also analyzed inductively using *Dedoose*. The codes generated from the interview data were applied to the open-response course evaluation data.

Survey

The survey data were used to triangulate findings from the current study. The statistical analyses are exploratory and descriptive in nature. Analyses involved computing frequencies and percentages for individual survey items (i.e., the percent of faculty who “often” engaged in specific teaching practices). See the Appendix for specific items and the associated response options.

Findings

The findings showed (1) intentional and purposeful course design, (2) establishing clear expectations, and (3) fostering supportive and trustworthy classroom environments to create community online during the COVID pandemic. Additional subthemes are presented below. To implement these strategies, faculty used tools such as Zoom breakout rooms, polling, and the Canvas asynchronous group discussion board. These tools not only enhanced student participation, but also provided an opportunity for voices to be heard.

Many instructors in our study were teaching online for the first time. Only 16% of survey respondents had taught at least one completely online course before the pandemic. Hence the transition to online education represented a significant shift in professional practice. Despite their limited online experience, faculty in our study used several strategies to create a positive sense of community online; 88% of survey respondents reported that they “often” or “very often” “strive to create a sense of community in the classroom” when teaching online.

Intentional and Purposeful Course Design

Many faculty members purposefully designed online courses to improve their teaching presence. Faculty were acutely aware of their responsibility to establish a positive online

experience. As Kristina explained, “I’m the node, and then you’ve got all these people that come off that node and there are some connections between them.” For the class to have a successful, productive remainder of the semester, Kristina needed to be the glue holding the community together. “And so I think that for the community... it’s not like the community existed on its own. It was a community that existed through me, right?” Faculty members provided a reassuring connection to campus, in the context of a pandemic when students were abruptly sent home.

From a different perspective, Jordan described himself as a “co-learner” in the classroom community. He elaborated:

I understand us to be co-learners and so we're sharing in the process. And I think to the degree to which I can do that with authenticity, then, that's the degree to which they recognize me as a learner as well. And if I'm a learner then that helps to form the community.

While Kristina positioned herself as the lead actor within the online classroom space, Jordan envisioned himself as another group member. Despite differences in their imagined roles, both instructors established a successful teaching and social presence. And both were aware of the pivotal role they played in the classroom community.

When adjusting to online teaching, faculty made deliberate pedagogical decisions to foster their teaching presence and support their students’ developmental needs. Beatrice described her course design process as follows:

I am always thinking about how to create the kind of classroom experience... that gets them connecting with the world around them and in relationships that are meaningful. How am I going to do that in their interactions with each other, whether it's like through certain kinds of activities and breakout rooms, the nature of my prompts, the ways that they're timed and so on. All of those things are considered. Because I'm trying to create an environment that honors their psychological and social needs.

Beatrice’s pedagogy focused on building a strong classroom community and supporting students’ development. In an online environment, this involved synchronous Zoom breakout room activities and asynchronous activities outside class time. Beatrice’s emphasis on “timing” conveys the careful choreography that characterized her teaching.

Establishing Clear Expectations

The second theme involved faculty establishing clear expectations about what students and instructors should expect from each other. Faculty recognized that students were anxious about online courses. Especially during the crisis, a clear structure for the remainder of the semester was reassuring. For example, immediately after receiving notification that courses would be moved online, Grant emailed students an updated syllabus, providing reassurance that there was a plan.

Faculty also established norms for how they expected students to engage in synchronous sessions, such as encouraging students to turn on their cameras. Samuel explained:

“In order for you to learn well in this environment, I expect the following things of myself and of you.” And I had these you know—I said on my slides, “I’m going to be on time to

class, I'm going to be prepared. I'm going to carry on with class exactly the same way as I do normally. I have PowerPoints in every class," and all that sort of stuff. And I also set my expectations are that you arrive in the classroom a couple minutes early, that your video camera is on, that you stay in touch with me if there's some reason why you can't participate, etc. I think those were all ways of getting us all on the same page as to what my expectations were for us as a group. And that creates a sense of community.

By outlining clear expectations and prioritizing “getting us all on the same page,” Samuel demonstrated his respect for students and the courtesy he expected students to show. This mutual respect provided a foundation for community.

Marcus did not establish guidelines similar to Samuel’s, but by the end of the semester he recognized the importance of clear expectations:

One thing that I felt that I would do differently in the Fall, if I'm teaching online at all, would be more sensitive to really requesting or enforcing everyone have their audio and video on. [...] Because I did have like two or three students who they were there, but then you know, they just had a picture up and their sound was muted and then sometimes you would call on them or say something and nobody responded.

Marcus described how, when nobody responded, it created an awkward moment. Marcus wondered if the student had left the Zoom meeting. Alternatively, the student might have limited internet bandwidth. When expectations are established from the beginning, students can inform the professor of any internet-related challenges.

Fostering Supportive and Trustworthy Classroom Environments

As students encountered difficulties transitioning into online learning, faculty members emphasized the importance of supportive and trustworthy environments. Kelly noted: “We can’t jump right into content without some serious community building.” Creating a supportive online community involved integrating technology. As discussed below, features like breakout rooms were frequently described as useful for community. Faculty also used Zoom to hold office hours and meetings with students. Figure 5 provides an overview of how survey participants utilized video conferencing tools. The highest proportion of instructors used these tools for individual student meetings (92%), while just under half used video for guest lectures (46%). Specific examples of how instructors used these tools appear below.

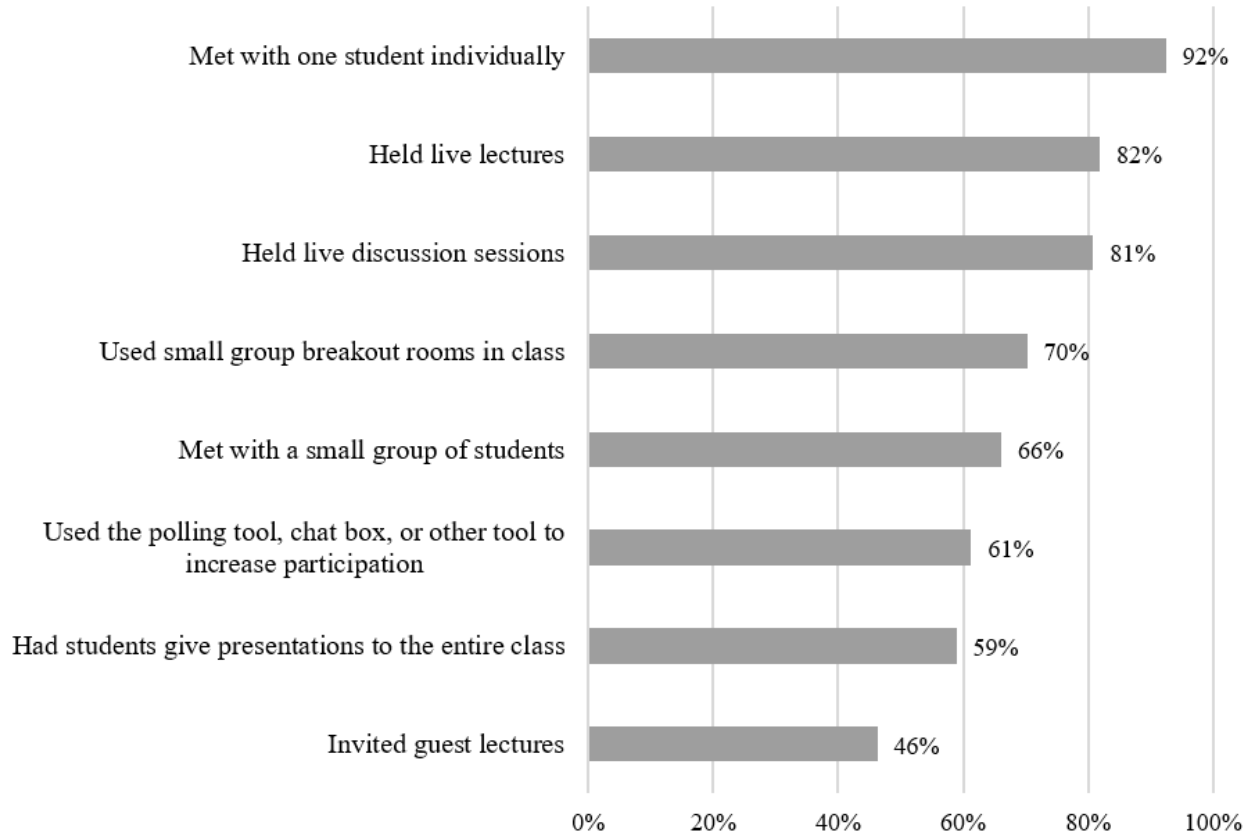
Faculty replicated aspects of the in-person classroom experience using technology. Before the pandemic, Deborah’s students were easily able to ask exam-related questions. She imitated the classroom environment by creating a Zoom meeting where they could quietly address their questions:

What they did is they checked [in] and they left their tile with no audio and no video, but if they had a question, I could answer it right there. And everybody else in the class could hear the question being asked too. And so, it was kind of like simulating the classroom a little bit.

While teaching online, Deborah was able to partially replicate the feeling of taking an exam together in a classroom.

Figure 5

How instructors used video conferencing tools during the COVID-19 pandemic: Faculty survey (n = 292).



Faculty-Student Interactions

Positive interactions between faculty and students are crucial to supportive environments. Despite challenges they encountered in their own lives, faculty were readily available to students; 96% of survey respondents reported that they were “often” or “very often” “accessible to [their] students through a variety of means (drop-in, office hours, email, before or after class).” Instructors were attentive to students’ needs, with 78% reporting that they “often” or “very often” “modify [their] course to accommodate students’ feedback about what is working well in the course and what could use improvement” and 76% “often” or “very often” “modify [their] course to accommodate [their] students’ needs.” Alex noted how students often requested that class discussions begin with a small group component, allowing them to process their thoughts in groups before transitioning to class.

Faculty also cultivated relationships with students by prioritizing their social-emotional needs. Maxine described her approach as emphasizing the “human connection”; “My primary concern was caring about them and helping them get through this.” Faculty regularly checked in with their students. Alex noted, “For the first few weeks, just be really on top of making sure you’re reaching out to every student individually all the time. Because that’s going to make them

feel recognized.” Beatrice described her approach to mentoring students as “tenaciously caring” about them, even “chasing” after them when necessary.

Faculty deliberately engaged with students who were struggling. Several participants contacted students when they noticed a change in their academic engagement. Survey respondents also showed similar concern for students, with 76% reporting that they “often” or “very often” “contact students who fall behind in class to offer support.” Grant stressed that this outreach was done in a “very empathetic” way, “kind of giving them opportunities just to keep getting things in to me and to re-engage.” In other words, it was not meant to be punitive. Similarly, Deborah described reaching out to students when she noticed their grades drop. “The biggest takeaway is that you can’t be reaching out too much. [...] The students do want you to reach out, be there for them.” Especially during the pandemic, when students were encountering additional mental health concerns, it was important for faculty to demonstrate their care for students as whole people. 93% of survey respondents “often” or “very often” “make sure each student feels valued.”

Some instructors established check-ins with their students in the minutes preceding class, during class, or immediately after class. Just under two-thirds (64%) of survey respondents reported that they “often” or “very often” “offer students opportunities to share how they are doing.” Several interview participants asked each student to share their weekly “highs and lows.” For example, Andrea took notes on information that students shared in class: “I’d follow up with emails for some of them later. Like one [who] was COVID positive was used in a plasma study. I was like, ‘That’s awesome.’ That was his high. He could help other people.” Andrea was thinking about her students outside class.

Faculty members believed it was especially important to contact certain vulnerable or disconnected populations, such as international students and students from lower-income families. Deborah said “making sure that my international students who were home felt comfortable” was very important, as she recognized that they were likely feeling isolated. Since most international students were in other time zones, it was difficult to attend synchronous classes. Considering international students’ needs, Grant recorded his lectures and held additional online office hours in the late evening. Melanie offered to meet one-on-one with an international student each week to discuss the course.

Faculty members were also concerned about less socioeconomically privileged students. Kristen described her check-ins with a student she was especially worried about:

One [student] was from a fairly disadvantaged background and he was emailing me saying, “I’m really sorry. I Zoomed into class late. I was helping my mom with something, and she really needed me with her. She’s afraid she’s going to get fired and I was helping her with her Zoom.”

In addition to classes, Kristen’s student also juggled family responsibilities. Some students had to choose between participating in their classes and attending to family concerns. Melanie noted that returning home and taking the class online “exaggerated inequality to some extent.” Faculty recognized how challenging the pandemic was for vulnerable students and proactively supported them.

Student-Student Interactions

Faculty used several strategies to create opportunities for students to engage, communicate, and collaborate. The survey results indicated that 70% of the instructors “often” or

“very often” “provide students opportunities to get to know their classmates.” Faculty facilitated student interactions through small group activities and creative technology use.

Small Group Activities. Several faculty members divided students into smaller communities or “family groups,” as Rachel called them, within the larger classroom. Sixty-seven percent of survey respondents reported that when teaching online they “often” or “very often” “create opportunities for students to work in pairs or smaller groups that allow collaborations and more personal connections.” Rachel held weekly meetings with each “family group” to discuss the class readings and their projects. When not meeting with Rachel, these student groups participated in discussion board conversations during class time. By working towards a shared goal on a group project, Eleanor explained that students “learn to rely on each other...and develop their sense of community, their sense of agency.” Beatrice thought assigning students to communities was like sorting people into houses in *Harry Potter*: “We’re a society here; we’re a club; we are a team; and we’re for each other.” The smaller groups allowed students to establish camaraderie with classmates.

One goal of these small group activities was offering students space to develop their autonomy as learners. Despite the important role teachers play in establishing social presence, Lisa acknowledged that sometimes it is better for teachers to step aside:

Giving students a little more space to go out there and connect in their own ways, or even in the break-out rooms to talk to one another [...] and thinking about the fact that community doesn't always have to be a) the whole class and b) facilitated by me. [...] Getting students to a point where they feel like there's enough of a community that if you need to step aside, they can keep things going.

Lisa’s statement suggests that fostering optimal classroom communities involves empowering students to establish community and engage with the content among themselves.

Creative Utilization of Technology. Technology played a critical role in fostering students’ engagement with their peers. In particular, Zoom breakout rooms provided opportunities for students to interact with peers in small groups. For example, Grant remarked:

I really use the breakout groups heavily to try to give them a chance to talk to each other about what was going on or about how class related to what's going on. Or to discuss the ethical implications of things we're going to cover.

Using breakout rooms separates students into groups that are small enough for students to feel comfortable speaking up. Alex explained that a common theme from prior course evaluations was that students wanted opportunities to interact with a wider range of classmates. When teaching online, Alex assigned students to breakout rooms randomly, allowing students to interact with peers. Kelly added that the breakout rooms fostered “social cohesion” and allowed for “really personal or deep” conversations.

Faculty also used polling tools to foster a sense of community; 61% of survey respondents used polling tools, chat boxes, or other tools to increase student participation. As Samuel explained:

I did a lot of poll questions—which I think is also good for community, because you can see how other people voted. [...] Sometimes my poll questions were fun. So, I stayed [in the northeast], it snowed in [the northeast] in April. And I made this joke that I was horrified to see that it was snowing last night. “How many people did it snow for last night?” And I had a poll question at the start of the class. And it's just a fun little thing that like, everyone can smile, it makes everyone feel like they're a part of something. And then afterwards, I don't know, maybe they're talking about it on their WhatsApp group or whatever, you know?

Not only did the polling tools increase participation, but they also fostered community by allowing students to see what their peers were thinking about. In other instances, the polling questions were not related to the course content but were designed to facilitate camaraderie among students. Samuel appreciated how his students might continue discussing the poll topic even after class.

Faculty members also used online discussion boards in the learning management system to facilitate peer interactions. Discussion boards allowed students to provide one another feedback. As Melanie explained:

I also had students write things on Canvas [discussion boards] to one another [...] I had them read each other's works [...] and then give each other feedback. And those were all designed not only to help them have better projects, but to help them build community, just so that they would continue to share with one another.

Like Samuel, Melanie believed that opportunities for students to know what their peers were thinking and respond to others' academic work was critical to community. Marcus added that discussion boards not only support students' content acquisition but also provide opportunities for students to develop communication skills: “How do you listen well? How do you have a charitable interpretation of your interlocutors? How do we ask good questions of one another?” Strong communities require listening to one another's ideas and responding respectfully.

Incorporating Community Outside the Classroom

Faculty incorporated students' family and home lives into the classroom experience. At the beginning of each synchronous session, Kristen asked one student to either share their favorite photo or location at home, or introduce the class to a pet, parent, sibling, or other family member. This practice allowed students to share personal aspects of themselves with their teacher and classmates. Another professor deliberately included parents in conversations. Curt explained:

I also understood that most of the students were at home, cooped up with their parents, and both parties were a little bit frustrated, not only the students, but parents were also anxious. So I started to have live Zoom sessions for parents only. So yes, I met with parents and I had great conversations with them. I put them at ease.

The online environment opened the classroom to students' parents. This increased access might have provided opportunities for students to discuss course content with their families.

Eleanor described incorporating her family into the classroom. She described a situation where students asked several questions in the discussion board that she felt her brother and

sister-in-law, both physicists, were better equipped to answer. Eleanor then contacted her family to answer the students' questions. Eleanor's practice exemplifies how the effective use of technology in online courses can improve upon the in-person experience by making it easier to incorporate voices from outside the immediate classroom, productively exposing students to voices outside the university. This last subtheme was the only theme that was not reflected in the course evaluation data. It is possible that interactions outside the classroom were less important to students compared to instructors.

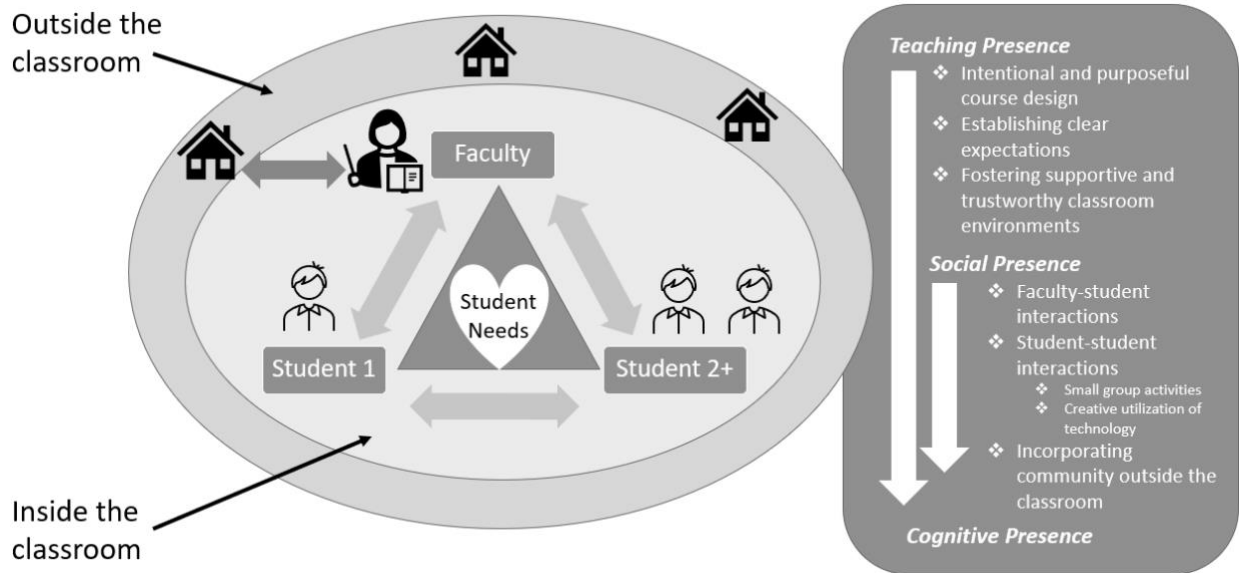
Discussion

The COVID-19 pandemic brought unprecedented disruption to higher education. This mixed methods study illuminates how faculty at one residential university supported students' holistic needs during the pandemic by creating strong online communities. While previous studies have typically focused on students' perceptions of community online, this study provides insights regarding how the faculty perceive their own roles in supporting the development of an online community and what strategies they use. Most prior studies that have incorporated faculty perspectives focus on courses designed for online environments rather than emergency online instruction. In comparison, our faculty interview participants began the spring 2020 semester in person, without any expectation of teaching online, and their online work was improvised.

In some respects, beginning the semester in person might have provided an advantage with respect to community building, since faculty and students had about seven weeks to establish connections with one another in the physical classroom. At the same time, the online course experience might have been viewed from a deficit perspective, citing what was "lost" compared to the traditional classroom experience. Certain components of the in-person experience were lost. For example, as one faculty member in our study noted, the types of spontaneous interactions that occur in person are difficult to replicate online. But the classrooms we heard about also gained from the online environment in some ways.

Despite the challenges of abruptly moving courses online, the 37 faculty we interviewed demonstrated a strong commitment to supporting community online, as did most survey respondents. Faculty members' strategies for building community centered around intentional and purposeful course design; establishing clear expectations for themselves and their students; and fostering supportive and trustworthy classroom environments. In implementing these strategies, faculty established a strong teaching presence in the online classroom (Garrison et al., 2010; Garrison & Akyol, 2013), the binding CoI presence that supported both social and cognitive presences (Shea & Bidjerano, 2009). One faculty member even described herself as the "node" or glue holding the class together during these precarious times. These strategies are represented in Figure 6 and show how instructors interact with students, how instructors foster relationships among students, and how instructors foster connections with participants outside the community.

Figure 6
Model of online community interactions



Faculty in our study adopted multiple roles, including course manager and course facilitator, while taking seriously their mentoring role (Martin et al., 2019). Considering the ongoing pandemic and the associated stresses, faculty were attuned to students' social-emotional needs (Kuh, 2018). One professor described how she "tenaciously cared" for her students (Goin Kono & Taylor, 2021). This prioritization of social-emotional needs suggests that the intersection of teaching and social presences might be especially important in emergency remote instructional contexts (Conklin & Dikkers, 2021).

Fostering interpersonal relationships in virtual environments is essential to students' learning (Strayhorn, 2019; Whipp & Lorentz, 2009). The faculty members in our study show how it is possible to create learning communities that replicate critical aspects of the on-campus environment that have long been recognized as essential for student success (Astin, 1999; Museus, 2014; Pascarella & Terenzini, 2005; Tinto, 1998). For example, faculty can establish strong, supportive relationships with students online by checking in on their students' emotional well-being, responding to students' feedback, and meeting individually with students. Students can develop relationships with one another through small group meetings in breakout rooms and by responding respectfully to one another's ideas on discussion boards.

While these relational aspects of the college student experience will not be the same as the in-person experience, with reflection and purposeful design they can be similar—or in some respects even better. For instance, with respect to students' families, prior research indicates that students' family relationships contribute to their sense of campus belonging, especially among certain populations like transfer students (Lester et al., 2013). Some faculty in our study established relationships with students' families when teaching online. This type of engagement

between students' families and professors is not as easily accomplished in person. Thus, online education might offer opportunities to increase belongingness and a sense of community among some student populations.

Limitations and Future Directions

While this study illuminates online community building, there are some limitations, as well as directions for future research. First, both the survey and interview respondents came from the same university. It is possible that these findings are not generalizable. Second, although our survey sample was generally representative of the university population, there might have been some selection bias in terms of who responded. More specifically, faculty with an interest in sharing their experiences teaching online might have had more positive experiences compared to those not responding to the survey. Third, we cannot evaluate the extent to which the strategies faculty utilized online to support community might have been different had this study been conducted outside the pandemic or if the faculty members did not have opportunities to interact with students in the first half of the spring 2020 semester. This latter point is less relevant for the survey respondents, as the survey was conducted in fall 2020. The alignment between the interview and survey findings provides some indication that the community building practices discussed by interview participants would occur even without the face-to-face in-person component.

We propose several directions for future research. First, we recommend that future studies examine community development online across a broader range of institutions to evaluate the extent to which findings are generalizable. Researchers could retrospectively interview and/or survey faculty about their experience building community online during the global pandemic. Second, future research could examine whether there are disciplinary differences (e.g., chemistry versus history) or differences based on course level (e.g., undergraduate versus graduate) concerning how faculty build community online. Finally, additional research should explore students' perceptions of community online during the pandemic. It is important to explore whether online community building strategies and outcomes differ by student demographics and characteristics. These three lines of inquiry will provide further insight on community building in online environments, increasing the generalizability of our findings and the diversity of voices represented.

References

- Archibald, D. (2010). Fostering the development of cognitive presence: Initial findings using the community of inquiry survey instrument. *Internet & Higher Education, 13*(1/2), 73–74. <https://doi.org/10.1016/j.iheduc.2009.10.001>
- Astin, A. W. (1999). Student involvement: A developmental theory for higher education. *Journal of College Student Development, 40*(5), 518–529.
- Baker, C. T., & Edwards, J. T. (2011). A holistic approach for establishing social presence in online courses and programs. *The International HETL Review, 1*(7), 44–52.
- Baxter Magolda, M. B. (2020). *Making their own way: Narratives for transforming higher education to promote self-development* [Kindle edition]. Stylus Publishing, LLC.
- Berry, S. (2017). Building community in online doctoral classrooms: Instructor practices that support community. *Online Learning, 21*(2), n2. <http://dx.doi.org/10.24059/olj.v21i2.875>
- Berry, S. (2019). Teaching to connect: Community-building strategies for the virtual classroom. *Online Learning, 23*(1), 164–183. <http://dx.doi.org/10.24059/olj.v23i1.1425>
- Castañeda, L., & Selwyn, N. (2018). More than tools? Making sense of the ongoing digitizations of higher education. *International Journal of Educational Technology in Higher Education, 15*(1), 22. <https://doi.org/10.1186/s41239-018-0109-y>
- Chickering, A. W., & Reisser, L. (1993). *Education and identity* (2nd ed.). Jossey-Bass Inc.
- Conklin, S., & Garrett Dikkers, A. (2021). Instructor social presence and connectedness in a quick shift from face-to-face to online instruction. *Online Learning, 25*(1), 135–150. <https://doi.org/10.24059/olj.v25i1.2482>
- Creswell, J. W., & Clark, V. L. P. (2011). *Designing and conducting mixed methods research* (2nd ed.). Sage.
- Garrison, D. R., & Akyol, Z. (2013). The community of inquiry theoretical framework. In M. G. Moore (Ed.), *Handbook of distance education* (3rd ed.) (pp. 104–119). 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., 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>

Goin Kono, K., & Taylor, S. (2021). Using an ethos of care to bridge the digital divide: Exploring faculty narratives during a global pandemic. *Online Learning*, 25(1), 151–165. <https://doi.org/10.24059/olj.v25i1.2484>

Goldrick-Rab, S., Coca, V., Kienzl, G., Welton, C. R., Dahl, S., & Magnelia, S. (2020). *#RealCollege during the pandemic: New evidence on basic needs insecurity and student well-being*. The Hope Center.

Grant, C. A. (2012). Cultivating flourishing lives: A robust social justice vision of education. *American Educational Research Journal*, 49(5), 910–934. <https://doi.org/10.3102%2F0002831212447977>

Hart, C. M. D., Xu, D., Hill, M., & Alonso, E. (2021). COVID-19 and community college instructional responses. *Online Learning*, 25(1), 41–69. <https://doi.org/10.24059/olj.v25i1.2568>

Healthy Minds Network, & American College Health Association. (2020). *The impact of COVID-19 on college student well-being*. https://healthymindsnetwork.org/wp-content/uploads/2020/07/Healthy_Minds_NCHA_COVID_Survey_Report_FINAL.pdf

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*, 27, 1–12.

Inside Higher Ed. & Gallup. (2018). *The 2018 Inside Higher Ed Survey of faculty attitudes on technology: A study by Gallup and Inside Higher Ed*. <https://mediasite.com/wp-content/uploads/2018/11/2018-Faculty-Survey-Mediasite.pdf>

Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology*, 23, 26507. <https://doi.org/10.3402/rlt.v23.26507>

Kilgour, P., Reynaud, D., Northcote, M., McLoughlin, C., & Gosselin, K. P. (2019). Threshold concepts about online pedagogy for novice online teachers in higher education. *Higher Education Research & Development*, 38(7), 1417–1431. <https://doi.org/10.19173/irrodl.v14i1.1338>

Kim, D., Wortham, S., Borowiec, K., Yatsu, D. K., Ha, S., Carroll, S., Wang, L., & Kim, J. (2021). Formative education online: Teaching the whole person during the global COVID-19 pandemic. *AERA Open*, 7(1), 1–12. <https://doi.org/10.1177%2F23328584211015229>

Kuh, G. (2018). Whither holistic student development: It matters more today than ever. *Change: The Magazine of Higher Learning*, 50(3–4), 52–57. <https://doi.org/10.1080/00091383.2018.1509590>

Lester, J., Brown Leonard, J., & Mathias, D. (2013). Transfer student engagement: Blurring of social and academic engagement. *Community College Review*, 41(3), 202–222. <https://doi.org/10.1177%2F0091552113496141>

- Lincoln, Y. S., & Guba, E. G. (1985). Establishing trustworthiness. *Naturalistic Inquiry*, 289(331), 289–327.
- Love, P. G., & Love, A. G. (1995). *Enhancing student learning: Intellectual, social, and emotional integration* (ASHE-ERIC Higher Education Report No. 4). ASHE. <https://files.eric.ed.gov/fulltext/ED400742.pdf>
- Lowenthal, P. R., & Dunlap, J. C. (2018). Investigating students' perceptions of instructional strategies to establish social presence. *Distance Education*, 39(3), 281–298. <https://doi.org/10.1080/01587919.2018.1476844>
- Martin, F., Ritzhaupt, A., Kumar, S., & Budhrani, K. (2019). Award-winning faculty online teaching practices: Course design, assessment and evaluation, and facilitation. *The Internet and Higher Education*, 42, 34–43. <https://doi.org/10.1016/j.iheduc.2019.04.001>
- Mayhew, M. J., Rockenbach, A. N., Bowman, N. A., Seifert, T. A., & Wolniak, G. C. (2016). *How college affects students: 21st century evidence that higher education works* (Vol. 1). John Wiley & Sons.
- McInnerney, J. M., & Roberts, T. S. (2004). Online learning: Social interaction and the creation of a sense of community. *Journal of Educational Technology & Society*, 7(3), 73–81. <https://www.jstor.org/stable/10.2307/jeductechsoci.7.3.73>
- McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, 14(1), 6–23. [https://doi.org/10.1002/15206629\(198601\)14:1%3C6::AID-JCOP2290140103%3E3.0.CO;2-I](https://doi.org/10.1002/15206629(198601)14:1%3C6::AID-JCOP2290140103%3E3.0.CO;2-I)
- Means, B., & Neisler, J. (2021). Teaching and learning in the time of COVID: The student perspective. *Online Learning*, 25(1), 8–27. <https://doi.org/10.24059/olj.v25i1.2496>
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage.
- Miller, K.E. (2021). A light in students' lives: K-12 teachers' experiences (re)building caring relationships during remote learning. *Online Learning*, 25(1), 115–134. <https://doi.org/10.24059/olj.v25i1.2486>
- Museus, S. D. (2014). The culturally engaging campus environments (CECE) model: A new theory of success among racially diverse college student populations. In *Higher education: Handbook of theory and research* (pp. 189–227). Springer.

- Oliphant, T., & Branch-Mueller, J. (2016). Developing a sense of community and the online student experience. *Education for Information, 32*(4), 307–321. <https://doi.org/10.3233/EFI-160979>
- Ouyang, F., & Scharber, C. (2017). The influences of an experienced instructor's discussion design and facilitation on an online learning community development: A social network analysis study. *The Internet and Higher Education, 35*, 34–47. <https://doi.org/10.1016/j.iheduc.2017.07.002>
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research* (1st ed.). Jossey-Bass.
- Patton, L. D., Renn, K. A., Guido, F. M., & Quaye, S. J. (2016). *Student development in college: Theory, research, and practice*. John Wiley & Sons.
- Quezada, R. L., Talbot, C., & Quezada-Parker, K. B. (2020). From bricks and mortar to remote teaching: a teacher education programme's response to COVID-19. *Journal of Education for Teaching, 1*–12. <https://doi.org/10.1080/02607476.2020.1801330>
- Radford, A. W. (2011). *Learning at a distance: Undergraduate enrollment in distance education courses and degree programs: Stats in Brief* (NCES 2012-154). National Center for Education Statistics. <https://nces.ed.gov/pubs2012/2012154.pdf>
- Robinson, C. C., & Hullinger, H. (2008). New benchmarks in higher education: Student engagement in online learning. *Journal of Education for Business, 84*(2), 101–109. <https://doi.org/10.3200/JOEB.84.2.101-109>
- Rovai, A. P. (2000). Building and sustaining community in asynchronous learning networks. *The Internet and Higher Education, 3*(4), 285–297. [https://doi.org/10.1016/S1096-7516\(01\)00037-9](https://doi.org/10.1016/S1096-7516(01)00037-9)
- Rovai, A. P., & Jordan, H. (2004). Blended learning and sense of community: A comparative analysis with traditional and fully online graduate courses. *The International Review of Research in Open and Distributed Learning, 5*(2), 1–13. <https://doi.org/10.19173/irrodl.v5i2.192>
- Salmon, G. (2011). *E-moderating: The key to teaching and learning online* (3rd ed.). Routledge.
- Shea, P., & Bidjerano, T. (2009). Community of inquiry as a theoretical framework to foster “epistemic engagement” and “cognitive presence” in online education. *Computers & Education, 52*(3), 543–553. <https://doi.org/10.1016/j.compedu.2008.10.007>
- Shea, P., Li, C. S., & 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>

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. <http://dx.doi.org/10.24059/olj.v9i4.1779>

Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. *The Internet and Higher Education*, 7(1), 59–70. <https://doi.org/10.1016/j.iheduc.2003.11.003>

Stolzenberg, E. B., Aragon, M. C., Romo, E., Couch, V., McLennan, D., Eagan, M. K., & Kang, N. (2020). *The American freshman: National norms fall 2019*. Higher Education Research Institute, UCLA.

Strayhorn, T. L. (2019). *College students' sense of belonging: A key to educational success for all students* (2nd ed.). Routledge.

Tinto, V. (1998). Colleges as communities: Taking research on student persistence seriously. *The Review of Higher Education*, 21(2), 167–177.

Tryon, P. J. S. van, & Bishop, M. J. (2009). Theoretical foundations for enhancing social connectedness in online learning environments. *Distance Education*, 30(3), 291–315. <https://doi.org/10.1080/01587910903236312>

U.S. Department of Education, National Center for Education Statistics. (2019). *Digest of education statistics 2019, Table 311.15*. <https://nces.ed.gov/fastfacts/display.asp?id=80>

Wei, C. W., & Chen, N. S. (2012). A model for social presence in online classrooms. *Educational Technology Research and Development*, 60(3), 529–545. <https://doi.org/10.1007/s11423-012-9234-9>

Whipp, J. L., & Lorentz, R. A. (2009). Cognitive and social help giving in online teaching: An exploratory study. *Educational Technology Research and Development*, 57(2), 169–192. <https://doi.org/10.1007/s11423-008-9104-7>

Wortham, S., Love-Jones, R., Peters, W., Morris, S., & García-Huidobro, J. C. (2020). Educating for comprehensive well-being. *ECNU Review of Education*, 3(3), 406–436.

Zhai, Y., & Du, X. (2020). Addressing collegiate mental health amid COVID-19 pandemic. *Psychiatry Research*, 288, 113003. <https://doi.org/10.1016/j.psychres.2020.113003>

Appendix

Table A
Faculty Participant Names and Characteristics

Faculty Participant (pseudonym)	School (pseudonym)	General Discipline	Teaching Level
Adam	Theology and Ministry	Theology/Ministry	Graduate
Alejandro	Social Work	Social Work	Graduate
Alex	Arts and Sciences	Humanities	Undergraduate
Andrea	Business	Business	Undergraduate
Beatrice	Education	Counseling/Psychology	Both
Carol	Theology and Ministry	Theology/Ministry	Graduate
Caroline	Social Work	Social Work	Graduate
Chloe	Adult and Continuing Education	Professional Studies	Graduate
Curt	Arts and Sciences	Social Sciences	Both
David	Law	Law	Graduate
Deborah	Arts and Sciences	STEM	Undergraduate
Eleanor	Arts and Sciences	STEM	Undergraduate
Garrett	Adult and Continuing Education	Professional Studies	Graduate
Grant	Arts and Sciences	Social Sciences	Undergraduate
Jacob	Business	Business	Undergraduate
Jasmine	Arts and Sciences	STEM	Both
Jessie	Law	Law	Graduate
Joanna	Nursing	Nursing	Undergraduate
Jordan	Theology and Ministry	Theology/Ministry	Graduate
Kayla	Arts and Sciences	Humanities	Undergraduate
Kelly	Education	Education	Both
Kristen	Arts and Sciences	Humanities	Undergraduate
Kristina	Business	Business	Undergraduate
Linda	Education	Counseling/Psychology	Both
Lisa	Arts and Sciences	Humanities	Both

Faculty Participant (pseudonym)	School (pseudonym)	General Discipline	Teaching Level
Marcus	Arts and Sciences	Humanities	Both
Marianne	Arts and Sciences	Humanities	Undergraduate
Matthew	Education	Education	Both
Maxine	Arts and Sciences	Humanities	Undergraduate
Melanie	Arts and Sciences	Humanities	Both
Mitch	Business	Business	Undergraduate
Rachel	Arts and Sciences	Humanities	Undergraduate
Samuel	Law	Law	Graduate
Silas	Arts and Sciences	Humanities	Undergraduate
Simon	Arts and Sciences	Social Sciences	Undergraduate
Terri	Theology and Ministry	Theology/Ministry	Graduate
Yael	Arts and Sciences	Humanities	Both

Note.

Interview Participants: Faculty in the humanities ($n=11$; 30%), social sciences ($n=3$; 8%), and STEM fields ($n=3$; 8%) were represented within the arts and sciences.

Survey Participants: Most survey participants identified their primary campus role as faculty members ($n=252$; 86%), with the remainder identifying as graduate students ($n=21$; 7%), administrators ($n=12$; 4%), and staff ($n=7$; 2%). Roughly half identified as men ($n=135$; 47%) or women ($n=138$; 48%), with the rest preferring not to answer ($n=14$; 5%). With respect to race/ethnicity, most instructors identified as White, non-Hispanic ($n=222$; 79%). The remaining instructors identified as Asian ($n=14$; 5%); Black or African American ($n=5$, 2%); Hispanic or Latinx ($n=13$; 5%); multiracial ($n=4$; 1%); or other race/ethnicity ($n=2$; 1%). Seven percent ($n=21$) preferred not to answer the question. Participants from eight schools were represented: adult and continuing education ($n=13$; 4%), arts and sciences ($n=157$; 54%), business ($n=33$; 11%), education ($n=36$; 12%), law ($n=17$; 6%), nursing ($n=12$; 4%), social work ($n=15$; 5%), and theology ($n=7$; 2%). The sample was roughly representative of the population of the university, although men were slightly under-represented.

Table B
Excerpts from Faculty Course Evaluations: Alignment with Each Theme

Theme	Subtheme	Sub-subtheme	Example Excerpts from Course Evaluations
Intentional and purposeful course design	--	--	<p>“I think [the professor] had the best transition to remote learning. She modified the syllabus in order to make it a bit more feasible to work out remotely, and it was clear that she put a lot of thought into all of the changes. Because of that clear effort, the students in the class also stepped up and tried extra hard to keep everything normal.”</p> <p>“Our professor did an entire new syllabus which included different activities that really helped us with the stress of online classes and our final grade. [This professor] was the professor that helped me adapt with online classes the most.”</p>
Establishing clear expectations	--	--	<p>“I really appreciated that you were organized and had a set plan for exactly what we were doing for every class period. It made it much easier to know what was coming ahead.”</p> <p>“The instructor did a fantastic job handling the transition to online - he was very clear about the new format and what was expected of the students and gave students plenty of opportunities to obtain points and help them through the transition. He sent out weekly emails detailing exactly what was going on, and came up with several fun, new initiatives to keep students engaged.”</p>
Fostering supportive and trustworthy classroom environments	Faculty-student interactions	--	<p>“[The professor] cares about her students a lot and it has been made very clear during these hard times.”</p> <p>“Amazing job being sensitive to students' needs, even before the whole covid crisis began.”</p> <p>“Thank you for being so understanding and accommodating to our extenuating circumstances this semester. You were always very helpful and took off a lot of the stress that we all felt during this time.”</p> <p>“[The professor] is a wonderful professor. She cares deeply for her students, and always encourages them to do their best and to make them feel comfortable with the material. She provided such a welcoming classroom atmosphere.”</p> <p>“I appreciated [the professor’s] openness to feedback and willingness to adjust and re-work the course in accordance with both those suggestions and the extenuating circumstances of this semester.”</p>
	Student-student interactions	Small group activities	<p>“We ended up doing class in small groups and it gave me a better chance to share since I have a harder time in front of the whole classroom. It also allowed for more in-depth conversation.”</p>

Creative utilization of technology	“The ability to have conversation in much smaller groups [when taking class online] offered better access to conversation with [the professor] than our large class sessions.”
	“[The professor] embraced the online course and technological tools with great optimism. She learned how to best use the technology (such as effectively using breakout rooms, taking polls, and having the class post comments in the group chat).”
	“[The professor] used the random breakout rooms really effectively during class discussions so that I got to have discussions with many more classmates than I probably would have normally.”
	“I also thought the poll feature was really engaging and an aspect that was not as common in in-person classes.”
Incorporating community outside the classroom	-- <i>Not mentioned in the course evaluations</i>

Interview Questions

Part I. Introduction:

1. Before turning to your experience teaching online, could you tell me a bit about your general teaching experience?
 - a. Probe: How long have you been teaching at [CURRENT INSTITUTION]?
 - b. Probe: Did you previously teach at other institutions? If so, where?
 - c. Probe: What course formats do you typically teach (e.g., small seminar, large lecture)?
 - d. Probe: Do you typically teach undergraduate- and/or graduate-level courses?
 - e. Probe: Do you typically teach introductory and/or advanced courses?

2. What courses did you teach in the Spring? And could you briefly describe each course?
 - a. Probe: What was the format of each class prior to transitioning online (e.g., small seminar, large lecture)?
 - b. Probe: What academic level were the students in your courses (e.g., undergrad vs. graduate; introductory vs. advanced undergraduate course; mixed level)?
 - c. Probe: How many students were enrolled in each of your courses?

3. And as I mentioned earlier, for our research, we’re not only interested in formative education, but formative education in an *online environment*, so can you also tell me a little bit about your experience teaching online? Had you taught an online or remote course prior to this spring semester?
 - a. Follow-up--If yes: Had you previously taught the spring 2020 courses online?
 - b. Follow-up--If yes: About how many courses have you taught online?
 - c. Follow-up--If yes: How did your experience teaching online this time differ from previous semesters, if at all?

4. How would you describe your initial reaction to learning that you would need to adjust your course to an online/remote format?
 - a. Probe: Did you have any preconceived notions about online teaching and learning?
 - b. Probe: How, if at all, have your attitudes toward online teaching and learning changed as a result of your experience this spring semester?

Part II. Practices Targeting Formative Education:

A. Formative Education - General Understanding

1. When you hear ‘formative education’ or ‘whole-person education,’ what is your interpretation of the concept? What are some words or phrases you would use to describe this educational approach?
 - a. Probe: How would you describe the role of formative education in your particular academic discipline?
2. When considering the courses you have taught at [CURRENT INSTITUTION], prior to the pandemic, could you please tell me about one or two in which successful formative education occurred?
 - a. Which courses fostered student formation and development of the whole student?
 - b. Follow up: Could you briefly describe the course?
 - c. Follow up: Which aspects of the course accomplished formative education?
 - d. Follow up: Could you describe a few examples of student formation that occurred within this course?

B. Formative Education Online

Formative Education Online - Multiple Dimensions

1. When you were teaching online this Spring, were there teaching practices or strategies you used to foster students' development beyond the subject matter, like their emotional, social, ethical, or spiritual development?
 - a. If so, which of these dimensions did you focus on? Why did you choose these dimensions?
 - b. Could you give a few examples of the techniques that you tried and the results?
2. Were there any teaching practices or strategies you used to help students forge connections between these multiple dimensions? [THIS MIGHT BE AN OPTIONAL QUESTION, ONE TO ASK TOWARD THE END]
 - a. Or: were there any teaching practices or strategies you used to help students integrate multiple dimensions of their development?
 - b. Could you give a few examples of the techniques you tried and the student response?

Formative Education Online - A Sense of Purpose

1. What does it mean to you for a student to have a “sense of purpose”?

- a. Probe: can you give some examples of when a student has developed a sense of purpose in their lives?
2. In your online course this Spring, were there teaching practices or strategies you used to try to foster students' sense of purpose (or engage them in reflection about their sense of purpose)?
 - a. If so, what were the results of your teaching practices? How did students respond to your efforts?

Formative Education Online - A Sense of Community

1. Were there teaching practices or strategies you used to try to foster students' sense of community (either within the class community or within a broader community)?
 - a. If so, what were the results of your teaching practices? How did students respond to your efforts?
2. Did you use the community of the class to foster students' own individual development? If so, how?
3. As you know, many international students returned to their home countries due to the pandemic, which might have made them feel more detached from campus than their domestic peers. Did you feel you were able to foster a sense of community among international students?
 - a. Probe: If any, what strategies did you use?
 - b. Probe: How did you know?

Concluding questions

1. Did you develop any new activities, assignments, or assessments for teaching formative education in an online environment? We are particularly interested in activities, assignments, or assessments that you are especially proud of.
 - a. Follow-up: Why did you select this particular activity/assignment/assessment? What made this activity/assignment/assessment successful?
 - b. Are there any materials from your course that you believe would further demonstrate your approach to formative education online? An example might be an assignment or class activity. We would welcome any other artifacts you would be willing to share.
 - c. Probe: How do you know that successful student formation has occurred?
 - i. Or -- How do you measure successful student formation?
2. How, if at all, did the online environment influence your teaching and ability to engage students in formative education?
 - a. Or -- What were the affordances and constraints of the online learning environment for facilitating formative education?
 - b. Probe: Was there a particular aspect of formative education that was particularly challenging or rewarding to facilitate online?
 - c. Probe: How would you compare your experiences teaching formative education online and in-person settings?
 - d. Probe: Has your understanding of formative education changed as a result of your online teaching experience?

- i. Follow up-- If so, how?
 - ii. Follow up-- If not, why?
3. Looking toward Fall 2020, what advice or strategies would you give a faculty member seeking to facilitate formative education in their online course?
 - a. Or-- if you were to teach this course again, is there anything you would do differently?
 - b. Or-- Suppose you were looking to hire a new faculty member to teach an online course this coming fall. What qualities would you look for in a potential hire?
 - i. Follow-up: Are these characteristics different from what you would look for in a traditional in-person class?

Supplemental Questions:

4. Now that the course is complete, were there any teaching practices or strategies you used to encourage student formation beyond the duration of your course (or to encourage student formation as an ongoing process)?
 - a. If so, what techniques did you use? How did students respond to your efforts?

Part III. Conclusion:

1. Is there anything else you would like to share about your experience teaching online this past spring and/or your thoughts moving forward, especially as it pertains to formative education?

Survey Questions

The current paper is part of a larger study. Below are the survey questions relevant to this paper.

Prior to spring 2020, had you ever taught a **completely online** course?

Yes	No	Total Respondents
54 (16%)	288 (84%)	342 (100%)

When teaching **online**, how often do you do the following activities?

	Never	Rarely	Sometimes	Often	Very Often	Total Respondents
I offer students opportunities to share how they are doing.	4 (1%)	24 (7%)	91 (27%)	106 (32%)	108 (32%)	333 (100%)
I contact students who fall behind in class to offer support.	0 (0%)	8 (3%)	68 (21%)	108 (34%)	136 (43%)	320 (100%)
I modify my course to accommodate students' feedback about what is working well in the course and what could use improvement.	2 (1%)	9 (3%)	60 (19%)	134 (42%)	113 (36%)	318 (100%)
I modify my course to accommodate my students' needs.	3 (1%)	7 (2%)	63 (21%)	122 (41%)	106 (35%)	301 (100%)
I create opportunities for students to work in pairs or smaller groups that allow collaborations and more personal connections.	16 (5%)	26 (9%)	58 (19%)	61 (20%)	143 (47%)	304 (100%)
I provide students opportunities to get to know their classmates.	3 (1%)	12 (4%)	76 (25%)	100 (33%)	111 (37%)	302 (100%)
I make sure each student feels valued.	0 (0%)	0 (0%)	22 (7%)	103 (34%)	177 (59%)	302 (100%)
I strive to create a sense of community in the classroom.	0 (0%)	3 (1%)	32 (11%)	92 (31%)	174 (58%)	301 (100%)
I am accessible to my students through a variety of means (drop-in, office hours, email, before or after class).	0 (0%)	1 (<.5%)	12 (4%)	81 (27%)	206 (69%)	300 (100%)

How have you utilized Zoom (or other video conferencing tools) in your classes? Check **all** that apply. I am currently doing this practice [during the COVID-19 pandemic]:

	Checked	Not Checked	Total Respondents
Held live lectures	239 (82%)	53 (18%)	292 (100%)
Held live discussion sessions	236 (81%)	56 (19%)	292 (100%)
Invited guest lecturers	135 (46%)	157 (54%)	292 (100%)
Had students give presentations to the entire class	172 (59%)	120 (41%)	292 (100%)
Met with one student individually	270 (92%)	22 (8%)	292 (100%)
Met with a small group of students	193 (66%)	99 (34%)	292 (100%)
Used the polling tool, chat box, or other tool to increase participation	179 (61%)	113 (39%)	292 (100%)
Used small group breakout rooms in class	205 (70%)	87 (30%)	292 (100%)

Teaching Presence in Online Courses: Similar Perceptions but Different Experiences from Multiple Instructor Perspectives

Murat Turk

University of Oklahoma, USA

Ali Ceyhun Müftüoğlu

University of Oklahoma, USA

Sinem Toraman

Cincinnati Children's Hospital Medical Center, USA

Abstract

Online course instructors' perceptions and perspectives regarding their teaching presence as a key presence in online learning environments significantly influence, if not determine, their online teaching practices, which in turn influence the quality of online students' learning experiences. Although gaining deeper insights into online course instructors' perceptions and experiences of teaching presence is quite important and valuable for online education, there is still limited qualitative inquiry into this critical presence across diverse online teaching contexts. The purpose in this qualitative, multiple case study was to explore and understand online course instructors' perceptions and experiences regarding their own presence in their online courses. We explored the perceptions and experiences of eight course instructors teaching undergraduate and graduate-level online courses at a midwestern U.S. college. Our findings indicated that teaching presence was uniformly considered important and necessary by the instructors although their applications and priorities regarding their teaching presence varied. We discussed our themes that emerged from our interview data and offered several theoretical and practical implications regarding teaching presence in online learning environments.

Keywords: Teaching presence, Community of Inquiry, online learning, online teaching

Turk, M., Müftüoğlu, A.C., Toraman, S., (2021). Teaching presence in online courses: Similar perceptions but different experiences from multiple instructor perspectives. *Online Learning Journal*, 25(4), 156-177. DOI:10.24059/olj.v25i4.2885

Over the past two decades, there has been an exponential increase in the number of higher education institutions offering online courses and programs (Kucuk & Richardson, 2019). Most of these institutions have begun considering online education as an integral component of their overall education policy (Berry, 2019; Kozan & Richardson, 2014; Richardson et al., 2017). The number of college students taking at least one online course as part of their higher education has steadily risen (Seaman et al., 2018). With the growing popularity of online education, the quality and effectiveness of online teaching practices have become a critical topic of interest (Kozan & Richardson, 2014). In online learning environments, effective and high-quality online teaching practices are made up of course design and organization, facilitation, and direct instruction, including assessment and feedback that are vital to ensure positive student outcomes, such as student satisfaction, perceived learning, and online sense of community (Caskurlu et al., 2020; Shea et al., 2005). Despite their flexibility, accessibility, and convenience affordances, online learning environments still hold unique challenges that involve a sense of isolation as well as psychological, social, and emotional disconnect from peers and instructors (Berry, 2019; Rovai, 2001; Sherblom, 2010). To effectively address these challenges, online learning environments ought to be intentionally designed, developed, and facilitated in line with the principles of effective frameworks tailored for online learning (Kucuk & Richardson, 2019). The Community of Inquiry (CoI) is a social-constructivist theoretical framework that provides fundamental principles for the design and implementation of online learning and teaching (Kozan & Richardson, 2014). According to the CoI framework (Garrison et al., 2000), there are three fundamental presences to be fostered and maintained in an online learning environment: (a) teaching presence, (b) social presence, and (c) cognitive presence. All three presences must exist together in an online learning environment because only an effective combination of the three presences fosters deep, meaningful, and high-quality learning experiences (Garrison & Arbaugh, 2007).

When designed or facilitated poorly, online courses fail not only to create and maintain a strong sense of community, but also fail to provide meaningful, engaging, and satisfying learning experiences for students (Caskurlu et al., 2020; Kucuk & Richardson, 2019; Rovai, 2002). Therefore, teaching presence is necessary to accomplish positive student outcomes in online learning environments (Gurley, 2018; Kupczynski et al., 2010; Zhang et al., 2016). Despite the key role and importance of teaching presence in online learning environments (Orcutt & Dringus, 2017), the literature still lacks an in-depth understanding of teaching presence and its three components (i.e., design and organization, facilitation of discourse, direct instruction) from different online course instructors' perspectives, which remain largely unexplored (Gurley, 2018). Such in-depth qualitative exploration of teaching presence from instructors' perspectives is important because deeper understandings of online course instructors' own perceptions and experiences of teaching presence may enrich and expand the CoI framework's teaching presence component across online learning and teaching contexts to improve online teaching practices. Knowledge about online instructors' perceptions of their own presence in online learning environments is invaluable for three reasons. First, online instructors' perceptions of their own presence may influence and even determine their instructional practices and behaviors as well as the learners' online learning experiences in the online courses that they teach (Richardson et al., 2016). Second, the need for further exploration of teaching presence as a key CoI presence in various online learning environments must be addressed, because "there is still much to be learned as contexts change including disciplines, course delivery, and characteristics of the learners, instructors, or both" (Richardson et al., 2016, p. 95). Third, exploration of teaching

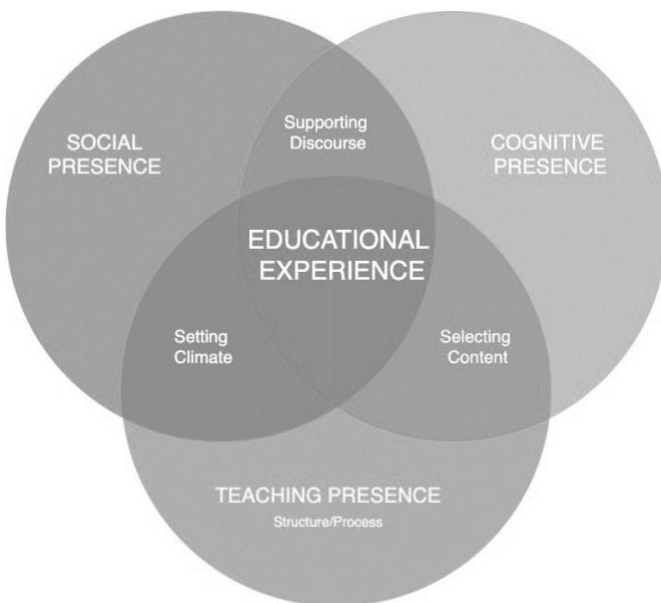
presence directly from online course instructors' perspectives is critical because researchers may gain a deeper and more thorough understanding of the nature and implications of teaching presence in online learning environments (Orcutt & Dringus, 2017).

Teaching Presence Within the Community of Inquiry

This qualitative case study was informed by the Community of Inquiry (CoI) framework developed by Garrison et al. (2000) as a product of their empirical inquiries into asynchronous text-based computer conferences in higher education. Garrison and his colleagues (2000) suggested certain elements that they believed were crucial components of online learning environments and named those elements as *presences*. According to the CoI framework, three online presences must be established and maintained by online participants (i.e., students and instructors) and these are *social presence*, *teaching presence*, and *cognitive presence* (Garrison, 2011). Figure 1 demonstrates the three presences intersecting with each other to create an effective and meaningful online learning environment.

Figure 1

The Community of Inquiry Framework and Presences



Note: Adapted from Garrison et al. (2000) and used with the authors' permission.

Social presence refers to the extent to which online participants within a learning community can present and establish themselves as well as perceive others as real humans (Garrison et al., 2000; Richardson et al., 2017). Teaching presence refers to basic roles and responsibilities of instructors in online learning environments, including course design, facilitation of student discourse, and direct instruction (Anderson et al., 2001). Cognitive presence refers to the degree to which online learners within a community of inquiry can make meaning out of the course content through critical discourse and communication with others, integrate different pieces of information, and apply their knowledge to new situations to solve problems (Garrison et al., 2000, Garrison, 2011). In the context of this study, teaching presence

within the CoI framework enabled us to explore different online course instructors' perspectives and experiences in terms of being present in an online learning environment.

Teaching Presence

Teaching presence is a key presence in online learning that refers to “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Anderson et al., 2001, p. 5). Teaching presence within the CoI framework has a particularly important role because it prescribes what an online course instructor is supposed to do so that high-quality educational and learning experiences can be created for online course participants (Anderson et al., 2001). Relevant literature highlights teaching presence as the binding or key presence within the CoI framework because it serves to create and sustain the necessary climate and foundation for social presence and cognitive presence to emerge and thrive in an online community of inquiry (Anderson et al., 2001; Arbaugh, 2014; Caskurlu et al., 2020; Garrison et al., 2010; Garrison & Akyol, 2013; Garrison & Arbaugh, 2007; Kozan & Richardson, 2014). Hence, teaching presence is the prerequisite presence for the other two presences of the CoI framework (Ke, 2010). In line with the theoretical tenets of the CoI, a large body of empirical research indicates that teaching presence is associated with a wide variety of desirable and valuable student outcomes in online learning environments such as online student satisfaction, perceived learning, sense of belonging and community, cognitive presence, and social presence (Akyol & Garrison, 2008; Arbaugh, 2008; Caskurlu et al., 2020; Garrison & Akyol, 2013; Garrison & Arbaugh, 2007; Shea et al., 2005, 2006; Shea & Bidjerano, 2009). In this study, the strong empirical foundation of teaching presence in relation to these student outcomes informed our exploration of teaching presence from instructors' perspectives because online course instructors are the agents expected to establish and maintain this key presence. Despite the key role and importance of teaching presence in online learning environments (Orcutt & Dringus, 2017), the literature still lacks an in-depth understanding of teaching presence and its components from different online course instructors' perspectives, which remain largely unexplored (Gurley, 2018). This study fills this gap by providing an in-depth qualitative exploration of teaching presence from instructors' perceptions and experiences and its dimensions across online course contexts.

In the context of this study, we defined and explored teaching presence based on the CoI literature. Accordingly, teaching presence was defined as the design and organization of an online course, facilitation of online student discourse and understanding, and direct instruction including assessment and feedback provided by course instructors for online students. While we acknowledge that teaching presence within the CoI framework is not limited to course instructors only but can rather be distributed across teachers, students, and course materials, for the specific purpose and questions of our study, we focused on teaching presence behaviors, roles, and responsibilities (i.e., design and organization, facilitation, direct instruction) fulfilled by online course instructors (Richardson et al., 2015). We must also acknowledge that although assessment or feedback is not a distinct subdimension of teaching presence as defined in the CoI framework, it can be subsumed by the direct instruction component of teaching presence because “direct instruction also takes the form of statements that confirm understanding through assessment and explanatory feedback.” We also used teaching presence and instructor presence interchangeably in the current study when discussing course instructors being present in an online course, although instructor presence was examined as a distinct phenomenon with a primary emphasis on the manifestation of instructor actions and behaviors during online learning as suggested by Richardson et al. (2016). The reason for our interchangeable use of the two concepts here is that

“instructor presence actions and behaviors were deeply rooted in activities traditionally associated with teaching presence” (Richardson et al., 2016, p. 88).

Informed by the CoI theoretical framework (Garrison et al., 2000), the purpose of this qualitative case study was to explore online course instructors’ perceptions and experiences in relation to teaching presence and its three dimensions (i.e., design and organization, facilitation, direct instruction). The following research questions were addressed in this study:

- 1) What were the instructors’ overall perceptions and experiences of being present in online courses?
- 2) What were the instructor’s perceptions and experiences of teaching presence dimensions across online teaching contexts?

Method

To explore online course instructors’ perceptions and experiences in relation to teaching presence and its three dimensions, we employed a qualitative multiple case study design. Following Yin’s (2018) guidance, our rationale for employing multiple case study design was to gain an in-depth and authentic understanding of specific life events or situations within their original contexts or real-life settings to interpret them meaningfully and contextually.

Researcher Positionality

Given the nature of qualitative research, we need to acknowledge researchers’ positionality throughout the research process in this study. Researcher positionality refers to researchers’ experiences and contextual embeddedness in the phenomenon studied (Creswell & Poth, 2018; Harding, 1992; Ponterotto, 2005). The first author identifies himself as an online course faculty and researcher and considered that his positionality enabled him to establish good rapport with the instructors—the participants of this study—during the data collection. He also noted his knowledge about the relevant literature that enabled him to probe further into the issues during the interview and helped him make better sense of the data. The second author, as another growing scholar and researcher, also noted that his knowledge about instructional design and technology, including online learning, enabled him to make better sense of the data together with the first author. The third author has expertise in research methodology, and she provided methodological guidance and consultation throughout the research process as well as bringing her insights through her experience of teaching online.

Description of Multiple Cases

As highlighted by Creswell and Poth (2018), employing multiple case study design allowed us to reflect as many different perceptions and experiences of online instructors from diverse content domains, experiences, and teaching backgrounds as possible. Multiple case study design also allows researchers to replicate major findings across multiple cases and to compare cases across major findings in terms of similarities and differences (Yin, 2018). In the context of this study, multiple cases consisted of 16 fully online courses that were taught at a midwestern U.S. college and used as the bounded systems. These sixteen online courses were taught by eight different instructors as part of programs in Adult and Higher Education, First-Year Composition, Women’s and Gender Studies, Library and Information Studies, Health and Exercise Science, Religious Studies, History of Science, Technology and Medicine, and Arts and Sciences General Education. Each of the eight online course instructors who taught online within the bounded systems was treated and used as a case in this study. All the cases were limited to one academic semester as the specific timeframe (i.e., Fall 2019).

In this multiple case study, we employed two sampling strategies. Initially, we identified potential participants via snowball sampling. Snowball sampling is a sampling strategy that helps researchers identify potential participants through key individuals or organizations having access to potential information-rich participants (Creswell, 2014). The first author emailed online program coordinators from different colleges and departments at the research site and requested them to help us reach out to those information-rich informants (i.e., online course instructors) for our study. In addition to the snowball sampling, we employed criterion sampling. Criterion sampling strategy allows researchers to set a certain set of rules in the context of their study so that they include only those individuals who meet their established criteria (Creswell & Poth, 2018). Accordingly, when we had a pool of online course instructors, we followed a set of criteria to determine the study participants. Our inclusion criteria for online course instructors were (a) having at least two years' experience in online education and (b) having actively taught at least one fully online course in a higher education setting. We decided to look for at least two years' experience in online teaching because of our interpretation of Richardson et al.'s (2016) categorization of instructors' online teaching experience reported as medium and high, where high experience indicated five or more years of experience in online teaching. We also looked for the second criterion so that the participants could bring relevant and bare minimum of online course experience to our study.

Recruitment Process

After receiving the Institutional Review Board (IRB) approval, the first author reached out to the online program coordinators from different colleges and departments at the site. Those online course instructors identified through program coordinators as potential information-rich informants were accordingly—via IRB-approved recruitment emails—invited by the first author to participate in this study. Participation was voluntary. Those instructors who agreed to participate in this study filled out an online course instructor demographic information form prepared by the authors. Using the instructors' background information and the inclusion criteria, we recruited those online course instructors meeting our criteria and scheduled interviews with them. This sampling procedure yielded eight online course instructors to participate in interviews.

Participants Characteristics and Study Context

Of the eight online course instructors, six of them were female and two of them were male. The average age of the participants was 43 ($SD=8.15$). Seven participants self-identified as White or Caucasian as their ethnicity; one participant identified as Asian. Majority of the instructors held a doctorate in philosophy (Ph.D.) degree ($n=6$) in various fields, including Teaching and Learning, Literature, English, Library Studies, and History of Science. The remaining two participants held a master's degrees, one in English and the other in Health and Sports Sciences. All instructors had teaching backgrounds in higher education. Four held full-time faculty status and three held part-time status. One participant reported that they were not teaching as a faculty member but working full time designing online courses at the time of the data collection.

In terms of receiving formal training in online teaching and course design, considering the three categories of formal training (i.e., online teaching, online course design, and learning management systems), instructors' background varied. Four of the instructors received at least one or two of the training categories (i.e., online course design and learning management systems). One participant received no formal training in any of the three categories, whereas three participants received formal training in all three categories. Regardless of their formal

training in online learning and online course design, the majority of the participants were somehow involved in course design activities. Only one participant reported that she had not designed any online courses before this study. All the instructors also reported that they usually taught online courses that they had designed. Table 1 presents the characteristics of the participants.

Table 1
Online Course Instructors' Characteristics (N=8)

Pseudonym	Faculty status	Teaching background	Years teaching online	Number of courses taught online	Formal training in online teaching	Formal training in online course design	Formal training with *LMS	Number of courses designed
Mary	Full-time	Higher Ed	5	about 20	No	No	Yes	3
Sharon	Full-time	Higher Ed and Corporate	2	1	No	Yes	Yes	None
Jessica	Part-time	Higher Ed	3	6	Yes	Yes	Yes	2
Luisa	Full-time	Higher Ed	17	6	No	No	No	6
Ginger	Part-time	Higher Ed	15	5	Yes	Yes	Yes	5
Michael	Full-time	Higher Ed	5	10-15	Yes	Yes	No	approx. 5
Thomas	Non-TT** staff	Higher Ed	5	8	Yes	Yes	Yes	12
Jennifer	Full-time	Higher Ed	9	about 15	Yes	No	Yes	2

Notes: *Learning management system

** Tenure Track

Data Collection

The data collection involved semi-structured interviews with the eight online course instructors. Before the data collection, each participant read and signed a consent form. Participants were not compensated for their participation.

Semi-Structured Interviews

Before the interviews, the first and second authors prepared a demographic information form and sent it to those course instructors who agreed to participate in the study. The purpose of the demographic information form was to gather demographic (e.g., age, gender, ethnicity) and background information to capture course instructors' educational and professional experiences in online teaching (e.g., number of years in online education, number of online courses taught). Considering participants' convenience and availability, the first author scheduled the interviews

and received the confirmations of participation via emails. The interview place was also determined based on the participants' preferences.

The first author conducted seven semi-structured interviews face-to-face and one Skype audio call during the Fall 2019 academic term. All interviews were audio-recorded as stated in the consent form. The average length of the interviews was approximately 30-40 minutes. After obtaining signed informed consents, each participant was asked to respond to a set of semi-structured interview questions drawn from an interview protocol (see Appendix A) prepared by the first author as a content expert in CoI's teaching presence and its indicators. A total of 28 questions including both major and probe questions were used during the interviews. Due to the nature of qualitative interviews, the questions were also modified based on participants' responses. When necessary, the first author also used different probing questions based on the natural flow of each interview.

Data Analysis

The first and second authors transcribed the interview audio files verbatim using an online service and then they checked the transcriptions for accuracy. Following an inductive approach to coding, the two authors read the transcripts to become familiar with the data and employed open coding technique to create initial codes. Inductive coding is applied to allow certain codes, categories, and themes to emerge from the data (Ezzy, 2002; Richardson et al., 2016). Then, the two authors discussed their codes and the description of the initial codes from their analysis of the same transcripts. A set of open codes was freely created to represent online course instructors' perceptions and experiences of teaching presence. As suggested (Ezzy, 2002; Richardson et al., 2016; Yin, 2018), cross-case analysis was employed to identify and discuss similarities and differences among the participants' perceptions and experiences of teaching presence. Cross-case analysis is an approach whereby researchers explore each case on its own and then make comparisons across the cases in terms of the relevant themes (Richardson et al., 2016).

The first two authors developed a codebook and iteratively revised it as new codes and categories emerged from the data. Throughout data analysis, the first two authors independently coded interview transcripts and met weekly to compare their codes for each case. All the discrepancies were fully examined and negotiated until the authors reached a 100% consensus on the final codes to be employed for the data analysis (Creswell, 2014). After the coding process, the first two authors explored the data for patterns to develop themes with respect to the research questions. Because the research questions called for the in-depth exploration of participants' perceptions and experiences, we used interviews as data collection tools and triangulated the data through multiple coders following the guidelines suggested by Creswell and Poth (2018).

Findings

In this section, we present our themes that emerged from our data analysis within a cross-case analysis of similarities and differences across cases. Overall, seven themes emerged from the two research questions: (a) being present in multiple forms and ways, (b) clear goals, expectations, and instructions, (c) role of feedback in online course design, (d) autonomy-supportive online course design, (e) multiple instructor roles in facilitating online student discourse, (f) sense of community and student outcomes, and (g) assessment and grading approach. While *being present in multiple forms and ways* theme was associated with our first research question and revealed the instructors' overall perceptions and experiences of being present, the other six themes reflected instructors' perceptions and experiences of teaching

presence dimensions across online teaching contexts. Accordingly, we organized these themes within two broad sub-headings: *Being present in multiple forms and ways and instructors' perceptions and experiences of teaching presence dimensions across contexts.*

Being Present in Multiple Forms and Ways

In relation to our first research question – *What are the instructors' overall perceptions and experiences of being present in online courses?* – we first asked each participant a general question regarding their overall understanding of teaching or instructor presence in an online learning environment. All instructors perceived being present to be quite important in one way or another. One of the instructors, Mary, for example, emphasized the human element, while discussing the importance of being present in an online course. As Mary stated:

Even though we're not meeting face-to-face, the students don't feel like it's a canned course and it doesn't feel like they're just interacting with a robot. You know that there's a human being who is still their instructor and cares about their learning.

In general, being present was also perceived by some course instructors as emerging at different levels in the online learning environment. For example, Jennifer seemed to perceive being present not only at the interaction or engagement level during the course but also at the design level even before the course started. Jennifer said, “So I see it [being present] as coming out in the modules, making sure that your voice is in there, it's not just a bunch of links to outside courses...” Similarly, Sharon discussed how she intentionally designed certain components of the course to reflect herself as a real human in the online learning context. Sharon noted, “I was very intentional when I thought about how I wanted this class to be created and thinking about what are some of the different steps that I could take to still have that human connection.” Different from other instructors, Luisa described her perception and experience of as being a supporter or a coach who motivates, guides, and helps online students. Luisa said, “I see myself as helping the students have asked, I want to make them excited about what they're doing. So I'm kind of a coach and a cheerleader. That's how I think about it [being present].”

Instructors' Perceptions and Experiences of Teaching Presence Dimensions Across Contexts

In relation to our second research question – *What are the instructor's perceptions and experiences of teaching presence dimensions across online teaching contexts?* – six themes emerged from our data analysis addressing online course instructors' perceptions and experiences of instructional design and organization, facilitation of student discourse and learning, and direct instruction including assessments and feedback.

Most of the instructors perceived the instructional design and organization of their online courses as being quite important. For example, Jennifer expressed the important effect of course design on course quality as perceived by online students and said, “I could see if the course was designed kind of terribly by an instructor who's not very engaged or who doesn't care, I could see it probably being a nightmare for students to take.” Luisa seemed to view course design and organization as the most important teaching presence component or level. Luisa said, “I guess it's, the most important thing I do is to make sure that all the pieces fit together,” highlighting the significance of the designer and organizer role of online course instructors. Similarly, Sharon stated that she felt like she was responsible ultimately for the design of her course and she

perceived the significant impact of online course design on her online students' learning experiences in her courses. She said,

I try to look at it with the view of what's going to be easiest for the students to follow, what's going to make the most sense, what is going to be chunked into groups of information that will help them to be able to flow through completing their assignments and understand the information the best.

Clear Goals, Expectations, and Instructions

The first theme that emerged in relation to our second research question was the guiding role of *course goals, expectations, and instructions*. Just like in a face-to-face course, course goals, expectations, and instructions were perceived and experienced by online course instructors as important elements guiding the design and organization of an online course. Although not all instructors intentionally thought about the formal instructional design process, they still had certain goals and expectations in mind for their students to achieve and fulfill in their online courses. For example, Mary stated that when she was planning a new online course, she was not thinking about a formal instructional design process, but still wanted to teach certain content and wished to assess student learning in certain ways throughout her online course, suggesting she still had certain specific goals to achieve, which also guided her own design and organization. In addition, clear goals and expectations conveyed to students as part of a skillfully designed and organized online course were perceived as positively influencing online students' academic work. For instance, Sharon discussed such positive effects of clear goals and expectations and said:

I think the more organized that I am in the way that I present it, and the more detail I can provide to them in terms of their instructions on the expectations, the more successful they are in completing the work.

Another instructor mentioned using students' exemplary work as task instructions showing students what they are expected to do and how they can do it. Luisa discussed her use of exemplary student work in a blog environment and said, "And I can actually show examples of student work, which is a really powerful learning tool. I think not just hearing from the teacher, but actually seeing what other students are doing." Most of the other instructors used similar traditional ways of providing instructions and directions, such as using rubrics and giving instructions in the tasks and assignments themselves.

Role of Feedback in Online Course Design

The second theme was the *role of feedback in online course design*. One of the online course instructors, Luisa, insistently emphasized the role of feedback in the design of her fully asynchronous online courses by indicating that her entire online course design was based on a system of feedback loops:

When I'm designing the course, I make sure that it's clear how there's going to be feedback for the work that everybody is doing. So either peer-to-peer feedback or feedback from me to the students or how I'm going to get feedback from the students

about my job and how well I'm doing. So I do a lot of course design, I work on that pretty hard. And what I'm always looking for are the feedback loops.

Luisa's emphasis seemed to suggest that it was feedback loops that primarily accounted for her entire online course design and organization, which was quite different from the other cases in this study.

Autonomy-Supportive Online Course Design

The third theme was *autonomy-supportive online course design*, allowing for choice and learner control. Thomas discussed how he intentionally designed his online courses in a way that would allow his online students to choose from among topics and issues to study and discuss with each other. As he stated:

I try to design with a lot of flexibility for the students in mind. And so, the first thing that I think about is student autonomy... And so student choice and helping students understand that choice is what I'm designing for.

Multiple Instructor Roles in Facilitating Online Student Discourse

The fourth theme was *multiple instructor roles in facilitating online student discourse*. We found that instructors shifted from one role to another in their online courses to achieve specific goals across online teaching contexts. One instructor mentioned not engaging much with their students' postings and interactions but rather intervening only when he thought the discourse was not going anywhere, while another instructor discussed the practice of redirecting the students' discourse to the major points that she wanted them to think about during online discussions. Overall, the instructors who utilized online discussions in their courses suggested using discussion prompts or questions to promote student discourse in one way or another and asking the students to interact with their peers in a constructive and respectful way. One of the instructor roles we identified in our case study was associated with being a model for online students. One instructor, Ginger, discussed the importance of demonstrating at the beginning of the course what effective online discussions and discourse would look like so that the students could follow suit accordingly. Ginger explained:

For the first two or three weeks, I think my role is the [emphasized] instructor. So I heavily involve with the topics, every topic, every student's post, to demonstrate what an effective online discussion board should be... So from week four or so, students pick the week or the chapters they would like to discuss. So they will be the [emphasized] instructor for their group, small group.

The primary instructor role in such student-led online discussions shifts from the instructor conveying the major messages to the instructor monitoring student discourse with minimal intervention being used only when necessary. Jennifer discussed the necessity of minimal instructor involvement in students' conversations to encourage more active student ownership of those conversations. Jennifer said:

I actually just kind of sit back and let them discuss. I used to try to go in and engage in the conversations and I was concerned that it was like making some of them more

nervous about posting, because I would be talking with them... For the most part, what I do is I just let them respond to each other.

We identified this instructor role as being a guiding and facilitating moderator. However, the level of instructor involvement in online student discourse within this role still varied across the instructors. For example, Mary explained her role in online discussions as trying to monitor and respond to as many student postings as possible and said, “I read every response. And I try to comment on everybody, but I can’t always, it’s just a lot, but especially when somebody expresses a viewpoint that is different from most of the students.”

Sense of Community and Student Outcomes

The fifth theme was *sense of community and student outcomes*. Almost all the instructors seemed to agree that having a sense of community in online learning environments was important. For example, Jennifer explained:

I actually really want them [students] to get to feel like a community... so, I really try to start it with the first assignment where they do introductions, they have to respond to three other people’s introductions. And so I start it there, and it’s very intentional... Because I want them to feel connected to me and to each other.

We found that sense of community was perceived important not only for its affective outcomes, such as positive feelings of relatedness and connectedness, but also for its different learning outcomes. For instance, Jennifer seemed to suggest that having a sense of community encouraged her online students to read and review their peers’ papers with more care and higher quality, helping them to make greater effort to learn how to give quality feedback to others. As Jennifer explained:

I think that they [students] feel more responsibility to each other...And so they’re assigned a peer that they work with. And I usually try to assign, pair them up with somebody who’s in a similar field to them. And so then I feel like they feel all the more obligated to try to give them good feedback, because “this is my colleague,” you know.

On the other hand, three instructors discussed the difficulty of fostering a sense of community and seemed to not feel so confident or happy about their ability to do it effectively in their online courses. Mary discussed her own online learning experience and suggested that she believed it is very difficult for online students, especially for those not knowing each other personally, to develop a sense of community, although they might feel like friends. Similarly, Michael reported that he could do more about it and he was still looking for ways to do it better. Likewise, Sharon discussed how difficult she believed it was to foster a sense of community in online courses and expressed her desire to learn more about it. As Sharon explained:

I think there’s definitely value to it [sense of community]. I do think it’s important, but I don’t think that I’ve mastered how to do it. I feel like it’s very difficult to do... I would love to know how to do a sense of community better in an online class.

Jessica mentioned a different challenge she perceived regarding fostering sense of community among online students. She indicated that online course size would have a significant impact on her ability to do things about sense of community in her online courses. As Jessica explained, “So, creating community is done better, for sure, in smaller classes, whether it be face-to-face or online. So, limiting, if creating a community is important for programs or for courses, limiting the number of students is huge.”

Assessment and Grading Approach

The sixth theme was *assessment and grading approach*. We found that the instructors adopted a wide range of approaches while assessing and grading their online students’ work and learning performance. Their approaches ranged from giving small quizzes to rubric-based assessments, self-regulated assessments, and even an un-grading pedagogy. For example, Ginger pointed out that she used short quizzes to check her students’ understanding of basic concepts for formative assessment purposes. Mary indicated that she graded her students’ discussion postings based on a set of criteria such as the word limit and responses to peer comments. She also gave two to three multiple-choice quizzes in one of the two online courses she taught while she assigned a certain number of practice exercises as assignments in her other online course. Jessica, however, noted that she did not use objective assessments (e.g., multiple-choice tests) but rather assessed her students’ work through the students’ writing due to the nature of the course she taught. She also followed a rubric, albeit not so strictly. As Jessica explained, “I don’t do a whole lot of varied stuff. I don’t do like quizzes or multiple-choice stuff. Like I don’t do anything like that. It’s all through writing.”

Unlike all the other instructors who participated in this study, two instructors, Luisa and Thomas, seemed to follow a different approach to assessment and grading. Luisa mentioned using no traditional assessments, but rather having her online students self-monitor and self-record their own work progress in the LMS so that their final grades would emerge because of all these self-reports. She reported adopting quite a formative approach in her assessment and grading. As Luisa explained:

And I don’t grade, by the way, I’m an un-grader, so all the feedback that they [students] are getting is in terms of, “here’s the progress you’ve made, here’s where you could make some more progress.” And it’s all very progress and process-oriented without grade, without numbers.

Since Luisa taught college writing rather than a specific subject domain, she seemed to be more able to adopt such a feedback-based, ungraded approach to assessment because there seemed to be no specific content knowledge to be acquired and reproduced by her online students. Thomas, who followed a very similar approach to assessment and grading, also expressed his dislike of traditional assessment and grading approaches. Like Luisa, he emphasized the role of feedback loops in his pedagogical approach to assessment and underscored his use of formative assessment as well. As he explained, “The model that I like best is un-grading. And I don’t mean like not grading, I mean, just recursive, iterative feedback loops, and so thinking of almost everything as formative assessment rather than summative.”

Discussion

Our multiple case study provides new insights into diverse manifestations of CoI’s teaching presence across online contexts. We believe that different experiences of teaching

presence by online course instructors can expand our understanding of teaching presence and its dimensions in online learning environments.

Overall Perceptions and Experiences of Being Present in Online Courses

The results of this study indicate that being there for their students in an online learning environment was perceived by the interviewed course instructors to be important and essential, which is in line with prior research (e.g., Martin et al., 2019). In addition, course instructors' overall understanding of being present in an online learning environment may not be limited to instructors' specific actions and behaviors during the course, as indicated by Richardson and her colleagues (2015, 2016), because we found in this study that being present in an online course could be perceived and experienced by instructors as a component of course design as well (e.g., design of modules). Some instructors seemed to imply that they could still project themselves as real people even before the course starts through their instructional designs. Incorporating the pre-course design dimension into the perception of a course instructor being present in an online course supports Richardson et al.'s (2015) conceptualization of instructor presence as the intersection of teaching and social presences but with one important difference. Unlike their primary emphasis on the during-course characteristic of instructor presence and specific instructor actions and behaviors during an online course, being present in an online course might also be perceived and experienced by some instructors as their course design being experienced by their students. Although instructor presence as a comprehensive construct involves instructional design (Richardson et al., 2016), this design-included perception of being present seems to be more likely to emerge or to be more salient among those instructors who teach online courses that they themselves design and develop, as our participant instructors did.

We also found that being present as an online course instructor might also be perceived and experienced as being a motivating cheerleader who consistently helps and supports the students in their online learning experiences, which is supported by prior research (e.g., Martin et al., 2019). This perception is also in good alignment with Richardson et al.'s (2015) *advocating* role of teaching presence enhanced by rich social presence indicators such as promoting excitement and expressing acknowledgement of students' achievement. Reflecting on such different perceptions and experiences of being present in online learning environments may encourage online course instructors, especially novice ones, to start constructing their own presences or profiles in their online courses (Richardson et al., 2015).

Perceptions and Experiences of Teaching Presence Dimensions Across Contexts

Our findings supported the perceived importance of instructional design and organization in establishing and maintaining teaching presence (Anderson et al., 2001; Caskurlu et al., 2020). Course design and organization have an important role in establishing teaching presence in online learning environments because it is during this design and organization stage where teaching presence can be intentionally planned and constructed by instructors to promote a sense of being there (Martin et al., 2019; Orcutt & Dringus, 2017). Our findings seem to indicate that whether a formal instructional design process is followed or not before an online course starts, online course instructors seem to always have certain goals and expectations about their students that might vary in specificity or depth depending on instructor priorities or teaching contexts. This implies that the design and organization dimensions (e.g., course goals, instructor expectations) of teaching presence may not always be conceived by course instructors as the pre-course component of a formal instructional design process only, but it can also be perceived and experienced as an element that permeates teaching presence at all levels and stages of online

teaching experiences and instructional practices. Moreover, the positive relationship evident from students' perspectives between design and organization components of teaching presence (e.g., clear goals, expectations, instructions) and positive outcomes in online learning environments such as perceived learning or satisfaction (Caskurlu et al., 2020) was also echoed by our case study from instructors' perspectives regarding perceived positive influence of clear goals and expectations on online students' academic work.

In terms of different experiences of the design and organization dimension of teaching presence, we found that making course expectations and instructions more concrete and comprehensible for online students through the provision of exemplary student work was one particular manifestation of the design and organization dimension of teaching presence, pointing to how the same CoI presence element or dimension commonly perceived to be important could still be practiced and experienced in different ways by different instructors (Orcutt & Dringus, 2017). Using exemplary peer work and keeping it accessible to students in online courses could be an effective way to ensure online students' thorough understanding of the specific requirements of learning tasks and assignments.

Although feedback is given as an element of the direct instruction component of teaching presence in the CoI framework (Anderson et al., 2001), it also emerged as a key element of online course design and organization in our case study. We believe that this is another good example of how the same teaching presence element could commonly be perceived to be important but still experienced differently by different instructors with their own pedagogical priorities and beliefs. Providing timely and positive feedback is an essential component of online learning expected and appreciated greatly by online students (Watson et al., 2017). In addition, providing timely and positive feedback is positively associated with important online outcomes including perceived teaching presence (Li et al., 2020). Our findings indicate that feedback might not be limited to facilitation and/or direct instruction dimension(s) of teaching presence but might also be very well integrated within the entire design and organization of online courses, which we argue should push our thinking about the place of feedback within the CoI framework one step further. Online course instructors as well as instructional designers may also need to consider such a systemic integration of feedback loops into the design and organization of online courses so that one of the most fundamental and valued components of high-quality education can be accomplished. Especially faculty members who are new to online teaching and not used to giving feedback in online learning environments could benefit from this design-based feedback perspective.

Autonomy-supportive course design is another important theme to discuss, although only one of the instructors explicitly mentioned student autonomy. We found it valuable to report autonomy support as an independent theme for the design and organization dimension, because we believe that choice, flexibility, and student control as indicators of student autonomy (Ryan & Deci, 2017)—in addition to clear goals, instructions, and due dates—might need to be explicitly incorporated into the design and organization dimension of teaching presence within the CoI framework. This autonomy-support perspective might add an additional dimension to the traditional conception of the design and organization component of teaching presence within the original CoI framework and online education model. Designing and organizing online courses for student autonomy should be quite important and valuable just like the design and organization of face-to-face learning environments, because autonomy is one of the basic psychological needs together with competence and relatedness (Ryan & Deci, 2000). These three basic psychological needs should be optimally satisfied in any learning environments, online or

offline, so that students can feel motivated and get better engaged with their own learning process (Ryan & Deci, 2000). Teaching presence with its autonomy-supportive course design and organization could help instructors to achieve this in online learning environments. We believe autonomy-supportive course design and organization is another good example of potential variations in actual experiences of teaching presence across instructors and contexts. We also found that instructor roles might vary in online courses from being a model to being a guiding moderator and a supportive facilitator. Our finding is consistent with the previous research indicating that online course instructors adopt different roles in their interactions with their online students (Martin et al., 2019; Shea et al., 2006). During online discussions, course instructors may exhibit or model appropriate and expected ways of participation by actively demonstrating them, especially in the early days or weeks of the online course (Martin et al., 2019). After such modeling, online instructors may step back and get into an active observer role rather than act as an active participant in student conversations. We understood that although the instructor's presence or involvement in online student discourse was commonly perceived to be important and necessary by the course instructors, their actual practices or experiences still varied. Some instructors might wish to respond to each and every student posting in online discussions, whereas others might prefer to adopt a less active profile to allow students to take ownership of their own discourse. This result also points to contextual and pedagogical variations in instructors' actual experiences of a particular dimension of teaching presence. Given that heavy instructor presence in student conversations may discourage student participation (Dennen et al., 2007), online course instructors may consider adopting a more facilitating and guiding role rather than an active or dominant role in the online student discourse.

The results of our multiple case study also provide supporting evidence that online faculty perceive students' sense of community to be important in online learning environments (Bolliger et al., 2019). Our findings indicate that sense of community is considered valuable by course instructors not only for its affective outcomes but also for its learning outcomes, such as students learning to provide better feedback to their peers. This perception of the positive impact of sense of community on learning outcomes should call for a stronger emphasis within the CoI framework on online course instructors' fostering and supporting students' sense of community through their teaching presence behaviors, including but not limited to facilitating student discourse. We also understood that some instructors might feel more confident or happier about their ability to foster a sense of community among their online learners, while others might still need support and/or professional training. This finding similarly points to potential variations in actual experiences of teaching presence across online contexts and course instructors. Given that fostering and maintaining a strong sense of community can contribute to successful online learning experiences (Berry, 2019; Rovai, 2002), such professional training may be considered seriously by both course instructors and online education leaders including institutions offering online programs and degrees.

The results of this study also highlight that a wide range of assessments and grading approaches were used by the instructors. Assessment is a significant component of online instructional practices, and it can be subsumed by the direct instruction component of CoI's teaching presence because online instructors can provide direct instruction in the form of assessment and feedback statements as well (Anderson et al., 2001). The most significant variation in actual experiences of this teaching presence dimension of direct instruction including assessment in this study was a self-regulated un-grading approach. This approach, unlike

traditional approaches to assessment and grading, was used by two instructors. The most fundamental component of this un-grading approach is the iterative feedback loops that continually inform the students how to improve their work rather than grading their work as a final product. Such an un-grading approach could be used especially in courses in which gradual progress of student work needs to be encouraged and maintained without the worry or concern over getting a poor grade along the way. This approach may especially work well for assignments that students can declare as “complete” using a checklist, as opposed to rating/ranking with a rubric. Instead of grading every assignment in an online course based on a rubric, instructors may use freeform feedback without any rubrics. We understand that such an un-grading approach might sound too flexible or lenient to some online educators. Considering the student ownership of the learning process, however, such an approach to assessment and grading could be considered as a promising alternative in online learning assessment. This significant deviation from traditional approaches to online assessment and grading also points to the importance of considering contextual characteristics and pedagogical orientations while interpreting teaching presence and its manifestations in online learning environments.

Overall, the results of this case study indicated that teaching presence with all its components might be uniformly perceived to be important and essential by online course instructors, but their actual experiences might significantly vary depending on specific contextual factors and pedagogical orientations. We consider this to be an important conclusion because it indicates that there might not be a single one-size-fits-all teaching presence construct as it is very likely to change while manifesting itself in diverse ways across online teaching contexts and instructors.

Limitations and Future Research

As in any research studies, this study also had some limitations. First, the study findings should be interpreted with caution when transferring this new knowledge into different settings given that the findings are context-dependent. Second, the qualitative research literature suggests that there are multiple ways of triangulating data such as using multiple theories, data sources, or researchers (e.g., Creswell & Poth, 2018; Maxwell, 2013). In this study, we only used interviews as data collection tools and triangulated our findings through the lenses of multiple researchers. For future research, we suggest using different data sources or theories that might provide various insights into the study phenomenon and address the validity of the data. Third, given the limited time we had for the data collection and availability of the participants, we could not do member checking for confirmation of our interpretations of the findings.

Based on the findings of this study, we offer further lines of inquiry for future research. First, future research should include further explorations of individual and contextual variations in instructors’ perceptions and experiences of teaching presence across online courses and programs in the context of higher education. Second, the online education literature has strong emphasis on quantitative research by addressing a priori assumptions. As reflected in the findings of this study, qualitative research offers rich descriptions of the study phenomenon, which indicates the high demand to build a bridge between quantitative and qualitative approaches to gain a more complete understanding. Accordingly, we recommend that future researchers consider using mixed methods approaches to study such significant online learning variables as CoI presences, including teaching presence, and intentionally integrate the quantitative results with qualitative findings.

Conclusion

This multiple case study explained how different instructors teaching different courses online might perceive and experience teaching presence and its dimensions in online learning environments. The instructors perceived teaching presence and its different dimensions to be important, and yet the ways they experienced teaching presence and its components varied across instructors and their specific online teaching contexts. The results of this case study indicate that there might be no one-size-fits-all teaching presence because pedagogical beliefs, instructor preferences, and instructional orientations, as well as specific course contexts and contextual factors, would very likely lead to variations in course instructors' perceptions and experiences of teaching presence and its dimensions. If we aim to achieve a thorough understanding and draw a complete picture of teaching presence in online learning environments, such individual and contextual variations need to be incorporated into this picture. It is our hope that this study adds to the still growing knowledge base about perceptions and experiences of teaching presence and its manifestations explored from instructors' perspectives.

Acknowledgements

The detailed and insightful feedback of the editors and two anonymous reviewers of the special issue are gratefully acknowledged.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received approval from the ethics review board of the University of Oklahoma, USA for this study.

The authors received no financial support for the research, authorship, and/or publication of this article.

References

- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1–17. <https://auspace.athabascau.ca/handle/2149/725>
- Arbaugh, J. B. (2008). Does the Community of Inquiry framework predict outcomes in online MBA courses? *International Review of Research in Open and Distance Learning*, 9(2), 1–21. eric. <https://doi.org/10.19173/irrodl.v9i2.490>
- Arbaugh, J. B. (2014). System, scholar or students? Which most influences online MBA course effectiveness? *Journal of Computer Assisted Learning*, 30(4), 349–362. <https://doi.org/10.1111/jcal.12048>
- Berry, S. (2019). Faculty perspectives on online learning: The instructor’s role in creating community. *Online Learning*, 23(4), 181–191. <https://doi.org/10.24059/olj.v23i4.2038>
- Bolliger, D. U., Shepherd, C. E., & Bryant, H. V. (2019). Faculty members’ perceptions of online program community and their efforts to sustain it. *British Journal of Educational Technology*, 50(6), 3283–3299. <https://doi.org/10.1111/bjet.12734>
- 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>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Sage.
- Ezzy, D. (2002). *Qualitative analysis: Practice and innovation*. Routledge.
- Garrison, D. R. (2011). *E-learning in the 21st century* (2nd ed.). Routledge.
- Garrison, D. R., & Akyol, Z. (2013). The community of inquiry theoretical framework. In M. G. Moore (Ed.), *Handbook of distance education* (pp. 104-119). Routledge.
- 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), 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>

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>

Gurley, L. E. (2018). Educators' preparation to teach, perceived teaching presence, and perceived teaching presence behaviors in blended and online learning environments. *Online Learning*, 22(2), 197–220. <http://dx.doi.org/10.24059/olj.v22i2.1255>

Harding, S. (1992). Rethinking standpoint epistemology: What is “strong objectivity”? *The Centennial Review*, 36, 437–470. <http://www.jstor.org/stable/23739232>

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>

Kozan, K., & Richardson, J. C. (2014). Interrelationships between and among social, teaching, and cognitive presence. *The Internet and Higher Education*, 21, 68–73.

<https://doi.org/10.1016/j.iheduc.2013.10.007>

Kupczynski, L., Ice, P., Wiesenmayer, R., & McCluskey, F. (2010). Student perceptions of the relationship between indicators of teaching presence and success in online courses. *Journal of Interactive Online Learning*, 9(1), 23–43. <http://www.ncolr.org/jiol/issues/pdf/9.1.2.pdf>

Li, J., Wong, S. C., Yang, X., & Bell, A. (2020). Using feedback to promote student participation in online learning programs: Evidence from a quasi-experimental study. *Educational Technology Research and Development*, 68(1), 485–510. <https://doi.org/10.1007/s11423-019-09709-9>

Martin, F., Budhrani, K., Kumar, S., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Roles and competencies. *Online Learning*, 23(1), 184–205.

<https://doi.org/10.24059/olj.v23i1.1329>

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Sage.

Orcutt, J. M., & Dringus, L. P. (2017). Beyond being there: Practices that establish presence, engage students and influence intellectual curiosity in a structured online learning environment. *Online Learning*, 21(3), 15–35.

<https://doi.org/10.24059/olj.v%vi%i.1231>

Ponterotto, J. G. (2005). Qualitative research in counseling psychology: A primer on research paradigms and philosophy of science. *Journal of Counseling Psychology*, 52(2), 126–136.

<https://doi.org/10.1037/0022-0167.52.2.126>

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. <https://doi.org/10.1016/j.chb.2017.02.001>

Rovai, A. P. (2001). Building classroom community at a distance: A case study. *Educational Technology Research and Development*, 49(4), 33–48. <https://doi.org/10.1007/BF02504946>

Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, 5(4), 319–332. [https://doi.org/10.1016/S1096-7516\(02\)00130-6](https://doi.org/10.1016/S1096-7516(02)00130-6)

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67. <https://doi.org/10.1006/ceps.1999.1020>

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press.

Shea, P. (2006). A study of students' sense of learning community in online environments. *Online Learning Journal*, 10(1), 35–44. <https://doi.org/10.24059/olj.v10i1.1774>.

Shea, P., & Bidjerano, T. (2009). Community of inquiry as a theoretical framework to foster “epistemic engagement” and “cognitive presence” in online education. *Computers & Education*, 52(3), 543–553. <https://doi.org/10.1016/j.compedu.2008.10.007>

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., Li, C.S., & 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>

Sherblom, J. C. (2010). The computer-mediated communication (CMC) classroom: A challenge of medium, presence, interaction, identity, and relationship. *Communication Education*, 59(4), 497–523. <https://doi.org/10.1080/03634523.2010.486440>

Watson, S. L., Watson, W. R., Janakiraman, S., & Richardson, J. (2017). A team of instructors' use of social presence, teaching presence, and attitudinal dissonance strategies: An animal behaviour and welfare MOOC. *International Review of Research in Open and Distributed Learning*, 18(2), 68–91. <https://doi.org/10.19173/irrodl.v18i2.2663>

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage.

Zhang, H., Lin, L., Zhan, Y., & Ren, Y. (2016). The impact of teaching presence on online engagement behaviors. *Journal of Educational Computing Research*, 54(7), 887–900.
<https://doi.org/10.1177/0735633116648171>

Exploring Online Pedagogical Practices for Enhancing Transfer of Learning in Higher Education

Tamara Galoyan

Kristen Betts

Drexel University, USA

Brian Delaney

Auburn University, USA

Mariette Fourie

North-West University Potchefstroom, South Africa

Abstract

Institutions of higher education play a critical role in bridging academia and workforce, yet college students find it challenging to transfer their learning across and beyond instructional formats, including online, hybrid, and face-to-face. The goals of this exploratory, sequential, mixed-methods study were to (1) explore graduate students' conceptualizations of transfer, and (2) examine online pedagogical practices for enhancing transfer. Participants included students enrolled in a full-time online graduate degree program in education at a private university in the Mid-Atlantic USA. Findings from the qualitative phase with seven semi-structured interviews were used to design a survey study with 68 graduate students to explore their perceptions of effective online pedagogical practices for enhancing transfer. This study is significant since its findings revealed a number of online practices that instructional designers and faculty can use to optimize learning and transfer in higher education.

Keywords: Transfer of learning, online learning, higher education, pedagogical practices

Galoyan, T., Betts, K., Delaney, B., Fourie, M. (2021). Exploring online pedagogical practices for enhancing transfer of learning in higher education. *Online Learning*, 25(1), 178-197.
DOI: 10.24059/olj.v25i4.2887

Education institutions worldwide face numerous social, economic, and environmental challenges. To face these challenges, education leaders must implement radical curricular reforms, according to *The Future of Education and Skills: Education 2030* by the Organization for Economic Cooperation and Development (OECD, 2018). The OECD report lists “transferability” as one of the essential design principles that can orient curricula to proactively address these challenges. The report also notes that “Higher priority should be given to knowledge, skills, attitudes and values that can be learned in one context and transferred to others” (p. 7). Broadly defined, transfer is “a term that describes a situation where information learned at one point in time influences performance on information encountered at a later point in time” (Royer, Mestre, & Dufresne, 2005, p. vii).

In March 2020, in response to the Coronavirus pandemic (COVID-19), institutions of higher education (IHE) in the United States and worldwide had to rapidly shift from in-person to emergency remote teaching. According to the *CHLOE 6: Online Learning Leaders Adapt for a Post-Pandemic World* report by Quality Matters and Eduventures Research (2021), more than 4,000 public and private institutions in the US with about 20 million postsecondary students were challenged to pivot to online and remote modalities. To meet the needs of a changing higher education landscape, it is critical for educators to explore and apply effective online pedagogical practices that support learning and transfer. Within this study, we define effective online pedagogical practices as instructional techniques, strategies, and/or methodologies used in an online learning environment to meet the desired learning goals. As noted by Steele and colleagues (2019), best practices vary depending on context such as disciplinary content, type of curriculum, and educational level. Specifically, to meet the needs of undergraduate and graduate student populations, it is important to foster the application of learned knowledge and skills across a variety of contexts, including delivery formats, courses, employment, and other aspects of their lives. The OECD (2018) report declared that students need to apply their knowledge, skills, and attitudes to unknown and changing situations to face the challenges of this rapidly changing world and to meet the demands of the future workforce. Fauth and González-Martínez (2021) defined learning transfer as:

... the degree to which one learns in an online teacher training program and how one can thus effectively and continuously apply what they learned in a work context, especially considering the aspects referring to the design of this training, student characteristics, and their work context (p. 10).

Online learning environments should incorporate strategies for enhancing transfer of learning to encourage application across situations since it helps learners to contextualize information, build personal relevance, be creative and extend their skills beyond the online learning environment (Ally, 2004). Based on a comparative study involving online and traditional course delivery methods, online students outperformed traditional students when it came to applied learning, thus illustrating the usefulness of online environments in terms of enhancing transfer of learning (Hansen, 2008).

Although IHEs play an important role in bridging academia and the workforce, research indicates that many college students find it challenging to transfer knowledge, skills, and experiences from academia to work environments (Selingo, 2018; Wyman, 2018; Hora, 2017; Galoyan & Betts, 2021). Research shows that some of the challenges related to transfer include (1) its complex nature; (b) a variety of conceptualizations; and (c) lack of knowledge about

pedagogical practices for enhancing transfer in higher education (Galoyan & Betts, 2021). As noted by Royer and colleagues (2005), understanding and facilitating transfer through appropriate instruction is “a vitally important educational issue” (p. viii).

The purpose of this exploratory, sequential, mixed-methods study was twofold: (1) to explore how online graduate students conceptualize transfer, and (2) to examine effective online pedagogical practices for enhancing transfer. This study is significant since within online learning, understanding which pedagogical practices potentially enhance transfer can help instructional designers and faculty optimize their skills, resources, and tools within a Learning Management System and educational applications so that students are able to demonstrate transfer of learning across contexts.

This study was guided by the following research questions:

1. How do online graduate students conceptualize transfer of learning in higher education?
2. Which online pedagogical practices enhance transfer of learning in higher education?

Conceptual Framework

Our conceptual framework was shaped by the transfer literature, including views of transfer, as well as traditional and contemporary models and taxonomies of transfer. Specifically, we focused on a recent comprehensive Integrative Transfer of Learning (ITL) model by Galoyan and Betts (2021) which reflects the contemporary views of transfer and guided the overall conceptualization of this study and interpretation of results.

Views of Transfer

Literature on transfer of learning has been shaped by three major views, namely behaviorist, cognitivist, and situated. The behaviorist view conceptualizes learning and transfer in terms of observable and measurable relationship between the environmental triggers or stimuli and responses to those triggers (e.g., Thorndike, 1924; Thorndike & Woodworth, 1901; Scribner et al., 1981). According to this view, transfer occurs when the behaviors learned in one context are utilized in a highly similar context. By contrast, cognitivist view of transfer focuses on the acquisition of abstract mental representations of the information learned. Based on the cognitivist view, the learner is an active participant in the learning process, and transfer is a function of how knowledge and its uses are stored in memory (Battig, 1979; Ertmer & Newby, 2013; Schunk, 1996). The cognitivist view emphasized individual cognitive abilities and skills such as problem solving, reasoning, planning, and critical thinking, among others. Finally, the situated view characterized learning and transfer in terms of co-construction of knowledge as the result of engaging in a community of practice (Lave & Wenger, 1991). According to this view, transfer may be influenced by various sociocultural factors (Beach, 1999).

Behaviorist, cognitivist, and situated views of learning and transfer have been reflected in many traditional and contemporary transfer models and taxonomies. The traditional models and taxonomies of transfer reflect behaviorist and cognitivist views focused mainly on the obvious similarity shared between the learning and transfer contexts (Galoyan & Betts, 2021). Examples of traditional models and taxonomies of transfer include *common elements model* (Thorndike & Woodworth, 1901), *near vs far transfer* (Detterman & Sternberg, 1993), *high-vs-low-road transfer* (Perkins & Salomon, 2012), *positive vs negative transfer* (Leberman et al., 2006), and *vertical and lateral transfer* (Gagné, 1968). While traditional models and taxonomies

emphasized the importance of contextual and intrapersonal factors affecting transfer, contemporary models and taxonomies reflected the situated view of transfer and characterized it as a dynamic process affected by various social, cultural, and linguistic factors (Galoyan & Betts, 2021). Examples of contemporary models and taxonomies of transfer include *Preparation for Future Learning* (Bransford & Schwartz, 1999), *Actor-oriented Model of Transfer* (Lobato, 2003), *Successful Transfer of Learning Model* (Daffron & North, 2011), and a recent *Integrative Transfer of Learning Model* (Galoyan & Betts, 2021).

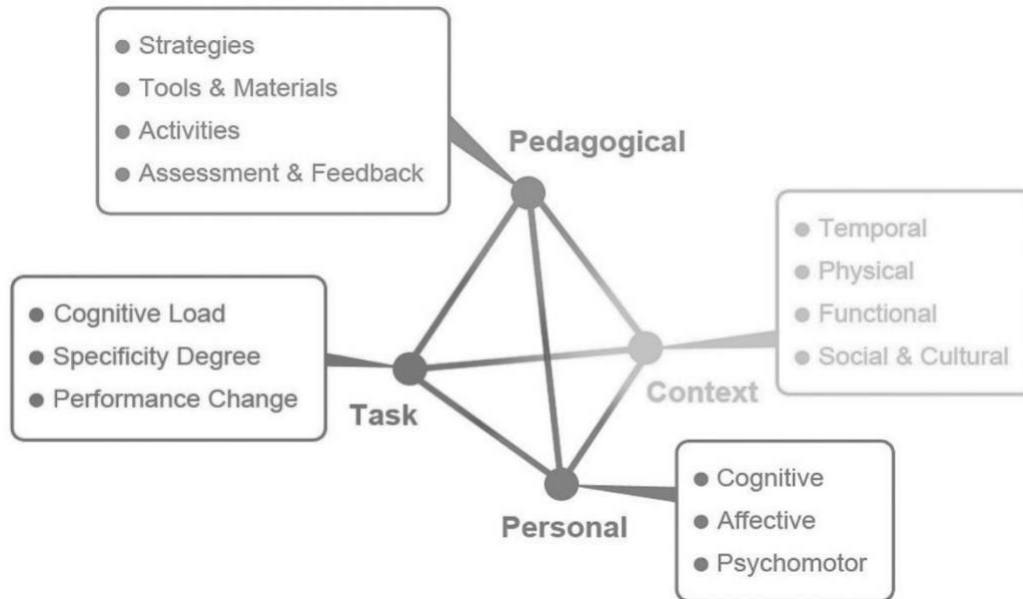
Integrative Transfer of Learning Model

We used the ITL model, developed by Galoyan and Betts (2021), as an analytic lens for this study since it is one of the recent comprehensive models of transfer that considers various factors affecting transfer across online, blended, and onsite learning environments. The ITL model is a result of a comprehensive literature review on transfer and aggregates various factors affecting transfer of learning across four broad, overlapping, and interconnected dimensions, namely *Task*, *Personal*, *Context*, and *Pedagogical* (see figure 1). The *Task* dimension includes factors related to the specific features of a given task such as the cognitive load imposed on a learner, the specificity degree of the task, or the change in the task performance expected from a learner. The *Personal* dimension encompasses intrapersonal factors affecting transfer such as cognitive, affective, and psychomotor. The *Context* dimension includes various factors related to the contextual features of transfer such as temporal, physical, functional, and social and cultural. Finally, the *Pedagogical* dimension incorporates factors that relate to pedagogical aspects of transfer, including various instructional strategies, materials and tools, activities, as well as assessment and feedback. For instance, in online and blended learning environments, integration of the instructional strategies and techniques, such as spaced practice, interleaving, and multiple forms of representation, can facilitate learning and subsequent transfer across contexts.

The ITL model aligns with contemporary views discussed earlier and conceptualizes transfer as a dynamic phenomenon. It recognizes the complexity and interconnectedness of the various factors affecting transfer and provides researchers and educators with a comprehensive and, at the same time, focused, lens to understand and enhance transfer across contexts and learning modalities. For this study, we were mainly concerned with the pedagogical dimension of transfer. Specifically, we were interested in exploring the various online pedagogical practices that could potentially enhance transfer of learning among graduate students. However, considering the complexity of the model and recognizing that transfer factors are interconnected, we also took into consideration the task, context, and personal dimensions in the interpretation of the results.

Figure 1

Integrative Transfer of Learning Model (Galoyan & Betts, 2021).



Methods

Research Design and Rationale

This study used an exploratory, sequential, mixed-methods design to address Research Question 1: How do online graduate students conceptualize transfer of learning in higher education? and Research Question 2: Which online pedagogical practices enhance transfer of learning in higher education? Mixed-methods research allows for combining qualitative and quantitative approaches “for the broad purposes of breadth and depth of understanding and corroboration” (Johnson et al., 2007, p. 123). This exploratory sequential study (Creswell & Clark, 2011) began with the collection and analysis of qualitative data from semi-structured interviews. The purpose of the interview was to address Research Question 1 by exploring how online graduate students conceptualize transfer of learning. The interview also explored participants’ experiences with online pedagogical practices that enhance transfer of learning, thus serving as the basis for the survey instrument design for the quantitative phase addressing Research Question 2.

Participants and Recruitment

Qualitative Phase

For the qualitative phase, we recruited seven volunteers (6 females and 1 male) to participate in a 45-minute, semi-structured, in-depth interview by using purposive sampling technique. Participants’ age ranged from 31 to 60 years’ old. Selection criteria included enrollment in a full-time, online graduate degree program in education at a private university in the Mid-Atlantic US. All participants were contacted via an invitation email containing information about the study and selection criteria. Approval by the Institution Review Board (IRB) was obtained prior to the start of the study.

Quantitative Phase

The quantitative phase included 68 participants (60.4 % female and 27.9 % male). The majority of participants (58.7%) were between 35 and 54 years old. The recruitment procedure and selection criteria were the same as those described in the qualitative phase.

Instruments

Interview Protocol

The instrument used in the qualitative phase was a semi-structured interview protocol designed by the researchers of this study. The design of the protocol was informed by our research questions and our broader conceptual framework. Interviews were conducted via ZOOM video conferencing and lasted approximately 45 minutes. At the beginning of the interview, participants were provided with a brief overview of the study, including research goals, interview structure, anticipated time of completion, and broad definitions of key terms such as *learning* and *transfer of learning*. Participants were then asked a list of demographic questions followed by several opening questions related to their views of transfer and online pedagogical practices that helped them transfer their learning across contexts. Example questions from the interview protocol are included below. (The full protocol is available in Appendix A).

- How would you conceptualize the phenomenon of transfer of learning?
- What factors do you think facilitate/hinder transfer?
- What instructional strategies have instructors used in your classes to facilitate transfer of learning (across tasks, across courses, from the program to real-world contexts, etc.)?

Survey

The quantitative phase included the collection and analysis of quantitative data from a survey instrument that was built upon the exploratory results of the qualitative phase (Creswell & Clark, 2011). The aim of the survey was to measure participants' perceptions of various online pedagogical practices related to enhancement of learning and transfer. The survey was administered online using the Qualtrics survey software. At the beginning of the survey, participants were provided with a brief overview of the study and the broad definitions of the key terms such as *learning* and *transfer of learning*. In addition, for clarity purposes, individual question items contained examples and explanations of some of the key terms (e.g., metacognition, interleaving, etc.). The survey consisted of three broad sections: (1) Metacognition and Learning (ML) (37 items), with specific reference to course design strategies, instructional strategies, as well as course activities, (2) Online Human Touch (OHT) (49 items), with specific reference to instructional strategies that contribute to a positive student experience and engagement, and learning, and (3) Feedback (10 items) with specific reference to ranking the importance of statements related to instructor feedback to support learning and transfer. Participants' ratings on the level of importance of the specific pedagogical practices were measured on a Likert-type scale ranging from 1="Not Important at All" to 5="Very Important. The feedback statements were rated by the participants in order of importance when receiving feedback with 1="Most Important" to 10="Least Important."

Findings

Qualitative Phase

All interview responses were audio-recorded. Audio responses were then transcribed and coded using MAXQDA software for qualitative data analysis. We applied two levels of coding: initial coding and pattern coding for themes. Initial coding employed in vivo coding, also known as literal coding, where a code is assigned to a word or a phrase from the actual language used by a participant (Corbin & Strauss, 2008; Saldaña, 2016). The second level of coding involved pattern coding (Miles et al., 1994; Saldaña, 2016), which helped to group the first-level codes into broader themes and categories. Pattern coding was applied to both within-subject and between-subject responses. The coding procedure was accompanied by intensive analytic memo writing that allowed for documentation and reflection on the coding process and code choices, as well as emerging patterns and themes.

The themes that emerged as a result of the qualitative data analyses were grouped into two broad categories: *Category One: Conceptualizations of Transfer* and *Category Two: Online Pedagogical Practices Enhancing Transfer*. Category One included themes related to participants' understanding of what transfer is and the factors affecting it. Examples include application, authentic experience, creativity, context and environment, and motivation and value. Category Two grouped the themes pertaining to online pedagogical practices that helped the participants transfer their learning across various contexts. Examples include practice, feedback, chunking, presentations, and guest speakers. Tables 1 and 2 illustrate example themes within the two categories and related excerpts from the interviewee responses.

The resulting themes from the qualitative phase as well as the related literature served as the basis of the survey instrument for the quantitative phase of this study. The survey explored online graduate students' perceptions of specific online pedagogical practices related to enhancement of learning and transfer, thus helping to validate and add to the exploratory findings from the qualitative phase (Creswell & Clark, 2011).

Table 1
Category One Themes: Conceptualizations of Transfer

Theme	Description	Example
Application	Using the learned knowledge and skills across different contexts	"...some of that responsibility also rests on the student in terms of taking what has already been done and again taking it to the next level, to apply it to other situations and other work that we would do."
Understanding	Making sense of the knowledge and skills to be learned	"But if I didn't understand why she's (professor) doing it and I didn't understand the principles behind it, I don't know if I would be able to necessarily intentionally integrate it into my own courses and make it meaningful without having that knowledge, that in-depth knowledge."

Making Connections	The cognitive process of connecting pieces of information across contexts	“I think of it in terms of making connections with prior and future learning, putting together different pieces to create new learning and applying what learning has occurred to new and novel situations.”
Relevance	Being able to see a value in the learned content and make a connection between the learning content and different aspects of learners’ lives	“...if somebody felt like what they were doing, you know, was not relevant to their work environment and they might feel like, how is this going to benefit me in the long run? ”
Motivation & Value	Affective factors that impact learning and transfer	“Lack of motivation. If there is no purpose for that particular knowledge or for it to be used later, why would anyone invest time in it?”
Context & Environment	The situation in which learning and/or transfer occurs	“Yes, I think it, definitely, is important that creating an environment where people want to learn. I think learning should be fun.”
Creativity	The cognitive process and the skill of generating and presenting ideas in a novel way	“When the instructor allows me to kind of express myself almost in a creative way to apply that information.”
Cultural Background	Learners’ culture and prior experiences that might affect their learning and transfer	“We have people from different cultures and backgrounds, maybe English is not their primary language. So that could hinder transfer.”
Instructional Design	Design and structure of an online course	“ I feel like both the assignments and the way that the courses were structured kind of inherently allowed for that transfer to occur.”

Table 2

Category Two Themes: Online Pedagogical Practices Enhancing Transfer

Theme	Description	Example
Technology	Online technological tools, applications, and resources used to enhance learning	"...we were required to select a different technology every time. That definitely forces you to go outside of your comfort zones, which I still find very, very helpful in my career now ..."
Differentiated Instruction	Instructional approaches and strategies that provide learners with a wide range of different pathways (diverse assignments, activities, etc.) to learn and transfer.	"I think that transfer can be enhanced by, again, looking at instruction in terms of multiple modalities or multiple options."
Group Assignments	Assignments that involve students working together	"...some of the things have been group assignments, have been surprisingly helpful transfer knowledge in the sense that I have learned how they are using certain skills, strategies, something like that, in their own professional world."
Portfolio Assignments	Type of assignment that allows learners to document and showcase their achievements, knowledge, and skills	"Also, another thing that she (professor) has done is the creation of the portfolio assignment...I have been able to really kind of showcase my work and then showcase how I have been able to apply it outside of my school my own professional role as well."
Practice	Instructional approaches and strategies that use repeated rehearsal and practice of the learned skills by applying them to a variety of contexts	"How do we make that learning stick in terms of putting it together in your brain? So again, sometimes it is something like, "Every repeated practice until a certain comfort level."
Feedback	Different instructional strategies, techniques, and tools for providing learners with feedback within an online course	"Written feedback, audio feedback, using Screencast-O-Matic to show you what that feedback is so that is really a big part of how she (professor) has facilitated my learning and I've been able to use that throughout the courses."

Chunking	The process of breaking down information elements into smaller pieces/units to enhance understanding, learning, and transfer	“...chunking the information and having things chunked and broken down into logical components and organized sequentially chronologically or whatever it is, depending on if it is a skill or is it knowledge or whatever it is.”
Instructor	The role of an instructor in enhancing learning within online learning environments	“If the professor is not excited about the content, then it's funny, I tend to be not myself...”
Discussions	Using conversations and discussions as an instructional strategy to enhance learner understanding, learning, and transfer	“...and then as you move through the content, always referring back to the short assignments or the discussion board topics...”
Presentations	Assignments that allow learners to showcase their learning by using online tools and applications	“...I have kind of made it a point to apply to do presentations, to offer to share my writing in some different ways...”
Guest Speakers	Having an invited guest expert talk about a specific topic in a synchronous or asynchronous session within an online course	“So, we've hosted live discussions and often brought in guest speakers that could drive the concept home.”
Metacognition	Instructional approaches or strategies that prompt learners to think about / reflect upon their own learning	“So, that intentional reflection is really crucial because it also helps me to see connections between my courses, connections to my dissertation research...”
Authentic Experiences	Providing learners with opportunities to apply and practice their learning outside the learning environment.	“So, in terms of instruction, I kind of think it's more of a making things authentic and applicable and providing the support that students would need to acquire new learning.”
Experiential Learning	Hands-on approach to teaching and learning	“Everybody learns differently, you know, I know for me, I'm a hands-on person.”

Quantitative Phase

A Cronbach's alpha coefficient was calculated to measure the internal consistency of the survey instrument. The Cronbach alpha was 0.962, which indicates a high level (96.2%) of internal consistency for the Likert-type questions (Gliem & Gliem, 2003). The statistical analysis included descriptive statistics reporting on frequency of responses on each of the three sections.

The results of the descriptive statistical analysis for each section have been reported in Tables 3-5. It was found that various online pedagogical practices were rated as *very important* by the participants. For ML, examples of *very important* online pedagogical practices included receiving detailed directions in the syllabus for each assignment (89.7 %), having rubrics for

graded assignments (80.3 %), aligning assignment topics (e.g., papers, projects) with their field of study (79.4 %), their current job (79.4%), and their potential dissertation topic (75 %) (Table 3). For OHT, examples of very important practices included the opportunity to review "Sample Assignments" by previous students (80.9 %), timely feedback on graded assignments (7-10 days) (79.4 %), timely responses (24-48 hours) from the instructor to emails (79.4 %) (Table 4). For Feedback, receiving understandable feedback was ranked first, followed by timely and specific feedback, respectively (Table 5).

Table 3

Example Item Analysis for ML (N=68)

Statement	Important (%)	Very Important (%)	Combined (%)
Metacognition and learning	30.1	45.6	75.7
<i>Course design strategies to support learning</i>	27.0	43.4	70.4
Detailed directions in the Syllabus for each assignment.	10.3	89.7	100.0
Having rubrics for graded assignments.	10.6	80.3	90.9
Having access to the syllabus prior to the course starting	24.2	69.7	93.9
Having access to the course (e.g., Announcement page, specific tabs) in the Learning Management System (Blackboard) prior to the course starting.	25.8	60.6	86.4
Assigned readings (articles, reports) related to weekly course content.	21.2	56.1	77.3
<i>Instructional strategies to support learning</i>	32.3	53.3	85.6
Providing opportunities to align assignment topics (e.g., papers, projects) with your field of study or "professional field."	17.6	79.4	97.0
Scaffolding of the final writing assignment by having multiple shorter writing assignments with feedback leading to the final assignment.	13.2	79.4	92.6
Providing opportunities to align assignment topics (e.g., papers, projects) with your "current job."	13.2	79.4	92.6
Providing opportunities to align assignment topics (e.g., papers, projects) with your "potential dissertation topic."	13.2	75.0	88.2
Spacing of activities so students are first introduced to new content, concepts or applications in a Discussion Board or Group Activity and then students work with the content, concept, or application later in the course as part of a major graded assignment.	38.2	55.9	94.1

Building upon prior knowledge to assist in making connections to new material (e.g., content or concepts from previous weeks or from previous quarter).	42.6	54.4	97.0
<i>Course activities to support learning</i>	32.9	36.2	69.1
Optional Live Sessions throughout the course to review and discuss upcoming assignments and answer questions.	32.4	45.6	78.0
Integration of the arts into the course (i.e., being able to complete an assignment using a medium other than a paper such as creating a video, Padlet, music, PowToons, concept map, etc.).	27.9	45.6	73.5
Optional Week 1 Live Session” Orientation” with a detailed overview of course content, assignments, and expectations.	33.8	42.6	76.4
Course activities that enable you to see assignment submissions of your peers (E-Poster Galleries, E-Flipbooks, reflections).	27.9	42.6	70.5
Posting a reflection at the end of the course related to learning and transfer of learning.	26.5	33.8	60.3

Table 4
Example Item Analysis for OHT (N=68)

<i>Statement</i>	Important (%)	Very Important (%)	Combined (%)
OTH Instructional Strategies	25.5	35.1	60.6
<i>Engagement</i>	26.0	28.4	54.4
Weekly “welcome announcements” the day a new week starts.	23.7	57.6	81.3
Text announcements throughout the course with specific information related to weekly course content.	28.8	44.1	72.9
Instructor using your name when speaking with you during the Live Sessions.	35.6	42.4	78.0
Instructor using your name when replying to you in the discussion boards.	27.1	42.4	69.5
Text reminder announcements for upcoming assignments.	28.1	38.6	66.7
Welcome video announcement from the instructor on the first day of class.	23.7	32.2	55.9
<i>Positive Student Experience</i>	24.2	27.8	52.0

Online pedagogical practices for enhancing transfer of learning in higher education

Text announcements throughout the course with specific information related to weekly course content.	23.5	48.5	72.0
Weekly "welcome announcements" the day a new week starts.	32.4	47.1	79.5
Instructor using your name when speaking with you during the Live Sessions.	33.8	45.6	79.4
Instructor using your name when replying to you in the discussion boards.	22.1	41.2	63.3
Text reminder announcements for upcoming assignments.	25.0	38.2	63.2
Welcome text announcement from the instructor on the first day of class.	29.4	32.4	61.8
Welcome video announcement from the instructor on the first day of class.	25.0	29.4	54.4
<i>Learning</i>	26.0	46.1	72.1
Opportunity to review "Sample Assignments" by previous students.	13.2	80.9	94.1
Timely feedback on graded assignments (7-10 days).	17.6	79.4	97.0
Timely responses (24-48 hours) from the instructor to emails.	13.2	79.4	92.6
Text feedback by the instructor on graded assignments with tracked changes.	8.8	77.9	86.7
Receiving text feedback by the instructor on graded assignments with tracked changes and comments.	27.9	60.3	88.2
One-on-One online meeting with the instructor by Zoom, Skype, Collaborate, etc. to discuss your research, project topic, and/or career interests.	27.9	57.4	85.3

Table 5

Descriptive Statistics for Ranking Feedback Received (N=68)

Feedback statements	Ranking	Mean	Median	Mode	Std. Dev.
Understandable: Expressed in a language that a student will understand	1	3.07	2.00	2	2.342
Timely: Provided in time to improve the next assignment	2	3.30	2.00	2	2.219
Specific: Pointing to instances in your submission where the feedback applies	3	4.35	4.00	3	2.441

Selective: Commenting in reasonable details on two or three things that the students that you can do something about	4	5.78	5.00	5	2.578
Forward-looking: Suggesting how you might improve subsequent assignments	6	5.98	6.00	5	2.274
Contextualized: Framed with reference to the learning outcomes and/or assessment criteria	5	6.12	6.00	7	2.336
Non-judgmental: Descriptive rather than evaluative, focused on learning goals, not just performance goals	7	6.28	7.00	8	2.787
Balanced: Pointing out the positive as well as areas in need of improvement	8	6.63	7.00	8	2.597
Transferable: Focused on process, skills and self-regulatory process, not just on the knowledge content	9	6.68	7.00	9	2.777
Personal: Referring to what is already known about you and your previous assignment	10	6.80	7.00	10	3.134

Note: The scale ranged from 1 = Most Important to 10 =Least Important

Discussion

Technological advancements have enhanced and expanded the traditional classroom learning environment to meet the needs of increasingly diverse undergraduate and graduate populations through web-enhanced, hybrid, and online learning, thus extending the mission of IHEs locally, regionally, nationally, and internationally. With increased enrollments in online graduate and undergraduate degree programs in US and all over the world (Betts et al., 2021), it is critical that faculty members explore and apply innovative pedagogical strategies to help students quickly adapt to the constantly changing workforce demands by transferring the learned knowledge, skills, and attitudes across a variety of contexts. According to Kubsch et al. (2020), “The ability to transfer one’s knowledge is considered especially important in the rapidly changing world we live in” (p. 1). Furthermore, the ability to transfer learning beyond university graduation to the real world is particularly important in an ever-changing economy and workplace (Galoyan & Betts, 2021; Downs, 2019; National Research Council, 2012).

We addressed Research Question 1 (How do online graduate students conceptualize transfer of learning in higher education?) by collecting and analyzing qualitative data from semi-structured interviews. Qualitative findings revealed that participants’ conceptualizations aligned with our conceptual framework, including traditional and contemporary views of transfer as well as the ITL model (Galoyan & Betts, 2021). For instance, we found that some conceptualizations of transfer aligned with the cognitivist views (e.g., Ertmer & Newby, 2013; Schunk, 1996), where transfer was characterized in terms of individual mental processes and cognitive skills. For example, one participant described transfer as “...making connections with prior and future learning, putting together different pieces to create new learning and applying what learning has occurred to new and novel situations.” Some other conceptualizations reflected the situated views (e.g., Lave & Wenger, 1991), where transfer is characterized in terms of contextual, environmental, and sociocultural factors. One participant noted that “We have people from different cultures and backgrounds, maybe English is not their primary language. So that could hinder transfer.”

The interview participants’ conceptualizations of transfer confirmed the different dimensions of the ITL model (Galoyan & Betts, 2021). For example, some of the themes aligned with the *Personal* dimension of the ITL model, where transfer was described in terms of cognitive abilities, such as understanding, making connections, creativity, metacognition, or

affective features like motivation and value, and relevance. Other themes, such as cultural background, context and environment, related to the *Context* dimension of the ITL model. Several themes, such as cognitive load and specificity of the task, related to the *Task* dimension. Finally, considering our research questions, many emergent themes tapped into the *Pedagogical* dimension of the ITL model, revealing multiple effective pedagogical practices for enhancing learning and transfer including instructional strategies, materials and tools, assessment, and feedback. Examples include group assignments, portfolio assignments, opportunities to practice, inviting guest speakers, technology, and feedback.

We addressed Research Question 2 (Which online pedagogical practices enhance transfer of learning in higher education?) by collecting and analyzing survey data that built upon the exploratory qualitative findings from the interviews. The findings revealed several online pedagogical practices that participants perceived as important. Some of these include, but are not limited to, course design strategies such as rubrics for graded assignments and detailed directions in the syllabus for each assignment; instructional strategies such as providing opportunities to align assignment topics (e.g., papers, projects) with learners' current job; building upon prior knowledge to assist in making connections to new material (e.g., content or concepts from previous weeks or from previous quarter); ongoing course activities such as optional Live Sessions to review and discuss upcoming assignments and answer questions; and integration of the arts and technologies into the course (i.e., being able to complete an assignment using a medium other than a paper such as creating a video, Padlet, music, PowToons, concept map, etc.). Some other pedagogical practices perceived as important by our learners' strategies included OHT strategies such as text announcements throughout the course with specific information related to weekly course content, a welcome video announcement from the instructor on the first day of class, and timely feedback on graded assignments (7-10 days).

We recommend that researchers and practitioners further explore and use the above-mentioned practices to enhance learning and transfer across online learning environments. However, since our study was limited to only graduate student population within a single private US university, the generalizability of the findings must be treated with caution. As discussed earlier, best educational practices are context-specific and may vary depending on various contextual factors such as disciplinary content, type of curriculum and educational level (Steele et al., 2019).

To conclude, the pedagogical practices discussed in this paper consider multiple aspects of pedagogy, including the learner, instructor, and curriculum, and reflect an array of learner-centered and personalized online instructional approaches and strategies that are geared toward maximizing learning and enhancing transfer. These pedagogical practices are of increasing significance as IHEs prepare to meet the needs of an increasingly diverse student population post-pandemic.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received approval from the ethics review board of Drexel University, USA for this study.

The authors received no financial support for the research, authorship, and/or publication of this article.

References

- Ally, M. (2004). Foundations of educational theory for online learning. *Theory and Practice of Online Learning*, 2, 15-44.
- Battig, W. F. (1979). The flexibility of human memory. *Levels of processing and human memory*, Lawrence Erlbaum Associates, 23-44.
- Beach, K. (1999). Chapter 4: Consequential transitions: A sociocultural expedition beyond transfer in education. *Review of Research in Education*, 24(1), 101-139.
- Betts, K., Delaney, B., Galoyan, T., & Lynch, W. (2021). Historical review of distance and online education from 1700s to 2021 in the United States: Instructional design and pivotal pedagogy in higher education. *Journal of Online Learning Research and Practice*, 8(1), 269-63.
- Bransford, J. D., & Schwartz, D. L. (1999). Chapter 3: Rethinking transfer: A simple proposal with multiple implications. *Review of Research in Education*, 24(1), 61-100.
- Corbin, J. S., & Strauss, A. A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*, 3rd edition. Sage Publications.
- Creswell, J. W., & Clark, V. L. P. (2011). *Designing and conducting mixed methods research*. Sage Publications.
- Daffron, S. R., & North, M. W. (2011). *Successful transfer of learning*. Krieger Publishing Company.
- Detterman, D. K., & Sternberg, R. J. (1993). *Transfer on trial: Intelligence, cognition, and instruction*. Ablex Publishing.
- Downs, L. R. (2019). Addressing the skills gap and new opportunities in higher ed. WCET Frontiers. <https://wcetfrontiers.org/2019/05/31/wes-poised-skills-gap-with-partner-schools/>
- Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly*, 26(2), 43-71.
- Fauth, F., & González-Martínez, J. (2021). On the concept of learning transfer for continuous and online training: A literature review. *Education Sciences*, 11(3), 133.
- Gagné, R. M. (1968). Contributions of learning to human development. *Psychological Review*, 75(3), 177.
- Galoyan, T., & Betts, K. (2021). Integrative transfer of learning model and implications for higher education. *The Journal of Continuing Higher Education*, 1-27. <https://doi.org/10.1080/07377363.2020.1847970>

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education.

Hansen, D. E. (2008). Knowledge transfer in online learning environments. *Journal of Marketing Education*, 30(2), 93-105. <https://doi.org/10.1177/0273475308317702>

Hora, M. T. (2017, February 01). Beyond the skills gap. *NACE*. <http://www.nacweb.org/career-readiness/trends-and-predictions/beyond-the-skills-gap/>

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2), 112-133.

Kubsch, M., Touitou, I., Nordine, J., Fortus, D., Neumann, K., & Krajcik, J. (2020). Transferring knowledge in a knowledge-in-use task—investigating the role of knowledge organization. *Education Sciences*, 10, 20.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Leberman, S., McDonald, L., & Doyle, S. (2006). *The transfer of learning: Participants' perspectives of adult education and training*. Gower Publishing, Ltd.

Lobato, J. (2003). How design experiments can inform a rethinking of transfer and vice versa. *Educational Researcher*, 32(1), 17-20.

Miles, M. B., Huberman, A. M., Huberman, M. A., & Huberman, M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.

National Research Council. (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. National Academies Press.

Organisation for Economic Cooperation and Development (OECD). (2018). The future of education and skills: Education 2030. *OECD Education Working Papers*.

Perkins, D. N., & Salomon, G. (2012). Knowledge to go: A motivational and dispositional view of transfer. *Educational Psychologist*, 47(3), 248-258.

Quality Matters & Eduventures Research (2021). CHLOE 6: Online Learning Leaders Adapt for a Post-Pandemic World. <https://encoura.org/project/chloe-6/>

Royer, J. M., Mestre, J. P., & Dufresne, R. J. (2005). Introduction: Framing the transfer problem. In J. P., Mestre (Ed.). *Transfer of learning from a modern multidisciplinary perspective*, vii-xxvi.

Saldaña, J. (2016). *The coding manual for qualitative researchers*. Sage.

Scribner, S., Cole, M., & Cole, M. (1981). *The psychology of literacy* (Vol. 198, No. 1). Harvard University Press.

Selingo, J. (2018, June 22). Hands-on learning is a necessary part of college, but here's what it doesn't teach students. *The Washington Post*. <https://www.washingtonpost.com/news/grade-point/wp/2018/06/22/hands-on-learning-is-a-necessary-part-of-college-but-heres-what-it-doesnt-teach-students/>

Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist*, 26(3-4), 207-231.

Steele, J., Holbeck, R., & Mandernach, J. (2019). Defining effective online pedagogy. *Journal of Instructional Research*, 8(2), 5-8.

Thorndike, E. L., & Woodworth, R. S. (1901). The influence of improvement in one mental function upon the efficiency of other functions. II. The estimation of magnitudes. *Psychological Review*, 8(4), 384.

Thorndike, E. L. (1924). Mental discipline in high school studies. *Journal of Educational Psychology*, 15(1), 1.

Wyman, N. (2018, August 3). Hiring is on the rise, but are college grads prepared for the world of work? *Forbes*. <https://www.forbes.com/sites/nicholaswyman/2018/08/03/hiring-is-on-the-rise-but-are-college-grads-prepared-for-the-world-of-work/#7f0de7a74e7e>

Appendix A

Interview Protocol

Overview

The aim of this semi-structured interview is to explore your understanding of transfer of learning and instructional strategies for enhancing transfer within the EdD Program and across real-world context. This interview takes about 45 minutes to complete. At the beginning of the interview, you will be asked several questions related to your demographic background followed by questions about your conceptualizations of transfer of learning and pedagogical practices that your instructors in the Ed.D. program used to enhance transfer.

Definitions

- **Learning:** The acquisition of knowledge or skills through instruction, study, or experience
- **Transfer of learning:** Applying knowledge and skills from one context to another within a course, across courses, professionally within the workplace, or other real-world contexts. Broadly defined, transfer is “a term that describes a situation where information learned at one point in time influences performance on information encountered at a later point in time” (Royer, Mestre, & Dufresne, 2005, p. vii).

Demographic Questions

1. Full Name: _____
2. In which year are you enrolled in the EdD program (1st year, 2nd year, 3rd year, 4th year or are you alumni?)
3. What is your age group?
 - 22-30
 - 31-40
 - 41-50
 - 51-60
 - 61-70
 - 71+
 - I prefer not to respond.
4. What is your sex assigned at birth?
 - Male
 - Female
 - I prefer not to respond.
5. What is your gender identity?
 - Man
 - Woman
 - Transgender
 - Other (please, specify) _____
 - Prefer not to answer

Opening Questions

1. How would you conceptualize the phenomenon of transfer of learning? What factors do you think facilitate /hinder transfer?
2. Do you think transfer can be enhanced by instruction and/or instructional design? If yes, how?
3. What instructional strategies have instructors used to facilitate transfer of learning (across tasks, across courses, across the EdD program to real-world contexts, etc.) in your classes at Drexel?
4. Describe how you have been able to transfer learning from your EdD courses professionally and to other real-world contexts?
5. Do you think the phenomenon of transfer of learning can affect student persistence and completion in a degree program?
6. Is there anything else you would like to share regarding transfer of learning?

An Exploratory Examination of Student-Led, Asynchronous Collaborative Online Discussions in Fostering Higher-Order Cognitive Skills and Ethical Leadership Learning

Graziella Pagliarulo McCarron

Larisa Olesova

Brianna Calkins

George Mason University, USA

Abstract

Previous studies have contextualized student-led, asynchronous online discussions as collaborative learning experiences that positively impact students' learning and foster higher order cognitive skills. From a leadership education perspective, student-led discussions have come to the fore as a helpful resource for deepening learning because of their focus on collaboration and shared leadership. While literature on student-led online discussions, leadership learning, and cognitive skill is plentiful, there is no single study that explores all these elements together or fully points to how practicing meaning-making in online, asynchronous leadership courses can inform larger cognitive processes. Thus, the purpose of this conceptual content analysis-based study was to examine 35 undergraduate students' collaborative discussion board posts at the beginning, middle, and end of an online, asynchronous Ethics and Leadership class to assess not only *if and to what extent* students expressed cognitive skills, in general, but also *if and to what extent* they understood ethical leadership via these types of discussions. Further, from an exploratory lens, this study examined if there was a relationship between expression of higher order cognitive skills and more complex ethical leadership understanding. Results indicate that, while students achieved higher order cognitive skills and more holistic ethical leadership understanding overall, robustness of student engagement could be situational in nature and expressions of cognitive skills and ethical leadership understanding tapered as the course progressed. Additional findings and implications are discussed.

Keywords: Asynchronous, student-led discussions, cognitive skill, online leadership studies

McCarron, G. P., Olesova, L., Calkins, B. (2021). An exploratory examination of student-led, asynchronous collaborative online discussions in fostering higher-order cognitive skills and ethical leadership learning. *Online Learning*, 25(4), 198-219. DOI: 10.24059/olj.v25i4.2895

Reviews of college and university enrollments from 2003–04 to 2015–16 illustrate that the percentage of undergraduates registered in online courses increased from 15.6% to 43.1% (de Brey et al., 2019), and this figure does not even account for the upswell attributed to learning pivots due to the 2020–21 COVID-19 pandemic. While online delivery formats vary (e.g., synchronous, asynchronous, hybrid), critiques of asynchronous pedagogies are abundant and often center on diminished learning and community engagement and decreases in relationship-building and collaborative learning (Moallem, 2015; Peterson et al., 2018; Roseth et al., 2011). Yet, asynchronous modalities are often deemed the most flexible given that students have few to no required virtual class meetings, can engage the course in ways congruent with their own schedules (Hrastinski, 2018; Lim, 2017), and can more easily balance education and work/life obligations (Harasim, 2000). One specific element of asynchronous online learning that has gained attention for its capacity to offer flexibility, enhance learning, and mitigate class engagement concerns is the collaborative discussion board.

Aloni and Harrinton (2018) and Perrotta (2020) noted that using discussion boards in asynchronous courses is important for promoting deeper understanding of course material and subject matter proficiency. Further, studies have contextualized asynchronous discussion boards as collaborative learning experiences that positively impact the development of students' higher order cognitive skills, particularly when students take an active leadership role and facilitate the discussion (Hew & Cheung, 2011; Waters, 2012) (i.e., student-led discussions). From a disciplinary perspective, these student-led online discussions have come to the fore in leadership education as helpful resources for deepening learning (e.g., McRay et al., 2016; Smith, 2015) and developing leadership understanding (Bleich, 2020). Leadership, described as “a relational and ethical process of people together attempting to accomplish positive change” (Komives et al., 2013, p. 33), is scaffolded by connection and conversation. Given the salience of collaboration and relational processes in leadership education (Higher Education Research Institute [HERI], 1996; Komives et al., 2016) as well as the designation of discussion as a “signature pedagogy” in leadership learning (Jenkins, 2016), student-led online discussion boards are essential to curriculum and overall student learning and development, and they warrant further exploration.

This exploration is of particular importance about the intersection between student-led discussions and cognitive skill, which, according to Yang et al. (2011), speaks directly to individuals' capacity to move from conceptual understanding to more complex application of theory to lived experiences. While literature on student-led online discussions, leadership learning, and cognitive skill is plentiful, no single study has explored these elements together. Understanding these components is important to creating engaging online learning environments for students that leverage real-world experience aimed at bolstering leadership development. Moreover, this holistic exploration may shed light on how fostering collaborative knowledge construction in student-led discussions can inform and transfer to cognitive processes in leadership *and* other disciplines. This exploration is even more important in the context of the undergraduate experience because most studies focused on the purpose and outcomes of student-led online discussions center graduate students (see Baran & Correia, 2009; Chen et al., 2019; de Oliveira & Olesova, 2013). Thus, the purpose of this conceptual content analysis-based study was to examine 35 undergraduate students' collaborative discussion board posts at the beginning, middle, and end of an online, asynchronous Ethics and Leadership class to assess not only *if and to what extent* students expressed cognitive skills, in general, but also *if and to what extent* they

understood ethical leadership via these types of discussions. Further, from an exploratory lens, this study examined if there was a relationship between expression of higher order cognitive skills and more complex ethical leadership understanding.

This exploratory research was guided by the following research questions:

- (a) If and to what extent do students express cognitive skills via weekly student-led discussions over the course of the term?
- (b) If and to what extent do students express ethical leadership understanding via weekly student-led discussions over the course of the term?
- (c) What, if any, is the relationship between expression of cognitive skill and ethical leadership understanding?
- (d) What, if any, is the relationship between cognitive skill, ethical leadership understanding, and select student demographics (academic program, GPA, and prior leadership coursework)?

We believe this study is significant because it will make a new contribution to the online learning *and* leadership education literature regarding the place of collaborative, student-led, asynchronous online discussions, and it will offer implications for enhanced undergraduate learning. Further, not only will it add to the work on online pedagogy and leadership education, but it may also begin to unpack the associations between student demographics and successful engagement in online, collaborative learning. For example, while Hsu et al. (2003) found that the level of students' participation in online collaborative learning could be predicted by grade point average (GPA), Williams and Lahman (2011) found no link between students' critical thinking in online discourse and GPA. Lastly, this study is significant because exploring the parallels between cognitive skills and leadership learning may illuminate new ways via which we can use collaborative pedagogy to foster deeper thinking across disciplines, support students toward holistic understanding, and connect instructional designers and leadership faculty more fully.

Literature Review

Collaborative, Student-Led Online Discussions and Cognitive Skill

Digital collaboration—defined as occurrences in which “individuals are responsible for their actions, including learning and respecting the abilities and contribution of their peers” (Laal & Ghodsi, 2012, p. 486)—is a valuable instructional approach that can help students make deeper meaning of content. Student-student interaction in asynchronous, online discussions and, specifically, in student-led discussions, can foster collaborative knowledge construction because active facilitation requires a stronger focus on building upon others' contributions and offering new ideas (De Wever et al., 2010; Jeanneau & O’Riordan, 2020). Contrary to instructor-led discussion, student-led discussion is based on lateral relationships (peer-to-peer), not on a hierarchical relationship (e.g., expert-novice) (Hew, 2005), and when students facilitate discussions, they usually engage in leadership by taking on meaningful facilitation roles (Baran & Correia, 2009). As facilitators, students ask questions, clarify, or justify their position or re-examine their ideas, provide comments to their classmates about whether they agree or disagree, and summarize discussions. All these student facilitation strategies reflect an explicit relationship to the higher levels of cognitive learning (Schindler & Burkholder, 2014).

Cognitive skill is one component of cognitive learning and refers to complex thinking aimed at synthesis, application, and creation of new meaning (Schindler & Burkholder, 2014). Several models examine students' cognitive skill in asynchronous online discussions. For example, Gunawardena et al.'s (1997) five-phase model explores socially constructed knowledge

in online discussions through the perspective of phases from sharing/comparing of information to application of newly constructed meaning. The model centers negotiation of meaning via students' thinking changes because of their engagement in cognitive activities in online discussions. Similar to Gunawardena et al.'s framework, Garrison et al. (2001) proposed the Practical Inquiry model, which is based on Dewey's (1938) work prioritizing reflection processes connected to searching for/exchanging ideas, comparing, contrasting, and explaining solutions, and testing solutions in online discussions.

While Gunawardena et al.'s (1997) five-phase model and Garrison et al.'s (2001) Practical Inquiry framework have been used extensively in the field of instructional design, both present with validity issues (Rourke et al., 2001). In response, Yang et al. (2011) developed, validated, and tested a content analysis model for assessing cognitive learning in online discussions that assesses two dimensions of cognitive learning—i.e., knowledge *and* cognitive skill (or processes for exhibiting knowledge). As proposed by Yang et al. (and defined in this current study), cognitive skill speaks to the intellectual activities that process information and is comprised of a five-factor continuum codifying students' capacity for (a) sharing and describing information, (b) explaining, comparing, interpreting, and clarifying, (c) analyzing and concluding, (d) applying, and (e) creating. Yang et al.'s model is informed by the revised Bloom's Taxonomy (Anderson et al., 2001), which centers the cognitive processes of remembering, understanding, applying, analyzing, evaluating, and creating, and it is applicable to general online discussions as well as discussions specifically related to problem-solving activities.

Collaborative, Student-Led Online Discussions and Leadership Learning

Rost and Barker (2000) underscored that "leadership education is aimed at producing citizens for a democratic society" (p. 1) by emphasizing "collaboration, wholeness, consensus, client-orientation, civic virtues..." (p. 5) and laboring toward "global connections, diversity, pluralism, critical dialogue, and multidisciplinary perspectives" (p. 5). The roots of modern-day student leadership education and development programs can be found in the 1970s as leadership studies (as a field) flowered and rudimentary leadership frameworks crystalized (Komives et al., 2006). The years since have more fully centered the importance of college-based leadership learning both inside and outside of the classroom (e.g., Dugan & Humbles, 2018; Guthrie et al., 2016; Owen, 2015). Given that belonging, inclusion, ethical pluralism, relationship, and dialogue are intrinsic to leadership education, online discussions serve as a living laboratory for learning.

In their assessment of ways to engage students in introductory leadership courses, Smith (2015) underscored the value of asynchronous online discussion boards in connecting students to leadership theory and promoting "authenticity and meaningful exchange" (p. 232). Similarly, Jenkins (2016), in their examination of salient leadership pedagogies, found that student-led discussion boards were among the most utilized strategies. Leadership education centers human interaction and collaboration (Rost & Barker, 2020), and, as such, student-led discussion boards and collaborative learning pedagogies are not only helpful to learning, but also essential to life-long leadership development. This connection becomes even more important as we negotiate turbulent societal times (e.g., pandemic, changing needs of students), the natural growth of online learning communities (Friedman, 2018), and the increasing salience of online leadership education (Jenkins, 2016). Yet, while scholars have produced excellent research examining the development of strong leadership pedagogies for digital spaces (Guthrie & Meriwether, 2018; Jenkins, 2016; McCarron et al., 2020; Purcell, 2017), we have yet to dig deeply into the relationship between leadership learning, collaborative learning via online, student-led

discussion boards, and the linkages between students' meaning making of leadership concepts and cognitive skill development. This examination is essential if our aims are to strengthen online collaborative learning not only in leadership education, but also writ large.

Conceptual Framework

Given that the aim of this study was to identify representations of general cognitive skill as well as representations of holistic ethical leadership understanding, the work was guided by two conceptual frameworks. Regarding cognitive skill, Yang et al.'s (2011) content analysis model for assessing students' cognitive learning in asynchronous online discussions served as guide. The model assessed two dimensions of cognitive learning—i.e., knowledge and cognitive skill. Cognitive skill, the focus of this study, is comprised of a five-factor continuum codifying students' capacity for (a) sharing and describing information, (b) explaining, comparing, interpreting, clarifying, (c) analyzing and concluding, (d) applying, and (e) creating. Yang et al.'s model moves from foundational understanding to more complex (i.e., higher order) expressions of thinking. To keep our analysis as pointed as possible, we pared down the framework to factors a, b, and d. The complete rationale for this choice is noted in Data Analysis below.

Regarding leadership, we opted to focus on ethical leadership meaning making given the aims of the course. As such, the Relational Leadership Model (RLM), presented by Komives et al. (2013), provided a basis for teasing out students' understanding of ethical leadership. The RLM includes five core components that inform how leadership processes might be framed. First, the RLM notes that the leadership process is just that, *a process*, grounded in iteration, group synergy, and “continuous meaning-making” (Dugan, 2017, p. 238; Komives et al., 2013). Additionally, the RLM underscores that leadership processes must be inclusive, empowering, ethical, and purposeful, and involve “knowing” (i.e., being knowledgeable), “being” (i.e., being aware of self and others), and “doing” (i.e., acting and applying learning) (Komives et al., 2013). This idea of knowing, being, and doing is particularly salient in that it also intersects with the notion of discourse and language (see Gee, 2015). Language—as expressed through discussion board posts in our study—could serve as a tool for students to inform, act, and be, thus, growing in their learning and meaning making complexity.

Both Yang et al.'s (2011) framework and the RLM speak to holistic thinking and share parallels in how meaning-making can move from simple to complex—e.g., from knowing to acting in the ethical component of the RLM and from describing to applying in the cognitive skill model. However, it is imperative to underscore that, while the cognitive skills model may move from lower to higher order, the RLM does not move on such a continuum but rather speaks to holism based on knowing, being, and doing. Yet, given the synergy between frameworks, we engage them in an exploratory fashion toward assessing students' online discussions.

Methodology

Research Design

The aim of this examination was to identify representations of cognitive skill as well as holistic ethical leadership understanding in undergraduate student-led online discussions. As such, a content analysis of students' weekly discussion posts was conducted based on its aptness in previous studies for categorizing narrative to draw conclusions (e.g., Rose et al., 2015) as well as assessing individuals' thinking skills (e.g., Johansson, 2020; Ulum, 2016). Our content analysis was conceptual in nature in that codes and concepts were scaffolded, informed, and directed by existing frameworks (see Hsieh & Shannon, 2005).

Setting and Context

The weekly discussion board posts assessed in this study were part of a required assignment for a fully online, asynchronous Ethics and Leadership course. This course is offered in both Fall and Spring semesters as part of major and minor requirements in a Leadership and Organizational Development degree track; it enrolls major/minor students as well as students seeking an elective. Critical learning outcomes for the course include students' capacity to articulate and apply key ethical decision-making principles, and supporting assignments range from reading and journaling to experiential site visits and leader interviews. In this study, we focus on one of the collaborative learning requirements for the course—the Ethical Leadership in the News (ELIN) assignment—which requires teams of three-four students (assigned by the instructor with one student designated as “team coach” to shepherd the process) to create a slide-based presentation for a pre-determined week linking class theory to current events.

As part of the ELIN team assignment, presenting students collaborate to summarize and compare weekly readings, describe the connection between those readings and the current event, and craft four class discussion questions. Questions must map to the cognitive processes noted in the revised Bloom's Taxonomy (see Anderson et al., 2001): remembering, understanding, applying, analyzing, evaluating, and creating. Students are provided with sample question stems that speak to each of these six processes (see Appendix A for sample questions). Once students develop the presentation and questions, the course instructor provides students with feedback and an additional discussion question typically focused on application, analysis, or evaluation. Once students incorporate instructor feedback, they post the presentation to the course discussion board. Over the course of the subsequent week, all enrolled students respond to the ELIN team's discussion questions and are required, by set days, to comment meaningfully on the responses of four or more classmates, respond to any questions posed of them, and, if presenting, offer a closing synthesis statement at week's end. In all, students post a minimum of five times. The weekly discussions run from Week 4 through Week 13 of the 16-week Ethics and Leadership class. The instructor is heavily involved in the weekly discussions and participates actively both in encouraging students as well as challenging them to dig deep in their responses.

Participants

Our Institutional Review Board-approved study was supported by secondary data, via which we examined pre-existing participant responses to “investigate new or additional research questions” (Heaton, 2008, p. 35); therefore, we did not recruit participants. The study sample included 35 of 41 students enrolled in the Ethics and Leadership course. Given that analysis focused on students who had posted responses to the discussion questions for *all* the weekly ELIN discussions, six students who did not post consistently were excluded from the study. While students represented a range of ages, academic programs, gender and racial identities, and enrollment statuses, not all demographic information was available for the participants. Accessible participants' demographics that are germane to this study can be found in Table 1.

Table 1
Participant Student Profiles (N=35)

Pseudonym	Academic Program	GPA to Grade Conversion	Prior Leadership Coursework
Anca	Non- Leadership	B or Higher	Yes
Ann	Non- Leadership	Below B	Yes
Arla	Non- Leadership	B or Higher	Yes
Alma	Leadership	Below B	Yes
Amy	Leadership	Below B	Yes
Anabelle	Non- Leadership	B or Higher	Yes
Bette	Non- Leadership	B or Higher	Yes
Barb	Non- Leadership	B or Higher	Yes
Christie	Non- Leadership	B or Higher	Yes
Cate	Non- Leadership	B or Higher	Yes
Cali	Non- Leadership	B or Higher	Yes
Connie	Non- Leadership	B or Higher	Yes
Carl	Non- Leadership	B or Higher	Yes
Dell	Non- Leadership	B or Higher	Yes
Donnie	Non- Leadership	Below B	Yes
Enid	Non- Leadership	Below B	No
Edith	Non- Leadership	B or Higher	Yes
Holly	Non- Leadership	B or Higher	Yes
Jeri	Non- Leadership	B or Higher	No
Krisia	Leadership	B or Higher	No
Marsha	Non- Leadership	B or Higher	No
Mary	Non- Leadership	B or Higher	Yes
Marshall	Leadership	B or Higher	No
Norma	Leadership	B or Higher	No
Nia	Non- Leadership	B or Higher	Yes
Olga	Non- Leadership	B or Higher	Yes
Evanie	Non- Leadership	B or Higher	No
Ruth	Non- Leadership	Below B	Yes
Ronni	Non- Leadership	B or Higher	No
Raina	Non- Leadership	B or Higher	Yes
Susan	Non- Leadership	B or Higher	No
Sol	Non- Leadership	B or Higher	Yes
Stella	Non- Leadership	B or Higher	No
Sai	Non- Leadership	B or Higher	Yes
Zed	Non- Leadership	B or Higher	Yes

Data Collection

Data were downloaded from the Ethics and Leadership course’s discussion board hosted on the university’s learning management system. For the study, we examined students’ initial posts for class Weeks 4, 8, and 13 (i.e., the beginning, middle, and end of term). We opted to study the initial posts only for several reasons: (a) they represented the most robust (i.e., content and length) response to the week’s discussion questions (see Appendix A for questions), (b) they often represented students’ most original thoughts because they asked about personal experiences and connection to readings, and (c) compared to more curt follow posts and

comments, they offered more insight into students' deep learning about course concepts. In total, 105 initial posts ranging from 250 to 500 words each were examined.

Data Coding and Coder Reliability

As a research team of two—one instructional designer and one leadership studies faculty member (also instructor for the study's class)—we each coded the same 105 posts in accordance with our expertise using established a priori codes grounded in the relevant conceptual frameworks (see Tables 2 and 3). Given that we operated as single coders, in alignment with Koo and Li's (2016) and Belur's (2021) guidance, we assessed intra-coder reliability using the test-retest approach—i.e., examining Pearson r for each coder on identical discussion board passages coded 10 or more days apart. Results yielded acceptable reliability for cognitive skill coding ($r=.91, p<.05, N=35$) as well as ethical leadership understanding ($r=.94, p<.05, N=35$).

For specific codes applied to the student passages, Table 2 provides coding details for progressive cognitive skills based on Yang et al.'s (2011) model. Table 3 shares coding details relevant to understanding ethical leadership concepts. While Yang et al.'s model includes five factors for assessing cognitive skill (sharing and describing information (SDS), explaining, comparing, interpreting, clarifying (ECIC), analyzing, and concluding (AC), applying (A), and creating (C)), we omitted “analyzing and concluding” (AC) and “creating” (C) from our study. Based on our use of the coding framework for a previous study, intercoder reliabilities indicated that AC was challenging to pinpoint accurately, and C was not applicable to the online course discussion for the leadership coursework under consideration. To streamline data analysis, the coding procedure involved identifying the highest level of cognitive skill and ethical leadership understanding per post. This code was used in analysis. For example, if a passage showed both SDS and ECIC, ECIC was chosen as code because our study's aim was to parse out higher order cognitive skills and leadership meaning making.

Table 2

General Cognitive Skill Indicators: From Simpler to Holistic Understanding

Code	Description from Guiding Conceptual Framework
SDS- Sharing, Seeking Information	“At this level, the discussions or postings are more opinions-oriented and without underlying reasoning, rationale, or explanations” (Yang et al., 2011, p. 10).
ECIC- Explaining, Comparing, Interpreting, Clarifying	“At this level, the discussions or postings are ideas, suggestions, perspectives with underlying reasoning, rationale or personal explanations and examples” (Yang et al., 2011, p. 10).
A-Applying	“At this level, the application reflects the use or employment of a learned concept, principle, or tool, etc. in a similar way or situation as previously illustrated” (Yang et al., 2011, p. 11).

Table 3*Ethical Leadership Meaning-Making Indicators: From Simpler to Holistic Understanding*

Code	Description from Guiding Conceptual Framework
Knowing	Knowing and understanding. Knowledge of the development of values; influence of systems on justice; models of valuing self and others; ethical decision making (Komives et al., 2013).
Being	Attitudes/opinions. Commitment to socially responsible behavior; authentic; establishes sense of personal character; values integrity; expects high standards (Komives et al., 2013).
Doing	Skills. Being congruent; being trusting; being reliable; having courage (Komives et al., 2013).

Data Analysis

To address research questions one and two (i.e., *If and to what extent do students express cognitive skills (or ethical leadership understanding) via weekly discussion boards over the course of the term?*), each initial discussion post for Weeks 4, 8, and 13 was coded, per Table 2 and Table 3. To address the third research question (*What, if any, is the relationship between expression of cognitive skill and ethical leadership understanding?*), in addition to frequencies, z-tests were employed to test for significant differences between means of cognitive skill and ethical leadership representations for Weeks 4, 8, and 13. Z-tests were chosen instead of t-tests given that sample size surpassed 30. To address the fourth research question (*What, if any, is the relationship between cognitive skill, ethical leadership understanding, and select student demographics (academic program, GPA, and prior leadership coursework)*), chi-square tests were conducted given the categorical nature of the variables. Academic program, GPA, and prior leadership coursework were dichotomous. Cognitive skill was transformed into a categorical variable by combining sharing and comparing into one variable. Similarly, for leadership understanding, knowing and being were combined. The rationale for this choice was based on the researchers' specific interest in isolating "application" and "doing" variables.

Results**Expression of Students' Higher Order Cognitive Skills over Term**

The results for the first research question revealed that students were able to achieve the higher order cognitive skills (i.e., application) in Week 4. Students' posts reflected and integrated the use of a learned concept, theory, or principle in practice (Yang et al., 2011). The following excerpt from participant Carl's initial Week 4 discussion board post addressing the question of *Can you recall a time where you were in a position of leadership and had to make a decision while remaining objective? Do you believe it is possible to always put aside our own personal bias?* offers a helpful illustration of expressions of application-based cognitive skill:

While working as a supervisor for SeaWorld, I was leading a team that handled around 20k cash every day. There was a person on my team that was having money issues in his personal life. He was friends with me... He was a hard worker, and always there to help when I needed him to work more if needed. One day though investigations came to me with a report on this guy. He was stealing money when he can, and investigations had the

stolen figure around 4-5k. They told me as supervisor I must present the report to him, and escort him to my director for termination. It was such a hard thing to do as I knew him and became friends with him, it was such a horrible 15-minute walk as he was pleading with me to defend him, and he would never do it again. Though I didn't want to turn him in, he did break many rules within our company, but also my ethics on stealing and being dishonest. I believe being a leader you must out aside your own bias as sometimes it can make you make the wrong choice.

However, Weeks 8 and 13 showed that most students' posts reflected sharing and comparing/explaining skills; higher order application decreased from 62.9% in Week 4 to 17.1% in Week 13 (see Table 4). Following is a discussion board excerpt from participant Connie, via which they share basic knowledge about ethical foundations in reply to *In your own words, explain why it is important to lead ethically in your personal life in order to lead ethically in a professional context*. Connie offers that "By having the foundation of an ethical individual, you will even be better equipped to take on the responsibility of leading others in an ethical manner, not just working alongside them."

Taking their thinking one step further but not quite to application, Christie digs a little more deeply and explains the place of crucibles in ethical leadership. She responds to *Do you think it is possible to become a better leader after a crucible in one's life?* as such:

Yes, it is possible to become a better leader after a crucible, because a crucible is a life experience that can change how you see or interact with the world. I have personally experienced good and bad moments that have shaped who I am now as a leader, and I know that this will continue to change based on my future experiences. I believe that the idea of "better" comes from the opportunity to reflect on and learn from your mistakes. I don't think that this ability is only due to age, but life chances and experiences.

Table 4

<i>Highest-Order Cognitive Skill Expression Per Post by Discussion Week (N=35)</i>	Sharing	Comparing/Explaining	Application
Week 4	14.3%	22.8%	62.9%
Week 8	17.1%	57.2%	25.7%
Week 13	42.8%	40.1%	17.1%

Expression of Students' Ethical Leadership Understanding Over Term

The results for the second research question revealed that only 20% of students demonstrated "doing" skills in Week 8, while no students expressed "doing" in Week 4. "Doing," with regard to a holistic understanding of ethical leadership, includes illustrations of being congruent, trusting, and reliable, and having courage (Komives et al., 2013). The following excerpt from participant Susan's Week 8 post on how they act out the ethical principles of moral courage in their lives offers a view of complex, holistic understanding and doing:

I definitely feel that I have moral courage...Now that I am a special education teacher, I certainly display moral courage more than ever. I have to stand up for my students and advocate for them when they cannot, and I always do what I feel is right whether or not there will be adverse consequences for me (i.e., socially within the school where I work,

etc.). My love for my students and the population of individuals with exceptionalities in general has really brought out moral courage in me more than ever before.

Interestingly, in parallel with the decreases by Week 13 in application-based cognitive skills (see Table 4), students' expressions of "doing" also decreased by Week 13 (see Table 5). Overall, most students' posts reflected knowing and being, where "knowing" spoke to knowledge of ethical leadership models and associated systems and "being" represented attitudes. In their Week 4 discussion post, participant Susan expressed "knowing" as follows:

Utilitarianism is basically that the most "ethical" or "best" actions a person makes are the ones that are made with the consequences of those actions in mind, and actions that should be taken are the ones that have consequences that do the most "good."

Dell, also in Week 4, offered the following with regard to "being" and clearly illustrated their personal commitments, values, and self-understanding:

Altruism is about being invested in the wellbeing of others without any personal or social motives. It is an unselfish act of caring and compassion. It is important to practice altruism because someone's kind actions can cause others to practice altruism. We should be the change that we want to see in the world.

Table 5

Most Complex Ethical Leadership Understanding Per Post by Discussion Week (N=35)

	Knowing	Being	Doing
Week 4	0%	100%	0%
Week 8	0%	80%	20%
Week 13	0%	91.4%	8.6%

Relationship Between Expression of Cognitive Skill and Ethical Leadership Understanding

For the third research question, z-tests for means were conducted comparing the mean for cognitive skill scores to ethical leadership understanding scores for Weeks 4, 8, and 13. For Week 4, we found that the cognitive skill mean (M=2.52) was significantly different (at $p < .05$) than the ethical leadership understanding mean (M=2) ($z=3.98, p=.000067$). This result parallels frequencies for Week 4 indicating that posts did not express holistic meaning making—given the absence of ethical leadership "doing"; yet, with respect to cognitive skill, a combined 37.1% expressed simpler sharing/comparing and 62.9% expressed higher order application (see Tables 4 and 5). For Week 8, we found that the cognitive skill mean (M=2.06) was not significantly different (at $p < .05$) than the ethical leadership understanding mean (M=2.21) ($z=-1.02, p=.305835$). For Week 13, results indicated that the cognitive skill mean (M=1.76) was significantly different (at $p < .05$) than the ethical leadership understanding mean (M=2.21) ($z=-2.498, p=.013249$). Compared to expressions of ethical leadership understanding, which skewed toward "higher scoring" notions of being and doing, many students still expressed simpler cognitive skills related to sharing and describing.

Relationship Between Cognitive Skill, Ethical Leadership Understanding, Student Profile

For the final research question, we attempted chi-square tests given the categorical nature of the variables; two-by-two cross-tabulation tables were created for relationships between cognitive skill and each profile variable as well as ethical leadership understanding and each profile variable. Given our small sample size and, as a byproduct, tabulation table cell counts of less than five, the chi-square statistic was unviable—it uses an approximation because it assumes

a large sample size (see Kim, 2017). As such, we calculated the Fisher Exact Test for each variable pairing because it does not approximate but uses an exact test for independence, thus, supporting the smaller sample. No significant associations emerged from the Fisher Exact Test.

For this final research question, we also calculated descriptive statistics by student variable across all weeks cumulatively to unpack themes in cognitive skill and leadership understanding expression. Overall, per Table 6, results indicated that, regardless of leadership-centered major, GPA, or prior leadership coursework experience, students largely expressed sharing and comparing with regard to cognitive skill and knowing and being with regard to ethical leadership understanding. Interestingly, non-leadership major students, students with Below B GPAs, and students with no leadership coursework experience were more prone to expressions of doing. From a GPA perspective, specifically, students with Below B GPAs expressed application and doing more than their peers with GPAs of B or Higher.

Table 6

Students' Profiles in Relation to Cognitive Skills and Ethical Leadership Understanding (N=35)

	Ethical Leadership Understanding		Cognitive Skills	
	Knowing/ Being	Doing	Sharing/ Comparing	Application
Leadership Major (n=5)	93%	7%	60%	40%
Non-Leadership Major (n=30)	90%	10%	65.6%	34.4%
B and Higher GPA (n=29)	92%	8%	65.5%	34.5%
Below B GPA (n=6)	83%	17%	61.1%	38.9%
Prior Leadership Class (n=25)	92%	8%	65%	35%
No Prior Leadership Class (n=10)	87%	13%	63%	37%

Discussion and Implications

This study provided a holistic exploration of how fostering knowledge construction in collaborative, student-led, asynchronous online discussions can inform and transfer to cognitive processes in leadership and other disciplines. Understanding three components (student-led discussions, leadership learning, and cognitive skills) can help create real world experiences aimed at bolstering meaningful application of leadership education. Specifically, this study offered new perspectives for understanding how student-led discussions can help undergraduate students make deeper meaning of leadership learning.

We found that connecting students to leadership theory and promoting “authenticity and meaningful exchange” (Smith, 2015, p. 232) in student-led discussions is a valuable instructional technique. For example, students’ weekly online, asynchronous discussion posts over the course of the semester for Ethics and Leadership showed that, of all the expressions of ethical leadership understanding, “being” was most robust across all weeks with “doing” peaking in Week 8 (i.e., 20%) and declining to 8.6% in Week 13. Next, expressions of the highest order cognitive skill (i.e., application) were most abundant in Week 4 (the first week of discussion). Expressions of application declined by the final discussion in Week 13 and, in fact, by Week 13, “sharing” represented the most prevalent cognitive skill expression. The frequencies of both “being” and “sharing” in students’ posts suggest that students were actively involved in negotiations of their own ideas in a collaborative, meaningful dialogue (Baran & Correia, 2009). At the same time, results may indicate that students were uncertain about how to convey lived experiences; they

needed more guidance in translating being-based attitudes to action. Results also suggest that, perhaps, students were too burdened by end-of-term fatigue or time pressures to engage fully in discussion. In their research, Galbraith and Merrill (2012) found that student exhaustion and cynicism did indeed increase over the academic cycle. This finding, combined with current day concerns such as Zoom fatigue (see Fauville et al., 2021), offers context for decreased end-of-term engagement with online collaborations and discussions.

Regarding question framing and support with expressions of lived experience, Akin and Neal (2007) affirmed the importance of online discussion questions that honored experiential learning and that were “designed around a concept or theory being taught but aimed directly at the personal story of the student” (p. 195). Though students creating weekly discussion questions for classmate engagement were given instructor support in crafting higher order questions based on the revised Bloom’s Taxonomy of learning, this study’s findings suggest that question development guidance could have been more explicit: Though discussions are “student-led,” students may need more scaffolding. Our findings support previous studies that also suggest questioning technique for peer facilitation (Chen et al., 2019; Hosler & Arend, 2013). For example, facilitation questions can ask for explanation of how and why, or for evidence drawn from life experience. Further, given that meaning making is both a cognitive and emotional process (Komives et al., 2013), perhaps, our findings suggest that students could benefit with deeper work in the course linking the conceptual to sense of value, purpose, and their own commitments. To this end, individual journals and reflective assignments could be essential processing partners to more collaborative, online discussion-based assignments.

Additionally, students’ decreased motivation could be tied to students’ strategies and regulatory skills in online discussions. Park and Yun (2017) found that undergraduate students used performance-avoidance strategies to avoid peers making fun of their poor performance. Whether reasons for dips in participation and engagement are attributed to exhaustion or self-consciousness, instructors, particularly leadership educators, can play a vital role in connecting students with course content and with each other by centering notions of mattering and belonging, and by employing andragogical principles (see Knowles, 1973) such as helping students understand why a topic is important to learn. Additionally, educators can help sustain motivation by exploring their classrooms as “communities of practice” (Lave, 1991) that exist not solely for knowledge transactions but also for helping students develop identities as leadership practitioners fully encompassing learning as a social process.

This question of how best to scaffold, support, and sustain students as learners and practitioners is not only necessary to interrogating and revising pedagogy, but it is also of import to future research. Prospective studies might consider examining the arc of student motivation throughout their asynchronous, online discussion board engagement as a way of unpacking student needs and identifying strategies instructors can employ to craft a connected learning community. This research could be particularly helpful in the context of exploring how to support less-engaged students as they cross comfort zones in discussion facilitation and connection creation. Afterall, “connection” is essential to leadership learning.

In tandem with our exploration of the presence and extent of cognitive skill and ethical leadership understanding over the course of the term, our study also examined the *relationship* between these expressions. Our conceptual frameworks (i.e., Yang et al.’s (2011) model for assessing cognitive learning in online discussions and the Relational Leadership Model (Komives et al., 2013)) offer perspectives on holistic thinking that invite a continuum from foundational to more complex and higher order understanding. As such, we sought to unpack if

there were parallels between the models across Weeks 4, 8, and 13. We found that means differed between sets of expressions for Weeks 4 and 13, indicating that cognitive skills of sharing/comparing and applying did not map to ethical leadership understanding of knowing/being and doing. This finding not only suggests that descriptions for sharing/comparing are inconsistent with those for knowing and being, but also that “applying” from a cognitive skill perspective is more general than what “doing” encompasses in the Relational Leadership Model.

While “applying” in Yang et al.’s work encompasses hypotheticals, “doing” speaks to explicit actions, follow through, and commitments. Thus, at face value, student posts are far more likely to fall into the applications category than the “doing” category. Given this observation, while Lee and Martin (2017) found that students preferred application questions to analysis, synthesis, judgement, comprehension, or facts, we must interrogate what we mean by “application.” Are we asking students to extrapolate, hypothesize, or offer what *could* be in their lives or lives of others? Are we asking students to speak to specific ways in which they *enact* course principles (e.g., ethical leadership) every day? If the latter, are we prepared to scaffold students’ thinking and provide spaces in our online courses that encourage enactment and mistake-making? As educators, we must engage in deep discourse around these questions.

Finally, while we did not discover any significant associations between student profile variables, cognitive skill, and ethical leadership understanding, we did discover that, regardless of major, GPA, or prior leadership coursework experience, students largely expressed sharing and comparing with regard to cognitive skill and knowing and being with regard to ethical leadership understanding. From a GPA perspective, specifically, students with Below B GPAs expressed application and doing more than their peers with GPAs of B or Higher. Given that GPA is often used as an indicator to predict students’ success in online courses (Boston et al., 2012), our findings suggest that GPA alone cannot be used to contextualize student outcomes. This finding supports the notion that our view of students must be holistic in nature. While holism and relational processes are integral to leadership education (Guthrie et al., 2017; Komives et al., 2013) online or face-to-face, we must extend the importance of holism to online learning, writ large, as a guide toward teaching practice that meets students where they are, dismantles assumptions about their success and capacity, and centers collaborative, online discussions as spaces for efficacy-building.

Limitations

While this study offers potential new insight, five major limitations must be acknowledged. First, this study was based on secondary data, which though rich, bounded our analysis and limited complex examinations of student demographics, exploration of granularity in familiarity with leadership concepts, and unpacking of experiences in relation to expressed cognitive skills and ethical leadership understanding. Second, our data set was modest in size (N=35), which also limited the nature of our analytics (e.g., use of regression) given potential convergence issues. Third, our study focused on only the “ethical” component of the Relational Leadership Model, but the model encompasses a larger framework that, from a systems perspective, would impact assessments of student learning. Fourth, the types of discussion questions to which students responded changed weekly, thus, there was no control the way students were invited to demonstrate understanding. Lastly, our study only examined students’ initial discussion posts for each week and did not unpack subsequent posts and classmate comments, which could have added more texture to the overall analysis.

Conclusion

The purpose of this study was to examine 35 students' collaborative discussion board posts at the beginning, middle, and end of an online, asynchronous Ethics and Leadership class to assess not only *if and to what extent* students express cognitive skills, in general, but also *if and to what extent* they understand ethical leadership via these discussions. Additionally, we also examined if there was a relationship between expression of higher order cognitive skills and more complex ethical leadership understanding. Our findings, though exploratory, offered insight into the intersections between online discussion boards, leadership learning, and cognitive skill as well as implications for engaging students in collaborative learning via asynchronous online discussions. In a world focused on a digital future (Munshi et al., 2019) and demanding individuals versed in intentional leadership practice (O'Keefe & Meeker, 2019), our study offers potential insight into how digital pedagogy aimed at collaborative practices can foster undergraduates' purposeful, inclusive, empowering, ethical, and process-oriented leadership practice (Komives et al., 2013). This work not only provides researchers a springboard for further exploration into the nexus between digital learning, student development, and learning outcomes, but also offers a space for a continued discourse, especially among leadership educators, about pedagogies and practices that transcend time and place for learning.

Declarations

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author(s) received approval from the ethics review board of George Mason University for this study.

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Akin, L., & Neal, D. (2007). CREST+ model: Writing effective online discussion questions. *Journal of Online Learning and Teaching*, 3(2), 191-202. <https://doi.org/10.1891/9780826134097.0007>
- Aloni, M., & Harrington, C. (2018). Research based practices for improving the effectiveness of asynchronous online discussion boards. *Scholarship of Teaching and Learning in Psychology*, 4(4), 271-289. <https://doi.org/10.1037/stl0000121>
- Anderson, L. W., Krathwohl, D. R., & Associates. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- Baran, E., & Correia, A-P. (2009). Student-led facilitation strategies in online discussions. *Distance Education*, 30(3), 339-361. <https://doi.org/10.1080/01587910903236510>
- Belur, J., Tompson, L., Thornton, A., & Simon, M. (2021). Interrater reliability in systematic review methodology: Exploring variation in coder decision-making. *Sociological Methods & Research*, 50(2), 837–865. <https://doi.org/10.1177/0049124118799372>
- Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals*. Longman.
- Bleich, M. R. (2020). The discussion board in online learning: Leadership development opportunities. *The Journal of Continuing Education in Nursing*, 51(12), 541-543. <https://doi.org/10.3928/00220124-20201113-03>
- Boston, W., Ice, P., & Burgess, M. (2012). Assessing student retention in online learning environments: A longitudinal study. *Online Journal of Distance Learning Administration*, 15(2).
- Chen, Y., Lei, J., & Cheng, J. (2019). What if online students take on the responsibility: Students' cognitive presence and peer facilitation techniques. *Online Learning*, 23(1), 37-61. <https://doi.org/10.24059/olj.v23i1.1348>
- de Brey, C., Snyder, T. D., Zhang, A., & Dillow, S. A. (2021). Digest of Education Statistics 2019 (NCES 2021-009). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. <https://nces.ed.gov/pubs2021/2021009.pdf>
- Dennen, V. P., & Wieland, K. (2007). From interaction to intersubjectivity: Facilitating online group discourse processes. *Distance Education*, 28(3), 281-297. <https://doi.org/10.1080/01587910701611328>
- deNoyelles, A., Zydney, J. M., & Chen, B. (2014). Strategies for creating a community of inquiry through online asynchronous discussions. *Journal of Online Learning and Teaching*, 10(1), 153-165.

- de Oliveira, L. & Olesova, L. (2013). Learning about the literacy development of English language learners in asynchronous online discussions. *Journal of Education*, 193(2), 15-23. <https://doi.org/10.1177/002205741319300203>
- De Wever, B., Van Keer, H., Schellens, T., & Valcke, M. (2010). Roles as a structuring tool in online discussion groups: The differential impact of different roles on social knowledge construction. *Computers in Human Behavior*, 26(4), 516-523. <https://doi.org/10.1016/j.chb.2009.08.008>
- Dewey, J. (1938). *Experience and education*. Macmillan
- Dugan, J. P. (2017). *Leadership theory: Cultivating critical perspectives*. John Wiley & Sons.
- Dugan, J. P., & Humbles, A. D. (2018). A paradigm shift in leadership education: Integrating critical perspectives into leadership development. *New Directions for Student Leadership*, 2018(159), 9-26. <https://doi.org/10.1002/yd.20294>
- Fauville, G., Luo, M., Muller Queiroz, A. C., Bailenson, J. N., & Hancock, J. (2021). Zoom Exhaustion & Fatigue Scale. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3786329>
- Friedman, J. (2018). Study: More students are enrolling in online courses. US News and World Report. <https://www.usnews.com/higher-education/online-education/slideshows/discover-10-current-trends-in-online-education>
- Galbraith, C. S., & Merrill, G. B. (2012). Academic and work-related burnout: A longitudinal study of working undergraduate university business students. *Journal of College Student Development*, 53(3), 453-463. <https://doi.org/10.1353/csd.2012.0044>
- Garrison, D. R., Anderson, T., & Archer, W. (2001) Critical thinking, cognitive presence, and computer conferencing in distance education, *American Journal of Distance Education*, 15(1), 7-23. <https://doi.org/10.1080/0892364010952707> 1
- Gee, J. P. (2015). Discourse, small d, big D. In K. Tracy, T. Sandel and C. Ilie (Eds.), *The International Encyclopedia of Language and Social Interaction*, 3, 1-5. <https://doi.org/10.1002/9781118611463.wbielsi016>
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17(4), 397-431.
- Guthrie, K. L., Jones, T. B., & Osteen, L. (Eds.). (2016). *Developing culturally relevant leadership learning: New directions for student leadership*, (No. 152). John Wiley & Sons.

Guthrie, K. L., & Meriwether, J. L. (2018). Leadership development in digital spaces through mentoring, coaching, and advising. *New Directions for Student Leadership*, 2018, 99-110. <https://doi.org/10.1002/yd.20291>

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *The Internet and Higher Education*, 3(1-2), 41-61. [https://doi.org/10.1016/s1096-7516\(00\)00032-4](https://doi.org/10.1016/s1096-7516(00)00032-4)

Heaton, J. (2008). Secondary analysis of qualitative data: An overview. *Historical Social Research/Historische Sozialforschung*, 33-45.

Hew, K. F. (2015). Student perceptions of peer versus instructor facilitation of asynchronous online discussions: Further findings from three cases. *Instructional Science*, 43(1), 19-38. <https://doi.org/10.1007/s11251-014-9329-2>

Hew, K. F., & Cheung, W. S. (2011). Higher-level knowledge construction in asynchronous online discussions: an analysis of group size, duration of online discussion, and student facilitation techniques. *Instructional Science*, 39(3), 303-319. <https://doi.org/10.1007/s11251-010-9129-2>

Higher Education Research Institute. (1996). A social change model of leadership development. Higher Education Research Institute. <https://www.heri.ucla.edu/PDFs/pubs/ASocialChangeModelofLeadershipDevelopment.pdf>

Hrastinski, S. (2018). A study of asynchronous and synchronous e-learning methods discovered that each supports different purposes. *EDUCAUSE Quarterly*, 31(4). <http://www-cdn.educause.edu/library/EQM0848>

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>

Hsu, T., Wang, H. F., & Hong, M. C. (2003). Effects of gender, GPA, computer self-efficacy, and learning motivation on the collaborative e-learning participation. In A. Rossett (Ed.), *Proceedings of E-Learn 2003--World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 241-248). Association for the Advancement of Computing in Education (AACE).

Jeanneau, C., & O'Riordan, S. (2020). The impact of a peer-facilitated discussion initiative on international students' learning experience in the context of internalization at home. *Language Learning in Higher Education*, 10(1), 1-24. <https://doi.org/10.1515/cercles-2020-2011>

Jenkins, D. (2016). Teaching leadership online: An exploratory study of instructional and assessment strategy use. *Journal of Leadership Education*, 15(12), 129-149. <https://doi.org/10.12806/V17/I1/R2>

Johansson, E. (2020). The assessment of higher-order thinking skills in online EFL courses: A quantitative content analysis. *English Studies*, 19(1), 224-256. <https://doi.org/10.35360/njes.519>

- Kennedy, D. (2004). The role of a facilitator in a community of philosophical inquiry. *Metaphilosophy*, 35(5), 744-765. <https://doi.org/10.1111/j.1467-9973.2004.00348.x>
- Kennedy, N. S., & Kennedy, D. (2010). Between chaos and entropy: community of inquiry from a systems perspective. *Complicity: An International Journal of Complexity and Education*, 7(2). <https://doi.org/10.29173/cmplct8917>
- Kim H. Y. (2017). Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. *Restorative Dentistry & Endodontics*, 42(2), 152-155. <https://doi.org/10.5395/rde.2017.42.2.152>
- Knowles, M. (1973). *The adult learner: A neglected species*. Gulf.
- Komives, S. R., Lucas, N., & McMahon, T. R. (2013). *Exploring leadership: For college students who want to make a difference* (3rd ed.). Jossey-Bass.
- Komives, S. R., Wagner, W., & Associates. (2016). *Leadership for a better world: Understanding the social change model of leadership development*. Wiley.
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, 15(2), 155-163. <https://doi.org/10.1016/j.jcm.2016.02.012>
- 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>
- Lave, J. (1991). Situating learning in communities of practice. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 63–82). American Psychological Association. <https://doi.org/10.1037/10096-003>
- Lee, J., & Martin, L. (2017). Investigating students' perceptions of motivating factors in online class discussions. *International Review of Research in Open and Distributed Learning*, 18(5), 148-172. <https://doi.org/10.19173/irrodl.v18i5.2883>
- Lim, F. P. (2017). An analysis of synchronous and asynchronous communication tools. *Advanced Science and Technology Letters*, 143(AST 2017), 230-234. <https://doi.org/10.14257/astl.2017.143.46>
- McCarron, G. P., Jackson, G. R., McNaughtan, J. L., Olesova, L., Schmidt, G. B., & Adams, T. T. (2020). Centering dialogic and digital approaches in leadership education pedagogy: Priority 6 of the National Leadership Education Research Agenda 2020–2025. *Journal of Leadership Studies*, 14(3), 72-77. <https://doi.org/10.1002/jls.21716>
- McRay, J., Goertzen, B., & Klaus, K. (2016). Student-moderated discussion boards in a graduate online course. *Journal of Leadership Education*, 15(1), 150-160. <https://doi.org/10.12806/v15/i1/a6>

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.

Munshi, M., Kuril, S., Sharif Khan, D., Shrimali, T., & Gaur, S. (2019). Strategic evolution from confinement of face to face learning and shift to online learning. *International Educational Applied Research Journal*, 3(10), 32–38.

O'Keefe, S., & Meeker, C. (2019). *Career readiness through leadership education* [Audio Podcast]. National Association of Student Personnel Administrators (NASPA). Retrieved from <https://soundcloud.com/user-606900324-709612745/episode-58-career-readiness-through-leadership-education>

Owen, J. E. (Ed.). (2015). Innovative learning for leadership development. *New Directions for Student Leadership*, (No. 145). Wiley.

Perrotta, K. (2020). Getting HIP: A study on the implementation of asynchronous discussion boards as a high-impact practice in online undergraduate survey history courses. *The Journal of Social Studies Research*, 44(2), 209-217. <https://doi.org/10.1016/j.jsr.2020.02.001>

Peterson, A. T., Beymer, P. N., & Putnam, R.T. (2018). Synchronous and asynchronous discussions: Effects on cooperation, belonging, and affect. *Online Learning*, 22(4), 7-25. <https://doi.org/10.24059/olj.v22i4.1517>

Purcell, J. W. (2017). Community-engaged pedagogy in the virtual classroom: Integrating eService-learning into online leadership education. *Journal of Leadership Studies*, 11(1), 65-70. <https://doi.org/10.1002/jls.21515>

Rose, S., Spinks, N., & Canhoto, A. I. (2015). *Management research: Applying the principles*. Routledge.

Roseth, C. J., Saltarelli, A. J., & Glass, C. R. (2011). Effects of face-to-face and computer mediated constructive controversy on social interdependence, motivation, and achievement. *Journal of Educational Psychology*, 103, 804-820. <https://doi.org/10.1037/a0024213>

Rost, J. C., & Barker, R. A. (2000). Leadership education in colleges: Toward a 21st century paradigm. *Journal of Leadership Studies*, 7(1), 3-12. <https://doi.org/10.1177/107179190000700102>

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.

Schindler, L.A., & Burkholder, G.J. (2014). Instructional design and facilitation approaches that promote critical thinking in asynchronous online discussions: A review of the literature. *Higher Learning Research Communications*, 4(4), 11-29. <https://doi.org/10.18870/hlrc.v4i4.222>

Smith, D. N. (2015). Effectively using discussion boards to engage students in introductory leadership courses. *International Journal of Leadership in Education*, 14(2), 230-237. <https://doi.org/10.12806/v14/i2/ab3>

Ulum, Ö. G. (2016). A descriptive content analysis of the extent of Bloom's taxonomy in the reading comprehension questions of the course book Q: Skills for success 4 reading and writing. *The Qualitative Report* 21(9), 1674-1683. <https://doi.org/10.46743/2160-3715/2016.2172>

Waters, J. (2012). Thought-leaders in asynchronous online learning environments. *Journal of Asynchronous Learning Networks*, 16(1), 19-33. <https://doi.org/10.24059/olj.v16i1.219>

Williams, L., & Lahman, M. (2011). Online discussion, student engagement, and critical thinking. *Journal of Political Science Education*, 7(2), 143-162. <https://doi.org/10.1080/15512169.2011.564919>

Yang, D., Richardson, J. C., French, B. F., & Lehman, J. D. (2011). The development of a content analysis model for assessing students' cognitive learning in asynchronous online discussion. *Educational Technology Research and Development*, 59(1), 43-70. <https://doi.org/10.1007/s11423-010-9166-1>

Xie, K. & Ke, F. (2011). The role of students' motivation in peer-moderated asynchronous online discussions. *British Journal of Educational Technology*, 42(6), 916-930. <https://doi.org/10.1111/j.1467-8535.2010.01140.x>

Appendix A

Student-Created Ethical Leadership in the News Discussion Questions by Week

Week	Discussion Question Prompt	Question Type
Week 4	Q1: How can leaders of organizations clarify their mission and values, to make it clear that they are an ethical organization, and ethics is not negotiable?	Exploration
	Q2: In your own words, explain why it is important to lead ethically in your personal life to lead ethically in a professional context.	Exploration
	Q3: Knowing that the religious beliefs of the supreme court judges influence their character and knowing that majority of our supreme court judges are making decisions based on their religious convictions, do you think their decisions will be truly ethical and for the good for the majority of the country?	Exploration
	Q4: Can you recall a time where you were in a position of leadership and had to decide while remaining objective? Do you believe it is possible to always put aside our own personal bias?	Application
Week 8	Q1: Do you have moral courage? If so, how did you learn to use moral courage? For example, did you discuss it with someone and wanted to be better, did you look up to someone growing up or have a role model, and/or did you learn by just practicing it or by learning about it?	Exploration
	Q2: If you were a business leader running your own company, how would you use the Ethical Leaders Decision Tree? For what type of decisions? All ethical decisions? Some ethical decisions? Explain why.	Application
	Q3: Out of the five different approaches of ethical standards that we should use, which one do you think is the best and most useful approach and why? Have you found yourself using one of these approaches in your life? If so, when?	Application
	Q4: Given all three stories in the article, do you agree with the author's responses? If not, what would you have done in each story, and why do you disagree or agree?	Application
Week 13	Q1: In the article from Fast Company, which leader do you resonate with most, and why, and which leader's actions do you least agree with, and why?	Exploration
	Q2: Based on Maxwell's Chapter 7 and the Crucibles of Leadership reading, is it possible for organizations to simultaneously enact the Midas Touch and the four skills of leadership? If so, how can these organizations do so effectively?	Application
	Q3: Do you think it is possible to become a better leader after a crucible in one's life? Please explain your reasoning.	Application
	Q4: What is your definition of ethical leadership-based Maxwell's conclusion? What other course connections can you draw to support your answer?	Exploration

Student Participation and Interaction in Online Case-Based Discussions: Comparing Expert and Novice Facilitation

Yishi Long

Adrie A. Koehler

Purdue University, USA

Abstract

Discussion is an essential component in case-based learning (CBL), as it offers students the opportunity to consider diverse perspectives, clarify confusion, and construct understanding. As a facilitator bears most of the responsibility for the overall success of CBL, understanding how facilitation strategies influence interactions during discussions is worthwhile. However, previous CBL facilitation research has primarily considered student perspectives during case discussions, without examining relationships between facilitator experience and student interaction and participation. This study combined social network analysis and content analysis to compare the structure of expert and novice instructors' discussion posts and to consider their relationship to student participation and interaction in online case discussions. Results showed that both the expert and novice instructors used facilitation strategies involving social congruence, cognitive congruence, and content expertise frequently in the discussions; however, when and how they used a combination of these strategies was noticeably different. These differences influenced student interaction. More specifically, students tended to interact with others more actively and densely as a result of questions initiated by the expert facilitator. Suggestions are provided for novice facilitators.

Keywords: instructor facilitation, student participation and interaction, case-based discussions, social network analysis

Long, Y., & Koehler, A. A. (2021). Student participation and interaction in online case-based discussions: Comparing expert and novice facilitation. *Online Learning*, 25(4), 220-246.
DOI: 10.24059/olj.v25i4.2901

Case-based learning (CBL) is widely used to prepare instructional design (ID) learners to develop problem-solving and decision-making skills (Ertmer & Koehler, 2014, 2015, 2018; Koehler et al., 2019). It situates learning in authentic, complex contexts and prompts students to identify case problems and propose solutions (Ertmer & Koehler, 2014). Students commonly struggle with case problems because they are ill-structured, include ambiguous details, and have multiple potential solutions (Jonassen, 2011). Therefore, discussions are considered an important part of CBL, as they offer learners a place to collaboratively make sense of the complexities involved with cases and promote students' problem solving and higher-order thinking (Ertmer & Koehler, 2014; Ertmer & Stepich, 2002; Yew & Schmidt, 2012). Through case discussions, students work with peers and their instructor to share perspectives, offer suggestions, and engage cognitively in developing deeper understandings of case problems and solutions (Ertmer & Koehler, 2018).

To gain the most from case discussions, instructors must embrace a facilitator role, guiding students through the problem-solving process and sharing the direction of the learning process with students, who are responsible for co-constructing their understanding (Ertmer & Koehler, 2015; Hmelo-Silver, 2004). Therefore, instructor facilitation is essential in creating well-functioning case discussions and supporting students' efforts to solve different kinds of problems (Hemlo-Silver & Barrows, 2006; Rico & Ertmer, 2015; Yew & Yong, 2014). Although research has established the importance of instructor facilitation in generating and maintaining student interaction during case discussions, little consideration has been given to how discussion outcomes differ across expert and novice instructors. In this study, we used social network analysis (SNA) to identify the discussion structures and interaction among the instructors and students (Yang et al., 2017) and content analysis (Hara et al., 2000) to investigate and compare expert and novice instructors' facilitation methods (De Laat et al., 2007). By using these methods, we are able to compare differences in student interaction and participation in case discussions resulting from the efforts of a novice and an expert facilitator and offer insight into how specific facilitation strategies can be used to improve case discussions.

Literature Review

Case-based Learning

As a student-centered pedagogical approach, CBL is consistent with constructivist learning principles, using real-world problems to foster students' deep analysis and problem solving (Ertmer & Koehler, 2014). In problem-centered approaches, like CBL, students analyze complex problems with multiple potential solutions, and gain knowledge that is transferable to future situations (Hmelo-Silver, 2004). Finally, ill-structured case problems simulate real-world situations offering learners an opportunity to develop professional skills (e.g., problem solving) in a safe and engaging way (Tawfik & Jonassen, 2013).

Generally, problem-solving has been described as a process comprising two main steps: problem finding and solution generation (Hmelo-Silver, 2004). However, developing problem-solving skills is difficult for learners, and five challenges students commonly face during problem-centered learning experiences include: limited domain knowledge and disconnection between prior knowledge and case scenarios; high cognitive load when synthesizing relevant information; lack of extensive analysis of problem representation; an inaccurate judgment of a solution plan; and low intrinsic motivation (Law et al., 2020). To combat these difficulties during CBL experiences, discussions offer learners a place to support the conceptualization of problems

and development of solutions when considering authentic and ill-defined problems (Ertmer et al., 2017; Goeze et al., 2014; Rico & Ertmer, 2015). Specifically, online discussion in CBL engages students in the development of active knowledge construction, enhances student performance in analytical and problem-solving skills, and prompts students' coverage of an afforded problem space (Ertmer & Koehler, 2014, 2015). To prepare for and maximize the benefits of discussions, students are often required to read and analyze a case by individually completing a case analysis beforehand (Ertmer et al., 2017).

According to Rico and Ertmer (2015), an instructor must assume a facilitator's role in online case discussions to support students' knowledge construction and co-construction in problem solving. (Note: Given the expectation that an instructor in problem-centered instruction is a facilitator of student learning, we use the words "instructor" and "facilitator" interchangeably.) Facilitation of online discussions include structuring the initial discussion prompt to address the problem space (Ertmer & Koehler, 2015); probing students' investigations and interaction (Ertmer & Koehler, 2014); and bringing closure to the case discussion (Rico & Ertmer, 2015).

Instructor Facilitation

Although meaningful ill-structured problems have the potential to engage learners and prompt collaboration, they do not guarantee effective discussions will ensue (Hmelo-Silver, 2004). The facilitator must scaffold the discussion by supporting students' conceptual understanding, moving students from problem identification to solution generation, and promoting students' willingness to participate and interact actively (Ertmer & Koehler, 2014). In the absence of a dedicated facilitator, students tend to discuss case issues at a surface level, miss key case aspects, and focus on generating solutions without fully understanding problems (Ertmer & Koehler, 2015). In short, "the core of case teaching—and most of the art of it—lies in managing the students' discussion" (Andersen & Schiano, 2014, p. 66). With the nature of case problems as their focus, Schmidt and Moust (1995) proposed a framework characterized an effective facilitator as using strategies in three major areas: use of expertise (possessing relevant content knowledge), social congruence (interacting with students informally and showing an attitude of caring), and cognitive congruence (presenting content in an understandable manner).

Previous research supports the need for facilitators to be content experts, demonstrating a relationship between a facilitator's subject-matter experience and student academic performance and satisfaction (Schmidt, 1994; Schmidt et al., 1993). Facilitators with relevant domain knowledge can more readily use their expertise to meaningfully scaffold learners with limited experience and to address misconceptions (Schmidt, 1994). In online case discussions, content expertise is associated with prompting students to think deeply, clarifying content and providing examples, asking students for clarification, and emphasizing the focus of the content being discussed (Ertmer & Koehler, 2015).

In addition, research underscores the significance of facilitators' social congruence in actively engaging students and establishing a non-threatening learning environment, which can lead to a deeper understanding of students' feelings and difficulties and offer more effective guidance (Chng et al., 2011; Kassab et al., 2006; Schmidt & Moust, 1995). Chng et al. (2011) suggested that students showed more positive learning attitudes when interacting with a more socially congruent facilitator. Specifically, social congruent instructors implement affective (e.g., disclosing information from their background), cohesive (e.g., addressing student posts by name), and interactive (e.g., inviting all students to respond) strategies when facilitating online discussions (Watson et al., 2018).

Finally, cognitive congruence is an important attribute of effective problem-centered instructors (Yew & Yong, 2014). Cognitive congruence refers to facilitators' ability to present content and explain things in easily understood ways (Shmidt & Moust, 1995). Previous research suggests that student instructors, as compared to faculty instructors, were more cognitively congruent because they better understood problems facing students and proposed more easily understood probing questions when responding to peers (Dolmans et al., 2002; Schmidt et al., 1994). In online discussions, cognitive congruence methods include emphasizing relevant ideas, directing students' attention, and providing a summary of key ideas being discussed (Watson et al., 2018).

During facilitation of problem-centered environments, using a combination of social congruence, content expertise, and cognitive congruence facilitation strategies is important (Watson et al., 2018; Yew & Yong, 2014). While these skills are essential, novice instructors may have challenges utilizing strategies to effectively guide and support students. For instance, they may be inflexible and tend to stay close to their lesson plans, limiting students' opportunities to be exposed to other ideas (Berliner, 2001). Additionally, some research suggests that the frequency of instructor interaction in online discussions has no significant impact on students' progress and achievement (see Hoey, 2017). Therefore, facilitators in problem-centered environments need to "identify who needs support, what kind of support, when to provide support, and how to provide support" (Law et al., 2020, p. 333).

The Use of Social Network Analysis to Explore Participation and Interaction

While effective facilitation is established as an important element of a meaningful online CBL experience, determining the impact of facilitation can be challenging. As an emerging approach, SNA offers a way to gain insight into the interactions taking place during CBL. According to Breiger (2004), SNA is "the disciplined inquiry into the patterning of relations among social actors, as well as the patterning of relationships among actors at different levels of analysis (such as persons and groups)" (p. 507). It is commonly used to analyze a human network structure and the positions (e.g., active, peripheral, outsider) of people within the network (Carolan, 2014).

In online learning, SNA has served as an effective method to understand the structure of a network and the position of participants within the network, identify and analyze interaction patterns, and improve learning community design (Cela et al., 2015). A social network has two fundamental elements: nodes (participants) and edges (connections across these nodes) (Yang et al., 2017). For instance, in an online discussion, the nodes are students and instructors, and the edges, which may be directional, are connections between the individuals in the discussion network. SNA can measure how much individuals engage in the discussions at a network-level and node-level. At the network-level, density is the number of edges in a network divided by the total possible number of edges, which is used to describe how connected a network is (Carolan, 2014). At the node-level, several centrality measures can be made, with the most commonly used indicators being degree centrality, betweenness centrality, and closeness centrality (Yang et al., 2017).

De Laat et al. (2007) used density and degree centrality metrics to study the dynamics of participants' interaction and how well they connected in the discussions. Findings showed that students with a high value of degree centrality are active, and students with the highest value of degree centrality are central participants in the discussions. Erlin et al. (2009) applied the betweenness and closeness centrality metrics to an online discussion to monitor and evaluate 12

graduate students' participation. They found that students with high values of betweenness and closeness centrality quickly interact with others and tend to receive information flowing through the network quickly. In considering the relationship between instructor involvement and student interaction in online discussions, Doran et al. (2011) suggested tracking instructors' betweenness and centrality measures across different forums to see if student interaction changes accordingly. They indicated that intensive instructor involvement may decrease student involvement and vice versa.

Purpose

While the importance of instructor facilitation in problem-centered discussions has been established (Ertmer & Koehler, 2015; Schmidt & Moust, 1995; Yew & Yong, 2014), little is known regarding the differences in expert and novice discussion posts *and* how these differences influence student participation and interaction in case discussions. Specifically, we used SNA to examine student participation and interaction in relation to instructor facilitation level (expert vs. novice) across multiple case discussions, and then, we analyzed instructor discussion posts based on social congruence, cognitive congruence, and content expertise (Watson et al., 2018; Schmidt & Moust, 1995; Yew & Yong, 2014) to aid the understanding of student interactions. The following questions guided our research:

1. How does differing facilitation between an expert and novice instructor relate to student participation and interaction in online case discussions?
2. What are the differences in the structures of discussion posts between an expert and novice instructor in online case discussions?

Methods

Research Design

Although SNA provides an effective way for examining the interactions taking place in an online discussion and relationships among participants, this approach does not provide insight into the reason these interactions and relationships are forming. To understand the relationship between instructor facilitation efforts in an online case discussion and learners' participation and interaction, SNA alone was not sufficient. Therefore, we used a mixed-method social network analysis (MMSNA) (Froehlich et al., 2020) to triangulate quantitative SNA data with content analysis to gain a rich and deep understanding of the differences between expert and novice instructor facilitation styles and their influence on student participation and interaction in case discussions. The definition of MMSNA associates mixed methods, combining quantitative and qualitative research components (Johnson et al., 2007) and focusing on collecting, analyzing, and integrating quantitative and qualitative data in a study to enhance the breadth and depth of understanding (Froehlich et al., 2020). Quantitative data, in the form of the number of students' and instructors' discussion posts, were used to map the discussion structures and demonstrate interaction among the instructors and students. Qualitative data (instructors' discussion posts and case discussion summaries) were analyzed to deepen understanding of discussion structures and compare the differences between expert and novice instructors' facilitation methods and their impact on student interactions.

Research Context

Data were collected from an online graduate-level core course (Advanced Practices in Learning Systems Design) at a large Midwestern university during fall 2018. The course was designed to assist students in developing instructional design (ID) skills using a case-based approach. As ID represents a typically collaborative activity, a key aspect of the course included

asynchronous discussions to prompt interaction and draw out learners' varying expertise and backgrounds.

During the eight-week course, learners completed three instructor-facilitated case discussions. Prior to these discussions, students submitted a case analysis assignment individually (due by Monday morning) to describe key stakeholders, identify and prioritize case challenges and limitations, and create and evaluate proposed solutions prior to participating. Case assignments were designed to prepare them to participate in the upcoming discussions. Discussions opened Monday morning and ran through Saturday afternoon. When each discussion concluded, instructors returned individual feedback on case analyses. Discussion prompts focused attention on key design challenges and constraints in the first half of the week. In the second half of the week, students were prompted to discuss solutions that addressed previously identified design challenges. Both instructors facilitated the same discussion among the same students and provided comments that were viewable by everyone to encourage interaction. Additionally, while instructors had regular meetings to discuss course facilitation efforts, specific frequencies of posts were not set. At the end of each week, one instructor provided a case discussion summary to all students. To receive full discussion points, besides the initial posts, each student was required to create 4 to 5 substantive responses, well distributed throughout the week.

Participants

Participants included an expert CBL instructor, a novice CBL instructor, and 12 graduate students enrolled in the course (2 male, 10 female; 10 M.S. students, 2 Ph.D. students). As this was an advanced course in the online program, at a minimum, learners had completed five courses prior to this course, all requiring participation in online discussions. Moreover, ten students had previously worked or were working in K–12 and higher education, while the other two had professional experience in IT industries. Seven students had participated in CBL in previous work, while five individuals had no experience with CBL. The expert instructor had more than ten years of online teaching experience in higher education and nine years of experience using a case-based method in both face-to-face and online settings. Specifically, she had facilitated an online version of the course four times and previously implemented other case learning experiences as a high school teacher and an undergraduate instructor. The novice instructor had previously completed the course in a face-to-face format but had never taught online or facilitated case discussions. Previously, she was a teaching assistant for an undergraduate educational technology course that used CBL, but she was not responsible for facilitating discussions.

Data Collection

Across the three instructor-facilitated case discussions (IF1, IF2, and IF3), we collected posts made by the students ($n = 442$), the expert instructor ($n = 41$), and the novice instructor ($n = 35$) from Blackboard Learn. Out of the 518 total posts in the forums, IF1 had 150 posts, IF2 had 161 posts, and IF3 had 207 posts. The expert instructor's posts comprised 7.9%, the novice instructor's posts comprised 6.8%, and the students' posts comprised 85.3% of the overall discussion. We also collected two case discussion summaries the expert CBL instructor provided for IF1 and IF2 and one case discussion summary the novice CBL instructor provided for IF3. The three instructor discussion summaries were excluded from the interaction matrix because they were posted at the end of the discussion to bring closure to the conversation, with no expectation of generating additional posts from students.

All participant identities were removed prior to analysis to protect confidentiality. Students were labeled as S1 to S12. The expert instructor was labeled T1, and the novice instructor was labeled T2.

Data Analysis

To prepare the data for SNA, we created an interaction matrix among the participants, and to consider interactions among participants, we connected a discussion reply to the previous post when a participant's or several participants' names were mentioned. For example, if one discussion post mentioned several participants' names, we viewed this post as one message that went to several participants and attributed to the frequency of different receivers. If a reply did not include a specific receiver's name, we labeled it as a response to the individual post hierarchically above the reply to avoid losing connections among the participants. Students' initial posts to respond to the expert instructor's discussion prompts in each discussion were excluded in the interaction matrix because they did not capture interaction among participants. Instead, these initial discussion posts were viewed as a participation requirement for everyone, rather than how they chose to interact with others.

Second, we examined student participation and interaction and instructor facilitation quantitatively using an open-source network exploration and manipulation software called Gephi (Bastian et al., 2009). We used Gephi to calculate centrality values at each participant's interaction level (see Table 1), the density of the three case discussions, and to map the visualization of each discussion network (see Figure 1).

Finally, we applied a deductive approach to analyze and code the instructors' discussion prompts, facilitation posts, and discussion summaries to further explain quantitative analysis results. Specifically, we used an established coding scheme for examining instructors' efforts in online settings (Richardson et al., 2015). This scheme has been adapted and applied in online CBL research to provide a comprehensive consideration of meaningful facilitation (Watson et al., 2018), as aligned with an established framework capturing areas of effective facilitation (i.e., social congruence, cognitive congruence, and content expertise [Schmidt & Moust, 1995]). For example, we identified that both instructors applied the use of social congruence (e.g., acknowledging student ideas, addressing student posts by mentioning their names), cognitive congruence (e.g., clarifying ideas, emphasizing and stressing important ideas, directing student attention), and content expertise (e.g., using direct question after reviewing student responses) (see Table 2). Typically, a single instructor post included multiple strategies (see Table 3). We also totaled the frequencies for each code for the two instructors to capture potential differences across the structure of instructor posts (see Appendix A).

Validity and Reliability

We collected the data through three sources (i.e., instructor posts, instructor interaction frequencies, and student participation and interaction frequencies), and analyzed the data using two techniques (SNA and content analysis) to strengthen validity and reliability. Moreover, we utilized relevant studies as a foundation to enhance internal reliability. For instance, we used a widely known coding scheme to investigate effective CBL facilitation. Lastly, we coded case discussions and the instructors' discussion summaries independently and discussed divergent interpretations to reach consensus (Creswell, 2014).

Measures of Network and Participant Level Interaction

Network Density. The ratio of the actual edges in a network to the total possible edges was used to show how students were connected in each instructor-facilitated discussion. The value of density varies between 0 and 100%. We used the density metric to show how dense each

case discussion was. The more participants connected to one another in the discussion, the higher the density value is.

Degree Centrality. The degree centrality is the total connections a participant had in the discussion. We used it to uncover the most connected participants, indicating the participants who received from and sent out the largest number of messages to others in the discussion.

In-degree Centrality. The in-degree centrality is the number of replies a participant received from other participants in the discussion. Receiving the highest number of messages could be regarded as a sign of popularity or prestige.

Out-degree Centrality. The out-degree centrality is the number of replies a participant sent out to others. Participants who sent out the largest number of messages were identified as influential participants because they made others aware of their perspectives.

Betweenness Centrality. The betweenness centrality is the number of times a participant lay on the path connecting all other participants. A participant with the highest betweenness centrality indicates that he or she had the most control over the discussion because the information would need to pass through him or her. We used the betweenness centrality to uncover who served as a bridge to influence the flow of the discussions.

Closeness Centrality. The closeness centrality is a measure of the distance between each participant and others in the discussion. Participants with high closeness centrality value means that their messages could go quickly to all other participants. We used the closeness centrality to find which participants were most reachable to participants than any other participants.

Results

Frequency of Instructor Facilitation and Student Participation and Interaction

To show the overall connections among the participants in the three instructor-facilitated case discussions (IF1, IF2, and IF3), we calculated the density values. Results show that the discussion density from IF1 to IF3 were 35.7%, 48.4%, and 53.8%, respectively, indicating a gradual increase from IF1 to IF3, and the overall interaction levels peaked during IF3.

To explore how the two instructors interacted with the students in each discussion, we started by determining the centrality values for each participant and presenting the visual representation of the discussion (see Figure 1). As illustrated in Table 1, centrality measures provided a way to consider participant interactions across the three discussions by capturing the number of connections per participant (degree centrality), the number of replies received (in-degree centrality), the number of responses to others' posts (out-degree centrality), the influence a participant had on the discussions (betweenness centrality), and the reach of a participant's message (closeness centrality). In IF1, in-degree and out-degree centrality measures indicated that both instructors were active facilitators to make sure students were interacting with others. However, neither instructor was the most central or influential participant. Instead, students S7 and S12 had the highest in-degree centrality values of 9, indicating that they were in the prominent positions in the discussion. Students S7 and S8 had the highest out-degree centrality values of 8, suggesting that they were the most influential in making others aware of their opinions in the discussion. On the other hand, students S1 and S10 had the lowest out-degree centrality values, indicating that they contributed minimally. The betweenness and closeness scores for the expert instructor T1 and novice instructor T2 were above the mean and median scores for the students, thereby indicating that the instructors played an essential role in connecting different students and transmitting information quickly. Specifically, the novice

instructor T2 had the highest betweenness centrality value, indicating that she was the gatekeeper and could control the communication flows.

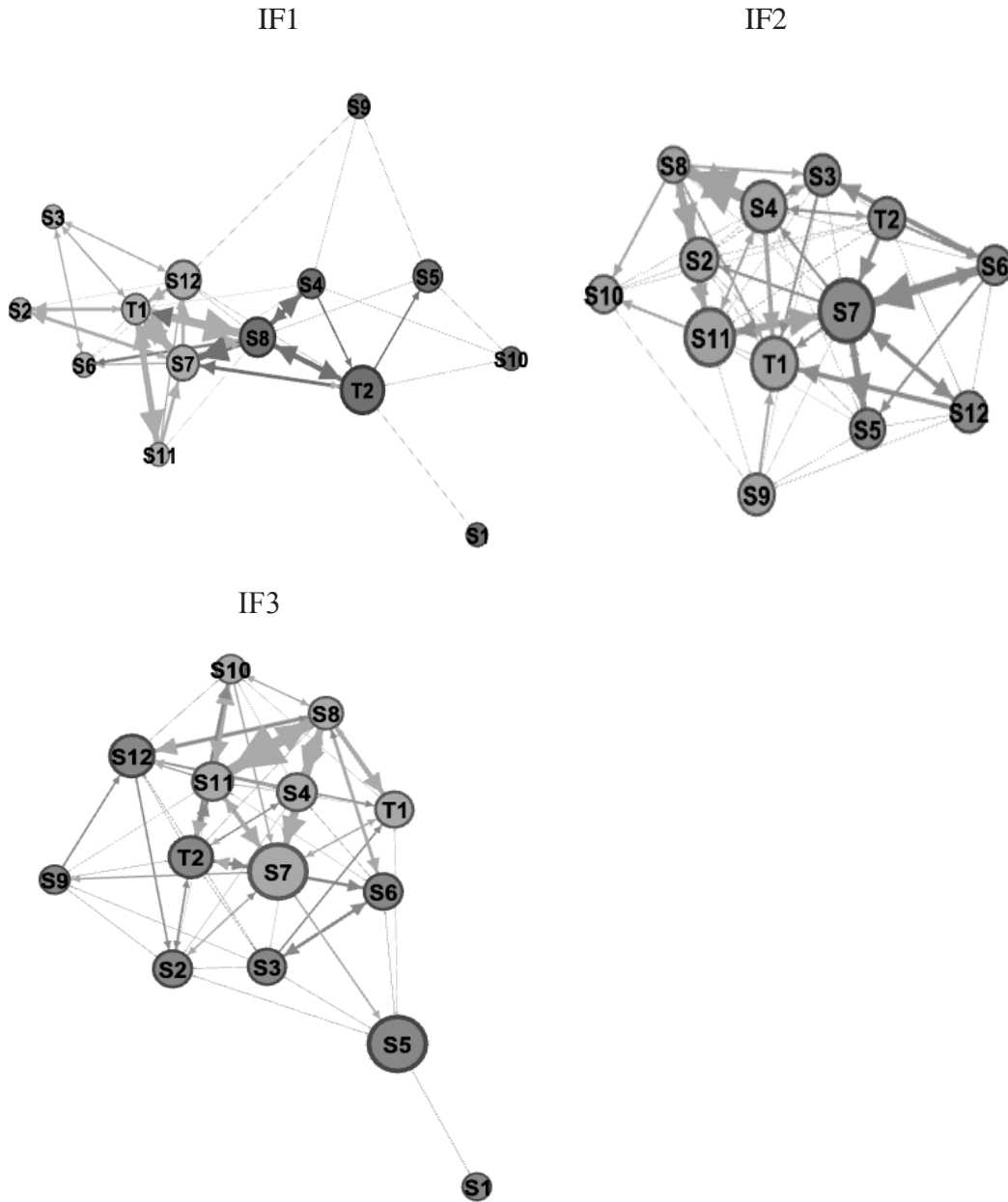
In IFI visualization, all students were involved to some extent, and the participants formed two dense subgroups. Participants in each group were more closely connected among each other than to others in another group. Each instructor was in one group to communicate with students. Visibly, instructor T1 formed a dense group to facilitate interaction with students S2, S3, S6, S7, S11, and S12, while instructor T2 prompted relative sparse connections among students S1, S4, S5, S8, S9, and S10. Students S1, S5, S9, and S10 were positioned away from the center of the discussion and were all in the novice instructor T2's group. Based on the visualization, the novice instructor T2 failed to engage less-active students (e.g., students S1, S5, S9, and S10) to participate more in the discussion.

Beginning in IF2, the number of general interactions increased. The most substantial contributors were students, such as students S4 and S11 who had the highest number of out-degree centrality values of 9. Moreover, student S9's interaction levels improved dramatically in IF2, which was evidenced by her degree centrality values. The expert instructor T1 maintained a balance between in and out degree centrality with a score of 8, with high values of betweenness centrality value of 8.25 and closeness centrality score of 0.75 to prompt the whole discussion forward. The novice instructor T2 had an out-degree centrality value of 7 and an in-degree centrality metric of 4, suggesting that she was a less prominent facilitator to interact with in the discussion. Her betweenness centrality value dropped vastly from 35.71 in IF1 to 4.2 in IF2, indicating that she moved away from the center in connecting students. Rather, student S7 had an in-degree centrality value of 11 and held the highest betweenness centrality value of 11.84, suggesting that she was the broker, bridging unconnected students in the discussion.

Table 1
Centrality Measures of Instructors and Students across the Three Case Discussions

	Participant	Degree	In-degree	Out-degree	Betweenness	Closeness
IF1	T1	15.00	7.00	8.00	10.94	0.71
	T2	13.00	7.00	6.00	35.71	0.67
	S1	1.00	0.00	1.00	0.00	0.42
	S2	6.00	3.00	3.00	0.00	0.48
	S3	7.00	3.00	4.00	0.25	0.50
	S4	10.00	5.00	5.00	8.76	0.60
	S5	6.00	2.00	4.00	12.64	0.55
	S6	9.00	5.00	4.00	1.80	0.55
	S7	17.00	9.00	8.00	17.87	0.71
	S8	15.00	7.00	8.00	22.98	0.75
	S9	3.00	1.00	2.00	1.03	0.52
	S10	4.00	3.00	1.00	0.00	0.41
S11	8.00	4.00	4.00	0.20	0.55	
S12	16.00	9.00	7.00	22.81	0.67	
IF2	T1	16.00	8.00	8.00	8.25	0.75
	T2	11.00	4.00	7.00	4.20	0.71
	S1	0.00	0.00	0.00	0.00	0.00
	S2	15.00	9.00	6.00	4.75	0.67
	S3	14.00	7.00	7.00	3.94	0.71
	S4	17.00	8.00	9.00	7.65	0.80
	S5	11.00	7.00	4.00	3.42	0.57
	S6	10.00	5.00	5.00	3.12	0.63
	S7	19.00	11.00	8.00	11.84	0.75
	S8	14.00	7.00	7.00	1.94	0.71
	S9	10.00	4.00	6.00	3.90	0.67
	S10	11.00	5.00	6.00	2.47	0.67
S11	18.00	9.00	9.00	9.77	0.80	
S12	10.00	4.00	6.00	3.76	0.67	
IF3	T1	13.00	6.00	7.00	4.55	0.68
	T2	19.00	9.00	10.00	7.43	0.76
	S1	1.00	1.00	0.00	0.00	0.00
	S2	13.00	8.00	5.00	4.91	0.62
	S3	13.00	5.00	8.00	4.56	0.72
	S4	18.00	9.00	9.00	5.34	0.72
	S5	11.00	5.00	6.00	14.41	0.65
	S6	14.00	7.00	7.00	4.70	0.68
	S7	20.00	10.00	10.00	14.41	0.81
	S8	16.00	8.00	8.00	2.69	0.68
	S9	10.00	5.00	5.00	0.72	0.59
	S10	13.00	7.00	6.00	0.74	0.62
S11	18.00	9.00	9.00	5.84	0.72	
S12	17.00	9.00	8.00	7.71	0.68	

Figure 1
 Visualization of participant interaction across the three case discussions



Note. The node color is associated with the subgroup, and the edges are represented in the corresponding colors. An arrow showed each edge from the sender to the receiver. The node size is associated with betweenness centrality values. The more interaction between the nodes, the thicker the edge is.

As illustrated in Figure 1, two connected subgroups were formed in IF2, and each instructor was in one of the groups. Student S1 did not participate in this discussion, thus having no interaction with others and not showing in the visualization. In the expert instructor T1's group, she found marginal students S9 and S10 of IF1 and interacted with them. The novice instructor T2 had a more densely connected group than IF1, but she lost the central position in connecting students. The number of students she connected with decreased from nine in IF1 to five in IF2. Since her responsiveness decreased, student S7 tended to be highly connected with others.

As the course progressed, IF3 showed the highest level of interaction. Both instructors continued interacting with students to move the discussion forward, which was represented by their above-mean betweenness centrality scores. However, neither of them coordinated interaction among all the participants. Student S7 had the highest betweenness and closeness centrality values of 14.41 and 0.81, respectively, indicating that she could influence the flow around IF3 and quickly make her posts reach others.

Two connected groups were formed in IF3, and each instructor was in a group. As Figure 1 displays, the expert instructor T1 formed a dense group to facilitate interaction with students S4, S7, S8, S10, and S11, while the novice instructor T2 facilitated relative sparse connections among students S1, S2, S3, S5, S6, S9, and S12. There were no isolated students during IF3 because all participants had at least one direct communication with another participant. However, student S1 was extremely peripheral, not contributing to the discussion productivity. She received one comment from student S5, but she did not respond.

Across the case discussions, both instructors maintained their role as facilitators, but they did not play the central role of information diffusion after helping students become comfortable with case discussions at the beginning of the course. This facilitation method helped improve interaction among students. As the instructors took a step back in discussions, some students, for example, student S7, started to embrace the key facilitator role in IF2 and IF3.

Structures of Instructor Facilitation Artifacts

To have a clear understanding of how the two instructors facilitated the three discussions and interacted with students, we examined instructor posts in the three discussions separately. The expert instructor T1 made 41 posts and the novice instructor T2 made 35 posts. More specifically, analysis of instructor T1's discussion posts resulted in a total of 176 indicators (Social Congruence = 109, 61.9%; Cognitive Congruence = 29, 16.5%; Content Expertise = 38, 21.6%); and analysis of instructor T2's discussion posts resulted in a total of 192 indicators (Social Congruence = 127, 66.2%; Cognitive Congruence = 39, 20.3%; and Content Expertise = 26, 13.5%).

Across the three discussions, instructor T1 demonstrated more expertise, but she used less social and cognitive congruent strategies than instructor T2. The totaled frequencies for each code of the two instructors revealed the top 10 facilitation strategies used by them. Seven methods appeared to be the same: (1) acknowledging student ideas, (2) addressing student posts by mentioning their name, (3) showing enthusiasm about student discussion posts, (4) using direct questions after reviewing student responses, (5) directing student attention, (6) clarifying ideas, and (7) greeting students. Four of these strategies related to social congruence, two related to cognitive congruence, and one related to content expertise. For the other three most observed facilitation strategies, instructor T1 used two related to content expertise (tempering instructor expertise to promote a non-authoritative environment and prompting and structuring the direction of the discussion) and one pertaining to social congruence (inviting students to join and

contribute to the discussion). Instructor T2 commonly used two social congruence strategies (encouraging students and using emotions to indicate feelings) and one cognitive congruence strategy (emphasizing and stressing important ideas). That is, for the three different strategies, instructor T1 applied content expertise and social congruence strategies to deepen students' learning in a non-threatening environment. Instructor T2 used social congruence and cognitive congruence strategies to encourage and support students to emphasize relevant ideas shared (see Table 2 for the top 10 strategies used by each instructor).

When making a post, the expert instructor T1 more frequently invited all students to continue the discussion to stimulate interaction than the novice instructor T2. In total, instructor T1 invited students to join the ongoing conversation ten times, while instructor T2 only invited students three times. Moreover, both instructors used a combination of facilitation strategies for most posts, but their combined methods differed. Specifically, the most observed facilitation strategies that instructor T1 used were a combination of social congruence, cognitive congruence, and content expertise ($n = 11$), and a combination of social congruence and content expertise ($n = 11$). Instructor T2 also used a combination of social congruence, cognitive congruence, and content expertise frequently ($n = 12$), and the second most observed facilitation strategies she used were a combination of social congruence and cognitive congruence ($n = 9$). For instructor T1, she did not include social congruence strategies for the six prompts that she used to provide direction for the discussion. Instructor T2 had one post that was entirely focused on cognitive congruence and content expertise (see Table 3 for typical posts for each instructor).

After each discussion, one of the instructors provided final thoughts to summarize the case discussions and emphasized important and missed case aspects. The expert instructor T1 made a summary for IF1 and IF2. IF1 summary had 31 indicators (Social Congruence = 13, Cognitive Congruence = 14, Content Expertise = 4), and IF2 summary had 20 indicators (Social Congruence = 7, Cognitive Congruence = 14, Content Expertise = 2). The novice instructor T2 made a summary for IF 3, which resulted in 16 indicators (Social Congruence = 10, Cognitive Congruence = 5, Content Expertise = 1). Each instructor utilized strategies related to social congruence, cognitive congruence, and content expertise differently. For instructor T1, the utilization of strategies related to social congruence was less than the sum of cognitive congruence and content expertise. In contrast, instructor T2 primarily relied on social congruence strategies and used this strategy more frequently than the sum of cognitive congruence and content expertise strategies. That is, instructor T2 maintained the same facilitation style in the discussions and summary.

Table 2
Frequency of Top 10 Facilitation Strategies used by Both Instructors in Discussion Posts

Expert Instructor			Novice Instructor		
Facilitation Strategies	Category	Freq.	Facilitation Strategies	Category	Freq.
1. Acknowledging student ideas	Social Congruence	43	1. Acknowledging student ideas	Social Congruence	40
2. Addressing student posts by mentioning their name(s)	Social Congruence	25	2. Showing enthusiasm about student discussion posts	Social Congruence	33
3. Showing enthusiasm about student discussion posts	Social Congruence	20	3. Addressing student posts by mentioning their name(s)	Social Congruence	24
4. Connecting content ideas	Content Expertise	18	4. Emphasizing and stressing important ideas	Cognitive Congruence	15
5. Emphasizing and stressing important ideas	Cognitive Congruence	17	5. Directing student attention	Cognitive Congruence	14
6. Directing student attention	Cognitive Congruence	17	6. Using direct questions after reviewing student responses	Content Expertise	14
7. Clarifying ideas	Cognitive Congruence	12	7. Clarifying ideas	Cognitive Congruence	11
8. Using direct questions after reviewing student responses	Content Expertise	11	8. Encouraging students	Social Congruence	9
9. Referring to the group as “we”, “us”, or “our”	Social Congruence	10	9. Greeting students	Social Congruence	8
10. Inviting students to join and contribute to the discussion	Social Congruence	10	10. Using emotions to indicate feelings.	Social Congruence	7

Table 3
Examples of Typical Posts Made by Both Instructors

Instructor	Example Post with Associated Codes
T1	<p>Amy (<i>SC-Using a student's name</i>), you really nicely capture the various stakeholder perspectives here (<i>SC-Acknowledging a student's idea</i>)! Whether sharing the draft document with Craig was ethical or not, Stan already shared with Craig. So, he does have access to this information (<i>CC-Clarifying a student's misunderstanding</i>). Now, the question is, should he use this and if so, how? Let's think about Stan (and the engineers) a little more – what is their role in this case? Who do they represent (<i>CC-Direct student attention to an important idea</i>)? While Stan seems pretty intent on sharing his opinions for shaping the training, should he have that much said? I'm not saying he should or shouldn't – I just think it is something to consider (<i>E-Tempering instructor expertise</i>)!</p>
T2	<p>This was a powerful and passionate argument, Katie (<i>SC-Using a student's name</i>)! I think you've done a good job representing the blowback that Michael will get from some critics, if he chooses to implement in advanced classes <i>SC-Acknowledging a student's idea</i>. I wonder if/how Michael could reconcile himself to this type of criticism – should he be forced to implement in advanced classes, etc. (<i>E-Direct questioning of student response</i>). It is emotionally difficult to hear criticisms of 'elitism' (<i>CC-Direct student attention to an important idea</i>)!</p>

Note. SC: social congruence; CC: cognitive congruence; E: content expertise

Using Facilitation Strategies to Understand Interaction Patterns

Both instructors facilitated the discussions without making the experience entirely instructor-driven; however, students' activeness in the discussions varied because of the difference in instructor facilitation. As Figure 1 shows, students tended to interact more closely with the expert instructor T1 and maintained relatively sparse interactions with instructor T2. The differences in facilitation methods that both instructors used might aid the understanding of the different interaction patterns.

How and *when* each instructor used the facilitation methods was noticeably different. Instructor T1 implemented a combination of the strategies more frequently in IF1, suggesting that she established her instructor role at the beginning of the discussion and modeled how to interact with others for instructor T2. That is, instructor T1 used strategies to stretch students' learning to expand the depth of their understanding. While instructor T2 also used a combination of strategies in IF1, she was not as visible as instructor T1, suggesting that she failed to build her instructor role as someone to interact with. In the following discussions, both instructors continued facilitating with various combinations of strategies, and instructor T2 gradually created closer connections with students in IF2 and IF3 (see Figure 1). Table 4 shows the frequency of strategy combinations for each instructor.

Table 4

Frequency of a Combination of Strategies in Each Discussion

Instructor	IF1			IF2			IF3		
	SC+CC	SC+E	SC+CC+E	SC+CC	SC+E	SC+CC+E	SC+CC	SC+E	SC+CC+E
T1	4	3	9	1	6	0	2	2	2
T2	3	2	4	2	0	4	4	4	4

Note. SC+CC: a combination of social and cognitive congruence; SC+E: a combination of social congruence and content expertise; SC+CC+E: a combination of social congruence, cognitive congruence, and content expertise.

Discussion

In CBL, students are expected to “use old experiences to understand and solve new problems” (Kolodner, 1992, p. 3); however, the application of previous experiences can be challenging (Law et al., 2020). Online case discussions provide opportunities to support students' problem-solving processes (Ertmer & Koehler, 2014, 2015) and use their previous experiences and knowledge to a great extent. From these discussions, students may gain a more complete understanding of case situations and possible solutions. However, these benefits emerge from *productive* discussions, and instructors play an active role in engaging students and using various strategies to facilitate online discussions (Ertmer & Koehler, 2014, 2015). Moreover, as suggested by Doran et al. (2011), intensive instructor involvement may discourage students from responding to one another. We tracked both instructors' centrality measures for the three discussions with varying degrees of involvement to evaluate if students' interactions changed due to instructors' various facilitation levels. The results suggest that when they took a step back in facilitation, the overall student interaction increased, as evident in IF2 and IF3. This is also in line with Rovai's (2007) finding that instructors should avoid being the center of the discussions if they want to see more interaction among students.

Furthermore, our results demonstrated that both instructors used a combination of strategies related to social congruence, cognitive congruence, and content expertise to facilitate the case discussions (Watson et al., 2018), and these three types of facilitation strategies are

interrelated (Chng et al., 2011). However, when we took a closer look at the facilitation strategies that both instructors used in discussions and summaries, the results showed that the expert instructor T1 was adaptive to meet students’ changing needs, while the novice instructor T2 simply used the same strategies when facilitating discussions and bringing closure to the discussion (see Table 5). For example, instructor T1 used a positive tone to express instructor expertise to engage students to think deeply in the discussions and used discussion summaries to help students see connections and emphasize key points that students overlooked in the discussions. This approach is similar to what others have reported. According to Watson et al. (2018), expert facilitators have the skills to adjust their facilitation based on what the students need. Berliner (2001) also emphasized that experts are more flexible than novices. On the other hand, the novice instructor T2 intended to establish an informal relationship with the students and encourage them to interact more in the discussions, but her limited variability in combination with social congruence, cognitive congruence, and content expertise restricted the interactions she was able to facilitate with students.

Table 5
Examples of Discussion Posts and Summaries Made by Both Instructors

Instructor	Example Posts in Discussions and Summaries
T1	<p>Cathy, you’ve shared some great points! I want everyone to think about this some more: “in order to make everyone happy (which I think is very hard), Craig may need to first prioritize which stakeholders are being impacted by the training the most.” Making everyone happy does seem like a pretty challenging task, but hopefully Craig can do that—at least make everyone a little happy! Thinking of this, is there anyone that Craig has to ultimately make happy? In other words, who is the boss? While Electron is the organization he is working within, who hired Craig? What do you all think? [IF1 discussion post]</p> <p>Speaking of the funding agency, this brings up another point worth discussing – stakeholder roles. While I realize you’re still getting the hang of labeling the various individuals involved with a project, a good rule of thumb is to think of the client as the one providing the funding—after all these individuals are providing financial means to make the project happen, want to see a return on their investment, and therefore, get to direct many aspects of the project. [IF2 discussion summary]</p>
T2	<p>Given everything you know about the case: what’s the general ADDIE task (or border between two ADDIE tasks, in some cases…) that you believe the researcher needs to prioritize RIGHT NOW—that is, as of the close of the case—to move forward? (This is how (my instructor) explained to me over time; I struggled with the concept as well! [IF1 discussion post]</p> <p>I remember being frustrated by the idea of building this kiosk that apparently had to do everything for everyone and contain such a bewildering range of content (in my mind). My unhelpful suggestion was that there likely shouldn’t be a kiosk at all, unless MAYBE it had a game on it—and that Lynn should just TAKE OVER THE DESIGN OF THE WHOLE EXHIBIT (from Laura… somehow?), making sure all relevant wetlands information was in the exhibit! [IF3 discussion summary]</p>

Instructor T2 maintained her facilitation efforts by showing understanding towards students’ struggles, but she did not consistently use the discussion as a way to emphasize key ideas mentioned by students, cover missed points, or prompt deeper collaborative consideration of case details. Moreover, instructor T1 commonly used questioning to invite students to join and contribute to the discussion, a strategy less commonly used by the novice facilitator. As

questions during problem-centered experience can greatly influence the learning process (e.g., knowledge construction, interaction [Tawfik et al., 2020]), potentially instructor T1's use of this strategy resulted in differences in network structures. These facilitation differences may help explain why instructor T2 maintained sparse connections with the students across the discussions. Another explanation for instructor T2's sparse connections with students could be the role she established at the beginning of the discussion. While instructor T1 built her instructor role successfully and modeled her facilitation process for instructor T2 in IF1, instructor T2 failed to make students fully aware of her facilitator role. Moreover, instructor T2 was more cognitive congruent across the discussions. This aligns with findings that student facilitators represent more cognitive congruence strategies because they better understand the challenges that are encountered by other students (Dolmans et al., 2002; Schmidt et al., 1994). Perhaps as a first-time instructor of the course, instructor T2 identified more with the student role instead of as a facilitator. If students considered instructor T2 as their peer, they would likely hold back from interacting with her because some students might tend to devalue her facilitation and be reluctant to trust her suggestions (Koehler et al., 2020).

As Figure 1 shows, instructor T2 started to interact with students more closely in IF2 and IF3 than IF1. One potential explanation is that she was better prepared after observing instructor T1's facilitation methods, supporting her to become more comfortable with responding to students' posts when facilitating the discussion. This finding aligns with a meta-analysis indicating that instructors' facilitation abilities were more influential in prompting student learning than content expertise (Leary et al., 2013). Content experts are more directive in problem-centered discussions by correcting students' misconceptions and providing appropriate content-related questions (Schmidt & Moust, 2000); however, facilitation skills can compensate for novice instructors with limited professional expertise. Thus, it is important to develop facilitation skills and avoid being strong only in one area. According to Richardson and Alsup (2015), novices can learn from expert facilitators to sharpen their facilitation skills in online discussions. Also, expert facilitators can model their facilitation process at the beginning of case discussions to scaffold novice instructors.

Another interesting finding of this study relates to how students gradually took the role of the facilitator in IF2 and IF3. Given the general understanding that instructors are not the authoritative source of information and knowledge in CBL, the instructors took a step back in facilitation after they helped the students become familiar and comfortable with case discussions, and this change motivated and left room for students to embrace the facilitator role. Similarly, Hmelo-Silver (2004) suggested that facilitators diminish their scaffolding gradually as students become more experienced with problem-centered learning to encourage students to take the facilitator role. Moreover, Figure 1 from the SNA emphasizes the importance of purposely finding peripheral or marginal students to encourage them to interact more in the discussions. Although instructor T1 maintained interaction with diverse students, most of the students she interacted with were active students in the discussions. One explanation of this approach is that she intuitively targeted students she sensed she could generate the most interaction from. However, linking less engaged students with active students can possibly prompt all students to take ownership in their learning experience.

Limitations and Future Research

All participating students were graduate-level students in an online instructional design course. Whether these findings are applicable and generalizable to other levels (e.g.,

undergraduate) and content areas is unclear. Future research is needed to compare these findings with different levels of students across diverse fields. Second, the relationship between students' attributes (e.g., prior knowledge, previous experience, and motivation) and online case-based discussion participation was not examined. Future research should explore the relationship between student attributes, participation, and interaction in asynchronous case discussions. Third, the quality of student posts in response to the instructors' questions was not explored. Instead, we focused on quantifying the dynamics of students' interaction based on the expert and novice instructors' facilitation. Future research is needed to incorporate student perspectives of instructor facilitation and student discussion artifacts to better understand the comparison between expert and novice facilitators. Finally, future studies are needed to triangulate students' social network capacity in discussions and academic performance to consider students' learning behavior and attitudes.

Implications and Conclusion

Instructors are responsible for keeping discussions focused on key issues and moving the discussion forward productively while avoiding creating a question-answer forum that prevents students' reaching a deeper level (Hew & Cheung, 2010). Given the complexity and ambiguity of case problems, while not surprising, a novice instructor faces challenges managing discussions. Being a content expert is not a decisive factor in determining if a discussion is effective; instead, facilitation abilities are more critical (Leary et al., 2013). Therefore, novice instructors can seek advice and support from expert instructors prior to facilitating discussions. Additionally, novice and expert instructors can share experiences and discuss improvements for stimulating discussions.

Moreover, instructors' ability to use the combination of adaptive and flexible social congruence, cognitive congruence, and content expertise is significant in engaging students in case discussions. While a more socially congruent facilitator can create a less-threatening environment making students feel comfortable raising their questions and perspectives (Chng et al., 2011), simply using a majority of social congruence strategies does not prompt students to think deeply. Therefore, novice instructors should intentionally identify students' learning gaps and use strategies to help bridge the gaps.

Finally, instructors need to purposely diversify interaction among students with different interaction levels in discussions. If an LMS (e.g., Brightspace) could integrate SNA techniques to identify disconnected students and get a quick snapshot of group interaction characteristics, then it would be helpful for instructors to monitor students' participation and interaction processes. SNA tools (i.e., visualization and metrics) built into an LMS can help instructors visualize their students' interaction and plan interventions accordingly without extracting data from an LMS and importing it to SNA software. This could help lower barriers to entry so that instructors do not need to spend extra time learning how to use SNA tools.

This research offers insight into the difference between how an expert and novice instructor interact with students during case discussions. While distinct differences exist, additional research is needed to fully explore these differences in order to better understand how to best prepare case facilitators to orchestrate maximum outcomes from a case discussion.

Declarations

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

Human subject concerns were addressed through approval from the Institutional Review Board (IRB) of Purdue University, USA.

No funding was received to assist with the preparation of this manuscript.

References

- Andersen, E., & Schiano, B. (2014). *Teaching with cases: A practical guide*. Harvard Business Press.
- Bastian, M., Heymann, S., & Jacomy, M. (2009). *Gephi: An open source software for exploring and manipulating networks* (Version 0.9.2) [Computer software]. International AAAI Conference on Weblogs and Social Media. <https://gephi.org/>
- Berliner, D. C. (2001). Learning about and learning from expert teachers. *International Journal of Educational Research*, 35(5), 463–482. [https://doi.org/10.1016/S0883-0355\(02\)00004-6](https://doi.org/10.1016/S0883-0355(02)00004-6)
- Breiger, R. L. (2004). The analysis of social networks. In M. Hardy, & A. Bryman (Eds.), *Handbook of data analysis* (pp. 505–526). Sage.
- Carolan, B. (2014). *Social network analysis and education theory, methods & applications*. Sage.
- Cela, K. L., Sicilia, M. A., & Sanchez, S. (2015). Social network analysis in e-learning environments: A preliminary systematic review. *Educational Psychology Review*, 27, 219–246. <https://doi.org/10.1007/s10648-014-9276-0>
- Chng, E., Yew, E. H. J., & Schmidt, H. G. (2011). Effects of tutor-related behaviours on the process of problem-based learning. *Advances in Health Science Education*, 16(4), 491–503. <http://dx.doi.org/10.1007/s10459-011-9282-7>
- Creswell, J. W. (2014). *A concise introduction to mixed methods research*. Sage.
- Dolmans, D. H. J. M., Gijssels, W. H., Moust, J. H. C., Grave, W. S. D., Wolhagen, I. H. A. P., & van der Vleuten, C. P. M. (2002). Trends in research on the tutor in problem-based learning: Conclusions and implications for educational practice and research. *Medical Teacher*, 24(2), 173–180. <https://doi.org/10.1080/01421590220125277>
- Doran, P. R., Doran, C., & Mazur, A. (2011). Social network analysis as a method for analyzing interaction in collaborative online learning environments. *Systemics, Cybernetics and Informatics*, 9(7), 10–16.
- De Laat, M., Lally, V., Lipponen, L., & Simons, R. (2007). Investigating patterns of interaction in a networked learning and computer-supported collaborative learning: A role for social network analysis. *Computer-Supported Collaborative Learning*, 2(1), 87–103. <https://doi.org/10.1007/s11412-007-9006-4>
- Erlin, B., Yusof, N., & Rahman, A. A. (2009). Analyzing online asynchronous discussion using content and social network analysis. *ISDA 2009—Ninth International Conference on Intelligent Systems Design and Applications*, 872–877. <https://doi.org/10.1109/ISDA.2009.40>

- Ertmer, P. A., & Koehler, A. A. (2014). Online case-based discussions: Examining coverage of the afforded problem space. *Educational Technology Research and Development*, 62(5), 617–636. <https://doi.org/10.1007/s11423-014-9350-9>
- Ertmer, P. A., & Koehler, A. A. (2015). Facilitated versus non-facilitated online case discussions: Comparing differences in problem space coverage. *Journal of Computing in Higher Education*, 27(2), 69–93. <http://dx.doi.org/10.1007/s12528-015-9094-5>
- Ertmer, P. A., & Koehler, A. A. (2018). Facilitating strategies and problem space coverage: Comparing face-to-face and online case-based discussions. *Educational Technology Research and Development*, 66(3), 639–670. <https://doi.org/10.1007/s11423-017-9563-9>
- Ertmer, P. A., Quinn, J. A., & Glazewski, K. D. (2017). *The ID casebook: Case studies in instructional design*. Routledge.
- Ertmer, P. A., & Stepich, D. A. (2002). Initiating and maintaining meaningful case discussions: Maximizing the potential of case-based instruction. *Journal of Excellence in College Teaching*, 13(2/3), 5–18.
- Ertmer, P. A., & Stepich, D. A. (2005). Instructional design expertise: How will we know it when we see it? *Educational Technology*, 45(6), 38–43.
- Froehlich D. E., Waes, S. V., & Schafer, H. (2020). Linking quantitative and qualitative network approaches: A review of mixed methods social network analysis in education research. *Review of Research in Education*, 44, 244–268. <https://doi.org/10.3102%2F0091732X20903311>
- Goeze, A., Zottmann, J. M., Vogel, F., Fischer, F., & Schrader, J. (2014). Getting immersed in teacher and student perspectives: Facilitating analytical competence using video cases in teacher education. *Instructional Science*, 42(1), 91–114. <https://doi.org/10.1007/s11251-013-9304-3>
- Hara, N., Bonk, C. J., & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology course. *Instructional Science*, 28(2), 115–152.
- Hew, K. F., & Cheung, W. S. (2010). Fostering higher knowledge construction levels in online discussion forums: An exploratory case study. *International Journal of Web-Based Learning and Teaching Technologies*, 5(4), 44–55.
- Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235–266.
- Hmelo-Silver, C. E., & Barrows, H. S. (2006). Goals and strategies of a problem-based learning facilitator. *Interdisciplinary Journal of Problem-Based Learning*, 1(1), 21–39. <https://doi.org/10.7771/1541-5015.1004>

- 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>
- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Towards a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2), 112–133. <https://doi.org/10.1177%2F1558689806298224>
- Jonassen, D. H. (2011). Supporting problem solving in PBL. *Interdisciplinary Journal of Problem Based Learning*, 5(2), 95–112. <https://doi.org/10.7771/1541-5015.1256>
- Kassab, S., Al-Shboul, Q., Abu-Hijleh, M., & Hamdy, H. (2006). Teaching styles of tutors in a problem-based curriculum: Students' and tutors' perception. *Medical Teacher*, 28(5), 460–464. <https://doi.org/10.1080/01421590600627540>
- Koehler, A. A., Cheng, Z., Fiock, H., Janakiraman, S., & Wang, H. (2020). Asynchronous online discussions during case-based learning: A problem-solving process. *Online Learning*, 24(4), 64–92. <https://doi.org/10.24059/olj.v24i4.2332>
- Koehler, A. A., Ertmer, P. A., & Newby, T. J. (2019). Developing preservice teachers' instructional design skills through case-based instruction: Examining the impact of discussion format. *Journal of Teacher Education*, 70(4), 319–334. <https://doi.org/10.1177%2F0022487118755701>
- Kolodner, J. L. (1992). An introduction to case-based reasoning. *Artificial Intelligence Review*, 6, 3–34.
- Law, V., Ge, X., & Huang, K. (2020). Understanding learners' challenges and scaffolding their ill-structured problem solving in a technology-supported self-regulated learning environment. In M. J. Bishop, E. Boling, J. Elen & V. Svihla (Eds.), *Handbook of Research in Educational Communications and Technology* (pp. 321–342). Springer, Cham. https://doi.org/10.1007/978-3-030-36119-8_14#DOI
- Leary, H., Walker, A., Shelton, B. E., & Fitt, M. H. (2013). Exploring the relationships between tutor background, tutor training, and student learning: A problem-based learning meta-analysis. *Interdisciplinary Journal of Problem Based Learning*, 7(1), 41–66. <https://doi.org/10.7771/1541-5015.1331>
- Richardson, J. C., & Alsup, J. (2015). From the classroom to the keyboard: How seven teachers created their online teacher identities. *The International Review of Research in Open and Distributed Learning*, 16(1), 142–167.
- Richardson, J. C., Koehler, A. A., Besser, E. D., Caskurlu, S., Lim, J., & Muller, C. M. (2015). Conceptualizing and investigating instructor presence in online learning environment. *International Review of Research in Open and Distributed Learning*, 16(3), 256–297. <http://dx.doi.org/10.19173/irrodl.v16i3.2123>

Rico, R., & Ertmer, P. A. (2015). Examining the role of the instructor in problem-centered instruction. *TechTrends*, 59(4), 96–103.

Rovai, A. P. (2007). Facilitating online discussions effectively. *The Internet and Higher Education*, 10(1), 77–88. <https://doi.org/10.1016/j.iheduc.2006.10.001>

Schmidt, H. G. (1994). Resolving inconsistencies in tutor expertise research: Does lack of structure cause students to seek tutor guidance? *Academic Medicine*, 69(8), 656–662.

Schmidt, H. G., & Moust, J. H. (1995). What makes a tutor effective? A structural-equation modeling approach to learning in problem-based curricula. *Academic Medicine*, 70(8), 708–714. <https://doi.org/10.1097/00001888-199508000-00015>

Schmidt, H. G., & Moust, J. H. (2000). Factors affecting small-group tutorial learning: A review of research. In D. H. Evensen & C. E. Hmelo-Silver (Eds.), *Problem-based learning: A research perspective on learning interactions* (pp. 19–52). Erlbaum.

Schmidt H. G., Van der Arend, A., Koxx, I., & Boon, L. (1994). Peer versus staff tutoring in problem-based learning. *Instructional Science*, 22(4), 279–285.

Schmidt, H. G., Van der Arend, A., Moust, J. H., Koxx, I., & Boon, L. (1993). Influence of tutors' subject-matter expertise on student effort and achievement in problem-based learning. *Academic Medicine*, 68(10), 784–791. <https://doi.org/10.1007/bf00891781>

Tawfik, A., Graesser, A., Gatewood, J., & Gishbaugher, J. (2020). Role of questions in inquiry-based instruction: Towards a design taxonomy for question-asking and implications for design. *Educational Technology Research and Development*, 68(2), 653–678. <https://doi.org/10.1007/s11423-020-09738-9>

Tawfik, A., & Jonassen, D. (2013). The effects of successful versus failure-based cases on argumentation while solving decision-making problems. *Educational Technology Research and Development*, 61(3), 385–406.

Watson, S. L., Koehler, A. A., Ertmer, P. A., Kim, W., & Rico, R. (2018). An expert instructor's use of social congruence, cognitive congruence, and expertise in an online case-based instructional design course. *Interdisciplinary Journal of Problem-Based Learning*, 12(1). <https://doi.org/10.7771/1541-5015.1633>

Yang, S., Keller, F., & Zheng, L. (2017). *Social network analysis: Method and examples*. Sage.

Yew, E. H. J., & Schmidt, H. G. (2012). What students learn in problem-based learning: A process analysis. *Instructional Science*, 40, 371–395.

Yew, E. H. J., & Yong, J. J. Y. (2014). Student perceptions of facilitators' social congruence, use of expertise, and cognitive congruence in problem-based learning. *Instructional Science*, 42, 795–815.

Appendix A

Codebook and Frequencies

Instructor	Categories	IF1	IF2	IF3	IF1 Summary	IF2 Summary	Total Counts by Indicator
T1	Social Congruence						
	Af-Value						
	Af-Emotion	1		1			2
	Af-Enthusiasm	12	2	4	1	1	20
	Af-Humor	2					2
	Af-RichMedia						
	Co-Greeting & Salutations	3	2		2	1	8
	Co-Name	11	7	7			25
	Co-Encourage				1	1	2
	Co-Group Reference	4	1		3	2	10
	Co-Collaborative						
	Co-Diversity						
	Ak-Acknowledgment	24	8	4	5	2	43
	AG-Agreement/Disagreement			1			1
	AP-Approval	3					3
	I-Invitation	3	4	3			10
	Total Social Indicators	63	26	20	13	7	129
	Cognitive Congruence						
	FD-Emphasis	1			7	9	17
	FD-DirectStudentAttention	7	1	3	5	1	17
	FD-Tips	3					3
	FD-Summary	2		2		1	5
	FD-TipsOutside						
	DI-Clarify	5	1	2	2	2	12
	DI-Example	2					2
	DI-Demo						
	DI-Resource					1	1
	Total Cognitive Indicators	20	2	7	14	14	57
	Content Expertise						

Expert and Novice Facilitation in Online Discussions

	FD-Prompt	2	2	2			6
	FD-AskforClarification		1				1
	FD-ConnectsContentIdeas	6	4	2	4	2	18
	FD-AltViewPoint						
	DI-DirectQuestion	6	3	2			11
	As-FromDiscussion			1			1
	TemperingExpertise	7					7
	Total Expertise Indicators	21	10	7	4	2	44
T2	Categories	IF1	IF2	IF3	IF3 Summary		Total Counts by Indicator
	Social Congruence						
	Af-Self Disclosure	2	1	1	1		5
	Af-Value						
	Af-Emotion	4		3			7
	Af-Enthusiasm	6	11	14	2		33
	Af-Humor	1					1
	Af-RichMedia						
	Co-Greeting & Salutations	6	2				8
	Co-Name	4	6	13	1		24
	Co-Encourage	8			1		9
	Co-Group Reference	3	1				4
	Co-Collaborative						
	Co-Diversity						
	Ak-Acknowledgment	2	14	19	5		40
	AG-Agreement/Disagreement	2					2
	AP-Approval	1					1
	I-Invitation	1		2			3
	Total Social Indicators	40	35	52			127
	Cognitive Congruence						
	FD-Emphasis	4	2	7	2		15
	FD-DirectStudentAttention	6	5	1	2		14
FD-Tips	1					1	
FD-Summary				1		1	
FD-TipsOutside	1					1	

Expert and Novice Facilitation in Online Discussions

DI-Clarify	5		6		11
DI-Example		1			1
DI-Demo					
DI-Resource					
Total Cognitive Indicators	17	8	14	5	44
Content Expertise					
FD-Prompt					
FD-AskforClarification		1	1		2
FD-ConnectsContentIdeas		1	3	1	5
FD-AltViewPoint	1				1
DI-DirectQuestion	5	3	6		14
As-FromDiscussion	2		2		4
TemperingExpertise			1		1
Total Expertise Indicators	8	5	13	1	27

Introduction to *OLJ* Issue 25:4 Section II

Mary F. Rice, Managing Editor, *Online Learning* (OLJ)
University of New Mexico, USA

In addition to the papers associated with the American Educational Research Association Online Teaching and Learning SIG, we also have a selection of studies that have been reviewed and accepted for publication through our regular submission process. This year, the journal received several hundred submissions that were reviewed by more than one hundred reviewers. As an editorial team, alongside our reviewers and section editors, we have been working to clarify review processes, streamline decision-making and provide more useful feedback to authors who submit. Journal Editor-in-Chief Peter Shea and the Online Learning Consortium appreciate the opportunity to provide publication space for both established and new researchers. Those teaching and/or researching about online learning are invited to sign up through the journal system and volunteer to review as well as submit work.

The following articles investigate learner perceptions of new technologies and experiences with online learning, personalization, and analytics for optimizing online learning opportunities, and strategies for student support during the COVID-19 pandemic.

In the first article in this section, “Examination of the Hexad User Types and their Relationships with Gender, Game Mode, and Gamification Experience in the Context of Open and Distance Learning” Dilek Şenocak, Köksal Büyük, and Aras Bozkurt consider the emergence of gaming and gamification. The researchers adapted a cross-sectional survey design to learn about Hexad user types of distance learners. Findings revealed that the most common user types were Philanthropists, Achievers, and Free Spirits, followed by Socializers and Players. The least common user type was Disruptors. Women tended to score higher than men on the Disruptor user type. Achievers, Socializers, Philanthropists, and Players preferred multiplayer game modes, while the game mode had little influence on Free Spirits and Disruptors. This article contributes to ongoing work to make gamification practices in online settings more gender-inclusive.

In the second article, “Examining Higher Education Instructor Perceptions of Roles and Competencies in Online Teaching,” Florence Martin, Swapna Kumar, and Liane She categorized eight types of instructor roles: Subject Matter Expert, Course Designer and Developer, Course Facilitator, Course Manager, Advisor/Mentor, Assessor/Evaluator, Technology Expert, and Lifelong Learner. Through survey-based research with 141 online instructors, the researchers examined competencies that online instructors perform based on various roles. Many instructors reported using all the roles. Online instructors who participated in training and who collaborated with instructional designers rated the frequency with which they performed the roles to be higher. The findings of this study demonstrate that online instructors perceive themselves to have many roles.

In the third article, “Using Academic Social Networks to Enhance the Student Experience in Online Education,” Tiffani S. Bateman engaged in a qualitative, interpretive, phenomenological study that explored the lived experiences of six online higher education students reporting active participation in an academic social network. Three core themes emerged from Bateman’s data analysis: (a) acceptance and belonging; (b) self-validation; and (c) drawing from multiple perspectives about social media. The findings of this study provide a

foundation for future work in using and critiquing the use of social media in online educational experiences.

In the fourth article, “Understanding the Roles of Personalization and Social Learning in a Language MOOC Through Learning Analytics,” Napat Jitpaisarnwattana, Hayo Reinders, and Pornapit Darasawang designed an LMOOC and implemented what they referred to as a “Social and Personal Online Language Course (SPOLC).” This language learning environment incorporated a recommendation system and emphasized personalization and social interaction. Several types of learning behaviors were related to course completion. The researchers found that working in groups and creating a learning plan were important factors associated with course completion while interacting with other learners online was not. These findings offer insight into course design as well as the productive arrangement of students for working in LMOOC courses.

For the fifth article, “An Overwhelming Cloud of Inertia”: Evaluating the Impact of Course Design Changes Following the COVID-19 Pandemic,” Joann S. Olson and Rita Kenahan explored the impact of course design changes that sought to help students meet learning objectives while also seeking to alleviate the unanticipated pressures created by external forces. The findings suggest that increased flexibility with due dates and access to course materials were the most helpful strategy for helping students deal with the disruptive events of the semester due to COVID-19. In addition, managing the disruptions and finding a sense of balance was important for both instructors and students. Such findings provide additional evidence as to the benefits of making small, but important shifts in practice for students.

In the sixth article, “Comparing the Outcomes of the Different Teaching Modes: All-in-Person, Hybrid, and Online, for Different Student Demographic Groups in a Business School,” Douglas R. Moodie used data from four years of all the courses in the Coles College of Business at Kennesaw State University. The results of this study showed that for all demographics, students in hybrid course sections earned higher final course grades than those in online sections, which in turn, earned better final grades than those in AIP sections. While such findings were limited to one institution in the pre-COVID era, they may support future planning of hybrid courses as a matter of equity.

In the seventh article, “We Overwhelm Them with Hope”: How Online Mentors Can Support Online Learners,” Camey L. Andersen and Richard E. West analyzed responses from 143 mentors from around the world participating in a global higher education initiative. Results confirmed the effectiveness of four mentoring domains identified in the literature, reporting the most success from providing emotional and psychological support for students. Mentoring strategies, characteristics of an online role model, and online mentor confidence in students in gaining technology skills were all important ideas from the research. As online learning continues to grow the findings of this study can support the preparation and support of mentors.

In the eighth article, “Advancing Sociotechnical-Pedagogical Heuristics for the Usability Evaluation of Online Courses for Adult Learners,” Isa Jahnke, Nathan Riedel, Kanupriya Singh, and Joi Moore identified an initial set of social, technical, and pedagogical related items (STP) heuristics based on literature. Next, the researchers analyzed this set using empirical data from two online courses. The set that emerged in their research has the potential to support more efficient evaluation online courses as evaluators and instructional designers work to optimize user experiences.

In the ninth article, “The Scale of Online Course Anxiety: Assessing College Students’ Anxiety in Online Courses,” Xinyang, Li, William Lan, and Amanda Williams used an existing theoretical framework regarding the fundamental differences between online education and

traditional education to develop and test the instrument of Scale of Online Course Anxiety (SOCA). A sample of 170 students from a 4-year higher educational institution provided the data for the study. The total score and the four subscale scores show high reliability. A Confirmatory Factor Analysis exhibited solid goodness of fit between SOCA items and the factor structure hypothesized in previous research. Evidence of divergent validity showed that SOCA differentiates the state anxiety and trait anxiety as expected. Researchers and practitioners may be interested in using this instrument to determine how to support students in online learning experiences.

For the tenth article, “Student Perspectives of Online Teaching and Learning During the COVID-19 Pandemic,” Burhan Ozfidan, Orchida Fayez, and Hala Ismail explored the variables contributing to student satisfaction with online teaching and learning effectiveness. Data were collected through an online survey. The results of the study defined effective online teaching during the COVID-19 pandemic. In combination, eight criteria contributed to the definition: motivating students to accomplish, communicating effectively, meeting students' needs, providing access to a wide range of content, providing a well-organized course structure, providing numerous sources, providing explanatory feedback, and facilitating meaningful discussions. These findings add to the emerging knowledge base about what constitutes successful online learning practice in an emergency or sudden migration to a different modality.

The final article is “Reflecting on Best Practices in a Post-COVID-19 World” by Nathan Schrenk, Kelly Alves, Drew Van Dam, and Brianne Schrenk. In this article the authors demonstrate how they located and considered different research and practical resources to support remote learning. They also reflect on what they might retain beyond the pandemic.

While the COVID-19 pandemic continues to reach into 2022, affecting the lives of many in and outside of the academy, we nevertheless are hopeful for a peaceful and happy new year. We look forward to additional submissions, additional issues, and ongoing engagement with the online teaching and learning community.

Examination of the Hexad User Types and their Relationships with Gender, Game Mode, and Gamification Experience in the Context of Open and Distance Learning

Dilek Şenocak

Anadolu University, Eskişehir, Turkey

Köksal Büyük

Anadolu University, Eskişehir, Turkey

Aras Bozkurt

Anadolu University, Eskişehir, Turkey

University of South Africa, Pretoria, South Africa

Abstract

Gamification, which is defined as the use of game design elements in non-game contexts, is put forward as a solution to low motivation and is suggested for the creation of a sustainable learning ecology in open and distance learning (ODL). The overall purpose of the present study was to examine the distribution of the Hexad gamification user types and the correlations of gamification experience, game mode, and gender with the user types' scores within the context of an ODL system. The researchers adapted quantitative cross-sectional survey design to seek answers in this study. The Hexad user types of distance learners were determined based on the online "Gamification User Types Hexad Scale." Findings revealed that the most common user types in the ODL environment were Philanthropists, Achievers, and Free Spirits, followed by Socializers and Players with a lower mean, while the least common user type was Disruptors. Women tended to score higher than men on the Disruptor user type. Achievers, Socializers, Philanthropists, and Players preferred multiplayer game modes, while the game mode had little influence on Free Spirits and Disruptors. Regarding the gamification experience, Players and Free Spirits seemed to have more experience of gamified applications. This study provides insights to learning designers in developing gamified ODL systems to engage the different Hexad user types.

Keywords: distance education, gamification, the Hexad user types, game mode, gamification experience

Şenocak, D., Büyük, K., & Bozkurt, A. (2021). Examination of the Hexad user types and their relationships with gender, game mode, and gamification experience in the context of open and distance learning. *Online Learning*, 25(4), 250-266. DOI:10.24059/olj.v25i4.2276

Open and Distance Learning (ODL), and the flexible learning opportunities and support of life-long learning processes it engenders, has become part of mainstream education along with online content delivery methods, and continues to gain prevalence. The time-wise and/or place-wise separation of the learner, instructor, and content in ODL, however, may cause the learner to feel devoid of interactions or social relationships (Kegeyan, 2016; Subramanian, 2016). It would be safe to argue that communication, interaction, and motivation are important components of ODL (Bozkurt, 2020). Hone and El Said (2016) claim that online learners tend to drop out of the system due to the poor interaction with instructors and other learners, insufficient feedback, and the lack of teamwork or group interactions. Accordingly, new suggestions may be needed on how to enhance learner–learner, learner–instructor, and learner–content interactions and how to improve the social and emotional statuses of learners in online environments, and so to increase success and satisfaction in ODL contexts. In this sense, *gamification* can be put forward as an answer to the questions of how to increase student motivation, how to improve course attendance, how to bolster the student experience (Pilkington, 2018), how to increase the social and cognitive interactions between the learner and the instructor (Abu-Dawood, 2016), and how to support learner autonomy (Kopcha, Ding, Neumann, & Choi, 2016).

Related Literature

Gamification is the use of game design elements in non-game contexts (Deterding et al., 2011; Werbach, & Hunter, 2012). Though they sound alike, gamification, game-based learning, and serious games are different concepts (Marczewski, 2015). The general drive behind the use of gamification in education is to utilize the positive design elements of video games with single player or multiplayer game mode options (i.e., reward, socialization, autonomy, risk-taking, experimentation and challenges) to improve learner motivation and learning in a learning environment (Kopcha et al., 2016) or in different settings. In other words, gamification is the adaptation of certain game mechanics, such as points, badges, and leaderboards, to learning environments to make learning more fun, attractive, and sustainable. According to the Octalysis Model, the gamification design model developed by Chou (2016), the common goal of successful games is to motivate people to exhibit desired behavior by targeting one or more of eight basic instincts (accomplishment, meaning, social influence, etc.) of the individual. There have been several previous studies supporting the utilization of gamification in educational processes (Bovermann, & Bastiaens, 2018; Dicheva, Dichev, Agre, & Angelova, 2015; Vaibhav, & Gupta, 2014). Kapp (2012), and Werbach and Hunter (2012), however, have suggested that gamification may not be suitable for every system, in that it might not produce the same effect in every learning environment. As such, it would seem to be important to carefully analyze the systems that are planned to be gamified, to determine whether there is a need for gamification, and if so, to carefully carry out the gamification design. Werbach and Hunter (2012) have pointed out that identifying the users of the gamification is just as important as determining the targets, target behaviors, activity cycles, entertainment elements and proper tools for gamification design.

In a review of the literature, Bartle's (1996) player typology, as well as several other player typologies, are worthy of note (Nacke, Bateman, & Mandryk, 2014; Ferro, Walz, & Greuter, 2013). However, these typologies were created for game designs and, therefore, there is a need for new models specifically developed for gamified systems. To address this need, Marczewski (2015) classified gamification users under six user types based on the level of

intrinsic or extrinsic motivations they have during the interaction with gamified systems (Figure 1). The six Hexad user types used in the present study are:

Socializers are motivated by being in contact with or establishing social relationships with others.

Free Spirits are motivated by autonomy and self-expression. They enjoy discovering and creating within a system.

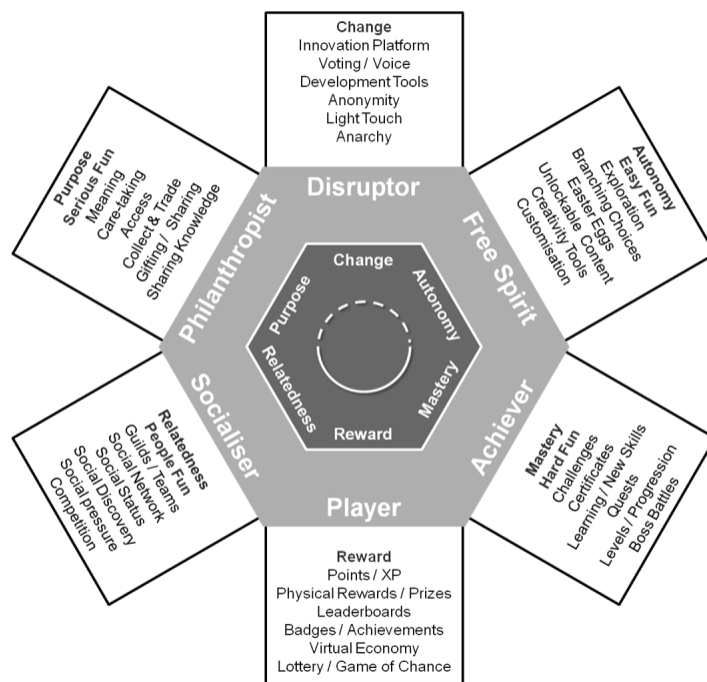
Achievers are motivated by competence or specialization. They are open to learning new things and developing themselves and seek to overcome challenges during such processes.

Philanthropists are attracted by the purpose and meaning of the thing they are doing. Such people, who can be described as self-sacrificing, want to help others without any reward in return.

Players are motivated by external rewards (i.e., points, badges, leaderboards). They fulfill all the assignments asked of them to obtain the reward from the system.

Disruptors are motivated by change. They continuously force the system to change, either positively or negatively, by setting themselves or others to work.

Figure 1
The Gamification User Types Hexad (Marczewski, 2015)



As is seen in Figure 1, Socializers, Free Spirits, Achievers, and Philanthropists are mostly motivated intrinsically, while Players are extrinsically motivated. In Self-Determination Theory (SDT), people with intrinsic motivation display an interest in the activity itself, and the resulting reward is the pleasure and happiness people get from the action (Ryan & Deci, 2017). In extrinsic motivation, unlike intrinsic motivation, there is an external reward, social approval, or avoidance of punishment (Ryan & Deci, 2000). As stated by Ryan and Deci (2000), *autonomy*, *competence*, and *relatedness* are the innate basic psychological needs of the individual. When these needs are met, people feel satisfied, which results in increased intrinsic motivation (Kapp, 2012). As the source of motivation for the intrinsically motivated user types (Free Spirits, Socializers, and Achievers) in the Gamification User Types Hexad, *autonomy* refers to the ability of people to guide their own behaviors; *competence* refers to the sense people have of their competence in learning and specializing in a subject; and *relatedness* refers to the feeling of being connected with others. *Purpose (meaning)*, on the other hand, which supports the intrinsic motivation to fulfill challenging tasks (Davis et al., 2016), has been associated with the Philanthropist user type.

Previous studies (Mora et al., 2019; Tondello et al., 2016; Tondello et al., 2019) have identified the most common user types to be Philanthropists, Achievers, and Free Spirits, while Disruptors are less common. In a similar study by Fischer, Heinz, and Breitenstein (2018), Philanthropists, Free Spirits, and Socializers were found to be more common in the gamified learning management system than other user types.

When examining the different user types in the context of gender, women have been observed to score partially higher in the Philanthropists, Socializers, Free Spirits, and Achievers user types (i.e., intrinsic motivation) than men, whereas men's scores were slightly higher in Disruptor category than those of women (Tondello et al., 2019). Another study (Mora et al., 2019) reported women to be more commonly Philanthropists and Achievers, while men were more commonly Players and Disruptors.

The literature review also unearthed studies assessing the link between game mode and user types. Barata et al. (2014) investigated the association between gaming habits and learner performance in a gamified learning experience, looking into what kind of students could be observed and how their behaviors were related to their game preferences in a gamified environment. The authors used the Brainhex player type model, which includes an online questionnaire, to classify the learners according to their gameplay styles. Their findings suggested that the learners who corresponded most with the Disruptors in Marczewski's (2015) classification usually preferred single player game modes.

Purpose of the Research

Based on the above considerations, the overall purpose of the present study was to examine the user types and the variables with the potential to be associated with such types (gamification experience, game mode, and gender) in gamification within the context of ODL. It also aimed to discuss how the Hexad user types contribute to the gamification system and how gamified ODL systems can be developed to engage these six Hexad types. In accordance with this overall purpose, this study sought to answer the following question: Do the Hexad user types differ significantly in terms of gender, gamification experience, and preferred game mode?

Methodology

Research Model and Design

In accordance with the purpose of the study, the research applied a cross-sectional survey design using a quantitative research methodology (Creswell, 2012). This study intends to examine ODL learners in terms of the gamification Hexad user types and considering that cross-sectional survey design is useful to “examine current attitudes, beliefs, opinions, or practices” (Creswell, 2012, p. 405) on the basis of different variables, it is thought that the research design is a good fit for the overall aim of the study.

Sample

For the evaluation of gamification user types in terms of game mode, gamification experience, and gender in ODL environments, a study universe comprising 1,120,000 learners enrolled in the Anadolu University Open Education System, which provides mass education in this regard, were identified as of January 2019. The study involved 2,292 students enrolled in the Anadolu University Open Education System in the fall semester of 2018–2019 academic year, including 1,522 women and 770 men. The age of the study participants varied between 18 and 68. The gamification experience defined in the study was measured based on whether the students had made use of SoruKüp, a gamified web-based exercise application within the Anadolu University Learning Management System (LMS). Within the sample, and based on the collected data, the number of students who had tried the above-mentioned application was 434, while 1,858 students had not. The ethical approval was granted by Anadolu University Institutional Review Board (IRB).

Data Collection and Analysis Procedures

The Gamification User Types Hexad Scale developed by Tondello et al. (2016) was based on Marczewski’s (2015) Hexad framework, which differs from other player classifications in its consideration of user types defined specifically for gamification. The statistical analyses in the study revealed that the scale was able to empirically measure Marczewski’s user types (Tondello et al., 2016), which are also the subject of the present study. Accordingly, it is believed that the use of the Turkish adaptation (Akgün, & Topal, 2018) of the original scale will contribute to improving Marczewski’s user type classification. The adapted scale is a 7-point Likert-type scale consisting of 22 items.

Outlier calculations were made to ensure the normality assumption, and thus, the Mahalanobis distance (MD) was calculated. For this test, a tight statistical significance level of $p < .001$ is recommended (Kline, 2005), and as a result of the Mahalanobis distance analysis made in this context, 146 people who were calculated according to $p < 0.001$ and greater in regard to the Chi-square distribution table were excluded from the analysis. For normal distribution of data, kurtosis, and skewness, which both fell within the range between -2 and +2 were considered acceptable values (George & Mallery, 2016; Tabachnick & Fidell, 2007).

A confirmatory factor analysis (CFA) was carried out to confirm the Turkish version of the scale in the present study. Fit indices were calculated based on the CFA results, and the Chi-square value ($\chi^2/df = 7,7$, $p = 0.001$, $N = 2292$) was found to be significant and above the acceptable values ($\chi^2/df = 3$ and $\chi^2/df = 5$) (Wheaton, Muthen, Alwin, & Summers, 1977). As such, the second item from the Players subdimension, the first item from the Disruptors subdimension, the third item from the Achievers subdimension, and the third item from the Socializers subdimension were removed due to the poor fit with the scale. The repeated CFA showed that the Chi-square value was ($\chi^2/df = 4.9$, $p = 0.001$, $N = 2292$) and within the acceptable values. Kline (2005) suggested in fact that the Chi-square value is sensitive to sample

size, which leads to difficulties in establishing a certain Chi-square value alone for the model fit. Given the sample size of the present study ($n = 2292$), the Chi-square value seems acceptable (Wheaton et al., 1977). As is seen in Table 1, the fit indices are calculated based on the confirmatory factor analysis results and are at excellent acceptable levels.

Table 1
The Gamification User Types Hexad Scale CFA Fit Indices

CFA fit indices	Excellent fit indices	Acceptable indices	Indices resulting from the study
χ^2/df	$0 \leq \chi^2/df \leq 2$	$2 \leq \chi^2/df \leq 5$	4.9
TLI	$.95 \leq GFI \leq 1.00$	$.90 \leq GFI \leq .95$.90
CFI	$.95 \leq CFI \leq 1.00$	$.90 \leq CFI \leq .95$.92
RMSEA	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$.041
SRMR	$.00 \leq SRMR \leq .05$	$.05 \leq SRMR \leq .10$.03

Table 2 presents the descriptive statistics and CFA factor loadings for the Turkish version of the Gamification User Types Hexad scale. The CFA revealed all statements to be significant and the factor loadings to be at acceptable levels (0.332–0.944). The reliability of the factors for the scale in Turkish was tested by calculating Cronbach's Alpha internal consistency coefficient, and the alpha coefficients were 0.64 for Philanthropists, 0.73 for Socializers, 0.60 for Free Spirits, 0.76 for Achievers, 0.79 for Disruptors and 0.86 for Players. Since the values obtained were above the threshold (cut-off) values, the factors were considered reliable (Hair et al., 2019). The basic statistical analysis of the study was conducted using the IBM SPSS Statistic 25 software package, and the confirmatory factor analysis was made using the R "Lavaan" package (Rosseel, 2012).

Table 2
Mean, Standard Deviation, Factor Loadings and Cronbach's Alpha Values of the Scale

Factors	Items	\bar{X}	SD	CFA Factor Loading	Cronbach's α
Philanthropists	P1	6.14	1.007	0.503	0.64
	P2	5.74	1.467	0.450	
	P3	6.55	0.672	0.405	
	P4	6.15	0.970	0.533	
Socializers	S1	6.12	1.118	0.520	0.73
	S2	5.55	1.264	0.654	
	S4	5.94	0.963	0.681	
Free Spirits	F1	6.09	1.019	0.512	0.60
	F2	6.12	1.098	0.348	
	F3	6.37	0.826	0.332	
	F4	5.50	1.315	0.380	
Achievers	A1	6.12	0.997	0.702	0.76
	A2	5.95	1.154	0.450	
	A4	6.14	0.924	0.712	
Disruptors	D2	3.12	1.805	0.891	0.79
	D3	3.72	1.862	0.944	
Players	PL1	5.34	1.538	0.820	0.86

PL3 5.50 1.339 0.610

Limitations

Gamification is a recent research area, and this study is one of the earlier studies that examines gamification user types in a massive ODL environment. Though this can be considered as a strength of the study, the researchers acknowledge the following limitations: First, the data of the study is collected from one specific ODL system and different ODL systems with different learning designs can provide complementary findings. Second, gamification user types are related to social and psychological aspects, thus, different research that considers such variables can provide a broader understanding. Finally, learners' attitudes and practices that are related to their gamification user types can be affected by the cultural settings and a replication of this study in different cultural settings can lead to different research findings.

Findings

Descriptive Statistics for the Hexad User Types

Table 3 demonstrates the descriptive distributions of the variables related to Philanthropists, Socializers, Free Spirits, Achievers, Disruptors, and Players as the student user types. It is worth noting that the participants of the study may display the characteristics of different user types to varying degrees. Therefore, the overall distribution of the scores of each user type in the sample should be considered.

Table 3

Descriptive statistics for the Hexad gamification user types.

Construct	<u>n</u>	Min.	Max.	<u>X</u>	<i>SD</i>
Philanthropists	2292	2.75	7.00	6.14	0.67
Achievers	2292	2.33	7.00	6.06	0.77
Free Spirits	2292	3.25	7.00	6.02	0.63
Socializers	2292	1.67	7.00	5.86	0.81
Players	2292	1.00	7.00	5.41	1.24
Disruptors	2292	1.00	7.00	3.42	1.45

In the study, the most common user types are Philanthropists, Achievers, and Free Spirits, followed by Socializers and Players, while Disruptors are the least common user type in ODL environments within the scope of this study, and these findings parallel those of previous studies (Fischer et al., 2018; Mora et al., 2019; Tondello et al., 2016; Tondello et al., 2019;).

The study findings also support the principles of SDT, which is the basis for the user type classification developed specifically for gamification by Marczewski (2015). Our finding that Free Spirits, Achievers, and Philanthropists, which were associated with autonomy, competence, and meaning (purpose), respectively, were the most common user types, and that Socializers, associated with relatedness, followed the means of the other user types suggest that the basic psychological needs and the desire to fulfill such needs, as argued by SDT and mentioned also by Tondello et al. (2019), are also strong sources of motivation for the ODL systems designed to be gamified. Our findings, further, are in line with the ideas put forward in the Octalysis Model

(Chou, 2016), which was developed within the context of gamification. Among the eight core motivations mentioned in the model, *meaning* can be associated with Philanthropists; *development and accomplishment* with Achievers; *creativity* with Free Spirits; and *social influence* and *relatedness* with Socializers. Therefore, such user types, being the most common in the present study, may lead to the idea that especially the core motivations associated with these user types should be considered in ODL environments.

Moreover, the finding of the above-mentioned studies (Tondello et al., 2019; Tondello et al., 2016), as well as the present study, that Players follow the other user types with the highest averages supports the idea that external rewards are one of the most important factors in promoting motivation, as expressed in SDT (Ryan & Deci, 2000). This finding, however, should be discussed carefully. As also dwelled on in the *overjustification effect* (Lepper, Greene, & Nisbett, 1973), if the Player user type focus on extrinsic rewards such as *points, badges, and leaderboards* more than the learning itself in gamified ODL systems, they may not maintain interest in learning activities in the absence of such rewards. Accordingly, this user type may be gradually integrated with intrinsically user types through a steady reduction of external rewards after they become accustomed to the system, internalize the goals and objectives, and give meaning to themselves, as mentioned also by Marczewski (2015). That said, further studies are needed to observe whether such a situation materializes.

When examining the above-stated distribution of user types in the context of this study and other related studies, it can be understood that Disruptors exhibit a unique distribution pattern (Mora et al., 2019; Tondello et al., 2016; Tondello et al., 2019). The lower mean in this user type, who are motivated by the triggering of change and acts with the drive to test the system limits, indicates that the motivation emerging out of the desire to instigate change should be taken into consideration in ODL environments, even though it is not as common as the other factors in terms of its effect on motivation.

The Killer type from Bartle's (1996) player typology, which demonstrates similarities with Disruptors, thrive on causing stress to other players or attacking other characters within the system. That said, a good game needs Killers, as balance is needed among the player types for a good game flow, even if the number of each individual type is not equal (Bartle, 1996). In other words, a lack of sufficient Killers in a game, and enough Disruptors in systems that have been gamified or are planned to be gamified may suggest that the system is not challenging enough, as Disruptors are also motivated by their ability to force the system into either positive or negative change, and by testing the system in a similar way to the Killers. For instance, it is believed that students who reveal system vulnerabilities, who always criticize the system, who provoke other users and who always try to break the rules in ODL environments, may more resemble this user type. This user type can thus be described as *the naughty kids* of gamified systems and is likely to cause an increased sense of excitement in gamified systems or cause other user types or system administrators to be permanently on the alert. In brief, all types of motivation, and thus Disruptors, are needed in the gamification of ODL environments to create a game effect in the system.

Orji, Tondello, and Nacke (2018) have stated that *persuasive gameful systems* are important in bringing about change in the behaviors of individuals by employing certain persuasive strategies and increasing system effectiveness through system personalization. Their study findings have shown that persuasive techniques such as *competition*, which addresses especially the Players, Socializers, and Disruptors, but do not adversely affect other user types; and *cooperation, social comparison, and reward*, which positively affect especially the Players

and Socializers and do not adversely affect other user types, are needed if persuasive gamification systems are to reach large masses (Orji et al., 2018). It is, therefore, believed that using such mechanics as leaderboards, status, countdowns within social comparison; communal discovery and social fabric of games within cooperation; points, virtual goods, reward schedules, and physical rewards within reward (Orji et al., 2018) will have a positive impact on attracting the attention of a wider learner profile in ODL environments.

Evaluation of User Types based on Gender, Gamification Experience, and Game Mode among ODL Students

An Independent Samples T-Test was used to establish whether there was a difference in user types by gender, gamification experience and preferred game mode. When the user types were analyzed in terms of gender, gamification experience and game mode, the Levene's test found a homogenous distribution in all variables ($p > 0.05$), and 'equal variances assumed' was used to interpret the analysis results. The obtained results are presented in Table 4 for gender, Table 5 for game mode, and Table 6 for gamification experience.

Table 4
Examination of User Types in the Context of Gender

Constructs	Gender	<u>n</u>	<u>x</u>	<i>SD</i>	<u>t</u>	<i>df</i>
Philanthropists	Male	770	6.15	0.70	0.336	2290
	Female	1522	6.14	0.66		
Socializers	Male	770	5.90	0.81	1.180	2290
	Female	1522	5.86	0.81		
Free Spirits	Male	770	6.05	0.64	1.391	2290
	Female	1522	6.01	0.64		
Achievers	Male	770	6.07	0.80	0.014	2290
	Female	1522	6.07	0.76		
Disruptors	Male	770	1.29	1.48	3.005**	2289
	Female	1522	3.48	1.43		
Players	Male	770	5.46	1.26	1.093	2290
	Female	1522	5.40	1.24		

** $p < 0.01$; (1–Strongly Disagree; 7–Strongly Agree).

Table 4 shows that user types varied significantly by gender only for the Disruptors factor (t : -3.005; df : 2289; $p < 0.01$). There was no significant difference in the other factors ($p > 0.05$).

Based on the above-stated findings, women were observed to be more likely to be Disruptors than men in ODL environments, although men were found to be more likely to be Disruptors in other studies (Fischer et al., 2018; Tondello et al., 2019). This may be due to the sociocultural differences of the contexts in which the studies were conducted.

The significant difference in the Disruptors user type in favor of women indicates that women are more likely to be motivated by the triggering of change in ODL environments. Such a desire for change may manifest in the form of challenges to others, the system, or the system

administrators, and testing the limits of the existing system, but can also be interpreted as an effort to further improve the system. Hunicke, LeBlanc, and Zubek (2004) emphasized several mechanical, dynamic and esthetic factors that make games successful; while Zichermann and Cunningham (2011) stated that especially the use of proper mechanics may result in terminal reactions in individuals. Such findings reveal once again that it is important to shift the desire for change in the existing Disruptors user type toward the positive, and to use proper gamification mechanics in the systems planned to be gamified for this purpose.

Table 5
Examination of user types in the context of preferred game mode

Constructs	Game Mode	<i>n</i>	<i>x̄</i>	<i>SD</i>	<i>t</i>	<i>df</i>
Philanthropists	Multiplayer	956	6.18	0.66	2.035*	2290
	Single Player	1336	6.12	0.68		
Socializers	Multiplayer	956	5.97	0.78	5.241***	2290
	Single Player	1336	5.79	0.83		
Free Spirits	Multiplayer	956	6.04	0.63	0.975	2290
	Single Player	1336	6.01	0.65		
Achievers	Multiplayer	956	6.14	0.76	3.478**	2290
	Single Player	1336	6.02	0.78		
Disruptors	Multiplayer	956	3.47	1.48	1.368	2289
	Single Player	1336	3.39	1.43		
Players	Multiplayer	956	5.57	1.21	5.016***	2290
	Single Player	1336	5.31	1.26		

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; (1– Strongly Disagree; 7– Strongly Agree).

Table 5 shows that Philanthropists (t : 2.035; df : 2290; $p < 0.01$), Socializers (t : 5.241; df : 2290; $p < 0.01$), Achievers (t : 3.478; df : 2290; $p < 0.01$) and Players (t : 5.016; df : 2290; $p < 0.01$) differed significantly in terms of preferred game mode, while there was no significant difference for Free Spirits or Disruptors ($p > 0.05$). In other words, the multiplayer game mode was preferred more by Philanthropists, Socializers, Achievers, and Players than the single-player game mode. The findings of our research partially concur with those of a study (Barata et al., 2014) in which all students types, other than the one whose player profile corresponded most to Disruptors preferred the multiplayer game mode.

The preference for multiplayer game modes among these user types suggests that this mode may be more suited to the nature of certain user types. For instance, it is possible that the multiplayer game mode is preferred by Achievers as they want to see themselves as more competent than others; by Socializers to be in contact with others socially; by Philanthropists to help others in the game; and by Players to battle with others for the rewards. It is a known fact that digital game preferences are affected by social and cultural conditions (Pala & Erdem, 2011) such as gaming with familiar or unfamiliar people, whether the game is recognized in the culture, habits, and popular activities of the period (Engl, & Nacke, 2013). It is, thus, believed that the preference for the multiplayer game mode in four user types in the present study may be

attributable to sociocultural conditions. Such preferences in learners are believed to be a result of the collectivist culture that is characterized by solidarity, sharing and cohesion with others (Hofstede, 2001). Nevertheless, further studies are needed to demonstrate whether this is due to the above-mentioned reasons.

It is believed that the influence of Socializers and Philanthropists, who are motivated by being in contact with others, but for different purposes, i.e., those who prefer playing multiplayer games in which there is engagement with others, and where there is cooperation and competition, should be taken into consideration in ODL environments. It is thereby believed that the first step of the Flow experience (Csikszentmihalyi, 1991) can be realized in gamification systems by ensuring that individuals who prefer different game modes or different user types are able to set their own goals; in other words, making users feel a sense of control.

Table 6

Examination of user types in the context of gamification experience

Constructs	Gamification Experience	<i>n</i>	<i>x̄</i>	<i>SD</i>	<i>t</i>	<i>df</i>
Philanthropists	No	1858	6.15	0.68	0.777	2290
	Yes	434	6.12	0.68		
Socializers	No	1858	5.87	0.81	0.095	2290
	Yes	434	5.87	0.80		
Free Spirits	No	1858	6.00	0.64	-3.836***	2290
	Yes	434	6.13	0.62		
Achievers	No	1858	6.07	0.77	-0.199	2290
	Yes	434	6.08	0.80		
Disruptors	No	1858	3.44	1.44	1.338	2289
	Yes	434	3.34	1.49		
Players	No	1858	5.38	1.26	-2.789**	2290
	Yes	434	5.57	1.18		

*** $p < 0.001$; ** $p < 0.01$; (1–Strongly Disagree; 7–Strongly Agree).

Table 6 shows that Free Spirits (t : -3.836; df : 2290; $p < 0.01$) and Players (t : -2.789; df : 2290; $p < 0.01$) are significantly different in terms of gamification experience. No significant difference was established for the other user types ($p > 0.05$).

Within the scope of the study, gamification experience was measured based on whether the learners had made use of the SoruKüp application, which is a web-based exercise application involving gamification elements in the Anadolum LMS. It was found that learners of the Free Spirit and Player user types seemed more experienced in this application in the ODL environment. Several previous studies (Krath & von Korflesch, 2021; Lopez & Tucker, 2019; Marczewski, 2015; Orji, Nacke, & Di Marco, 2017; Tondello et al., 2016) have investigated which game mechanics are best suited to the motivation of each user type in gamification. The findings of the present study indicate that the gamification mechanics, such as points, leaderboards, and badges, used in the gamified SoruKüp application may appeal more to Players, while the opportunity to add to the questions provided to the learners by the application may appeal to the Free Spirits. Yet, the question of whether such game mechanics affect other user

types sufficiently comes to mind, since there was no statistically significant difference in the gamification experience of the other user types. As such, further studies are required to investigate which gamification mechanics motivate other user types and to observe the extent to which they are effective.

Conclusion and Recommendations

The present study has investigated the six Hexad gamification user types and their relationships with gender, preferred game mode, and gamification experience. Based on the study findings, and the Gamification User Types Hexad Scale, the most common user types were found to be Philanthropists, Achievers, and Free Spirits in ODL environments, followed by Socializers and Players with lower means, and then by Disruptors with the lowest mean. Women were observed to be more likely to be Disruptors than men. There was a significant difference in the preference for multiplayer game modes among Philanthropists, Socializers, Achievers, and Players. Free Spirits and Players seemed to be more experienced in the SoruKüp application, which contains gamification elements.

Based on research findings, the following suggestions can be made for future research directions and gamified ODL environments:

Efforts should be made to examine which gamification mechanics attract which user types, or are useful or not for which user types in gamification applications, and making improvements to applications accordingly; researchers should consider the core drives such as meaning, development, accomplishment, creativity, social influence and relatedness, which are associated especially with the common user types (Philanthropists, Achievers, Free Spirits, Socializers) when gamification is used in ODL environments; researcher should examine whether Players shift to intrinsically-motivated user types, as suggested in literature, when external rewards such as the points, badges, and leaderboards that motivate them are gradually decreased after the users internalize and give meaning to the goals and objectives of the system; the industry should consider gamification elements that will also motivate Disruptors in an educational context when designing gamification systems; the industry should allow Disruptors to become more autonomous by enabling personal changes to be made to certain gamification applications in order to ensure their motivation sources are directed toward a positive direction in ODL environments, based on the understanding that they act with a desire to challenge the limits of the system and so bring about change; and practitioners should use personalized gamification applications in ODL environments when considering the game mode preferences and motivational sources that can be associated with gamification.

Acknowledgements

This study is the improved version of the master thesis entitled, “The examination of gamification user types, motivation and academic achievement in open and distance learning”, completed in the Distance Education Department of the Social Sciences Institute at Anadolu University in 2019.

A part of the thesis was also presented at 12th International Conference of Education, Research, and Innovation (ICERI2019) and published in proceedings as a study entitled, “Distribution of Hexad gamification user types and their association with intrinsic motivation in open and distance learning systems.”

Declarations

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author received approval from the research ethics review board of Anadolu University, Turkey for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Abu-Dawood, S. (2016, July). The cognitive and social motivational affordances of gamification in e-learning environment. In *2016 IEEE 16th International Conference on Advanced Learning Technologies (ICALT)* (pp. 373–375). Austin, TX, United States. <https://doi.org/10.1109/icalt.2016.126>
- Akgün, Ö. E., & Topal, M. (2018). Adaptation of the gamification user types hexad scale into Turkish. *International Journal*, 5(3), 389–402. <https://doi.org/10.21449/ijate.379139>
- Barata, G., Gama, S., Jorge, J. A., & Gonçalves, D. J. (2014). Relating gaming habits with student performance in a gamified learning experience. *Proceedings of the first ACM SIGCHI annual symposium on Computer-human interaction in play* (pp. 17–25). Toronto, Canada. <https://doi.org/10.1145/2658537.2658692>
- Bartle, R. (1996). Hearts, clubs, diamonds, spades: Players who suit MUDs. *Journal of MUD research*, 1(1), 19.
- Bozkurt, A. (2020). Communication, interaction, and motivation: Following the theoretical footprints of distance education. *Proceedings of Digital Education: 21st Century* (pp. 29–31). Moscow, Russia.
- Bovermann, K., & Bastiaens, T. (2018, June). Using gamification to foster intrinsic motivation and collaborative learning: A comparative testing. - *Proceedings of EdMedia+ Innovate Learning* (pp. 1128–1137). Amsterdam, Netherlands: Association for the Advancement of Computing in Education (AACE).
- Chou, Y. K. (2016). *Actionable gamification: Beyond points, badges, and leaderboards*. Octalysis Media.
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Pearson.
- Csikszentmihalyi, M. (1991). *Flow: The Psychology of Optimal Experience*. Harper Perennial.
- Davis, W. E., Kelley, N. J., Kim, J., Tang, D., & Hicks, J. A. (2016). Motivating the academic mind: High-level construal of academic goals enhances goal meaningfulness, motivation, and self-concordance. *Motivation and Emotion*, 40(2), 193–202. <https://doi.org/10.1007/s11031-015-9522-x>
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining gamification. *Proceedings of 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (-pp. 9–15). Tampere, Finland. <https://doi.org/10.1145/2181037.2181040>

- Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: A systematic mapping study. *Journal of Educational Technology & Society*, 18(3), 1–14. <https://www.jstor.org/stable/jeductechsoci.18.3.75>
- Engl, S., & Nacke, L. E. (2013). Contextual influences on mobile player experience—A game user experience model. *Entertainment Computing*, 4(1), 83–91. <https://doi.org/10.1016/j.entcom.2012.06.001>
- Ferro, L. S., Walz, S. P., & Greuter, S. (2013, September). Towards personalised, gamified systems: an investigation into game design, personality and player typologies. *Proceedings of the 9th Australasian Conference on Interactive Entertainment: Matters of Life and Death* (p. 7). Melbourne, Australia. <https://doi.org/10.1145/2513002.2513024>
- Fischer, H., Heinz, M., & Breitenstein, M. (2018). Gamification of learning management systems and user types in higher education. In *ECGBL 2018 12th European Conference on Game-Based Learning* (pp. 91). Sophia Antipolis, France.
- George, D., & Mallery, P. (2016). *IBM SPSS Statistics 23 step by step: A simple guide and reference*. Routledge.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis*. Cengage. https://doi.org/10.1007/978-3-642-04898-2_395
- 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>
- Hunicke, R., LeBlanc, M., & Zubek, R. (2004). MDA: A formal approach to game design and game research. *Proceedings of the AAAI Workshop on Challenges in Game AI*, 4(1), 1722–1726. California, United States. <https://users.cs.northwestern.edu/~hunicke/MDA.pdf>
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Sage Publications.
- Kapp, K. M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education*. John Wiley and Sons.
- Kegeyan, S. E. (2016). Distance learning: Its advantages and disadvantages. *International Journal of Professional Science*, 1, 71–75. <https://cyberleninka.ru/article/n/distance-learning-its-advantages-and-disadvantages>
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). Guilford Publications.
- Kopcha, T. J., Ding, L., Neumann, K. L., & Choi, I. (2016). Teaching technology integration to K–12 educators: A ‘Gamified’ approach. *TechTrends*, 60(1), 62–69. <https://doi.org/10.1007/s11528-015-0018-z>

- Krath, J., & von Korfflesch, H. F. (2021). Player types and game element preferences: Investigating the relationship with the gamification user types HEXAD scale. *International Conference on Human Computer Interaction* (pp. 219–238). Online Conference. https://doi.org/10.1007/978-3-030-77277-2_18
- Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the “overjustification” hypothesis. *Journal of Personality and Social Psychology*, 28(1), 129–137. <https://doi.org/10.1037/h0035519>
- Lopez, C. E., & Tucker, C. S. (2019). The effects of player type on performance: A gamification case study. *Computers in Human Behavior*, 91, 333–345. <https://doi.org/10.1016/j.chb.2018.10.005>
- Marczewski, A. (2015). *Even ninja monkeys like to play: Gamification, game thinking and motivational design*. CreateSpace Independent Publishing Platform.
- Mora, A., Tondello, G. F., Calvet, L., González, C., Arnedo-Moreno, J., & Nacke, L. E. (2019, June). The quest for a better tailoring of gameful design: An analysis of player type preferences. *Proceedings of the XX International Conference on Human Computer Interaction* (pp. 1–8). Donostia, Gipuzkoa, Spain. <https://doi.org/10.1145/3335595.3335625>
- Nacke, L. E., Bateman, C., & Mandryk, R. L. (2014). BrainHex: A neurobiological gamer typology survey. *Entertainment Computing*, 5(1), 55–62. <https://doi.org/10.1016/j.entcom.2013.06.002>
- Orji, R., Nacke, L. E., & Di Marco, C. (2017, May). Towards personality-driven persuasive health games and gamified systems. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 1015–1027). Denver, Colorado, United States.
- Orji, R., Tondello, G. F., & Nacke, L. E. (2018). Personalizing persuasive strategies in gameful systems to gamification user types. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1–14). Montreal, Quebec, Canada. <https://doi.org/10.1145/3173574.3174009>
- Pala, F. K., & Erdem, M. (2011). Dijital oyun tercihi ve oyun tercih nedeni ile cinsiyet, sınıf düzeyi ve öğrenme stili arasındaki ilişkiler üzerine bir çalışma [A study on the relationships between digital game preference and game preference reason with gender, class level and learning styles]. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 12(2), 53–71. <https://dergipark.org.tr/en/pub/kefad/issue/59495/855160>
- Pilkington, C. (2018). A playful approach to fostering motivation in a distance education computer programming course: Behaviour change and student perceptions. *International Review of Research in Open and Distributed Learning*, 19(3). <https://doi.org/10.19173/irrodl.v19i3.3664>

Rosseel, Y. (2012). lavaan: An R package for structural equation. *Journal of Statistical Software*, 48(2), 1–36 <https://doi.org/10.18637/jss.v048.i02>

Ryan, R. M., & Deci, E. L. (2000). Darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry*, 11(4), 319–338. https://doi.org/10.1207/s15327965pli1104_03

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publishing.

Subramanian, R. M. (2016). *The role of e-learning, the advantages and disadvantages of its adoption in Higher Education*. HINDCO Publications.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Pearson.

Tondello, G. F., Mora, A., Marczewski, A., & Nacke, L. E. (2019). Empirical validation of the gamification user types hexad scale in English and Spanish. *International Journal of Human-Computer Studies*. <https://doi.org/10.1016/j.ijhcs.2018.10.002>

Tondello, G. F., Wehbe, R. R., Diamond, L., Busch, M., Marczewski, A., & Nacke, L. E. (2016, October). The gamification user types hexad scale. *Proceedings of the 2016 annual symposium on computer-human interaction in play* (pp. 229–243). Austin, Texas, United States. <https://doi.org/10.1145/2967934.2968082>

Vaibhav, A., & Gupta, P. (2014, December). Gamification of MOOCs for increasing user engagement. *2014 IEEE International Conference on MOOC, Innovation and Technology in Education (MITE)* (pp. 290–295). Patiala, India. <https://doi.org/10.1109/mite.2014.7020290>

Werbach, K., & Hunter, D. (2012). *For the win: How game thinking can revolutionize your business*. Wharton Digital Press.

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. F. (1977). Assessing reliability and stability in panel models. *Sociological Methodology*, 8, 84–136. <https://doi.org/10.2307/270754>

Zichermann, G., & Cunningham, C. (2011). *Gamification by design: Implementing game mechanics in web and mobile apps*. O'Reilly Media, Inc.

Examining Higher Education Instructor Perceptions of Roles and Competencies in Online Teaching

Florence Martin

University of North Carolina Charlotte, USA

Swapna Kumar

University of Florida, USA

Liane She

University of North Carolina Charlotte, USA

Abstract

Online instructors adopt various roles and perform various competencies in the design and delivery of online courses. In this study, online instructor roles are categorized into eight types including Subject Matter Expert, Course Designer and Developer, Course Facilitator, Course Manager, Advisor/Mentor, Assessor/Evaluator, Technology Expert, and Lifelong Learner. Through survey-based research with 141 online instructors, this study examines competencies that online instructors perform based on various roles. When rating competencies, overall categorical means for all the roles were rated above 4.00, which showed that they used all these roles. The highest rated items and lowest rated items are discussed in addition to the connection between research and practice in online teaching. Online instructors who participate in training and who collaborate with instructional designers rated the frequency with which they perform the competencies to be higher. This study has implications for online instructors, instructional designers, and administrators who design and deliver online learning and offer professional development for online instructors.

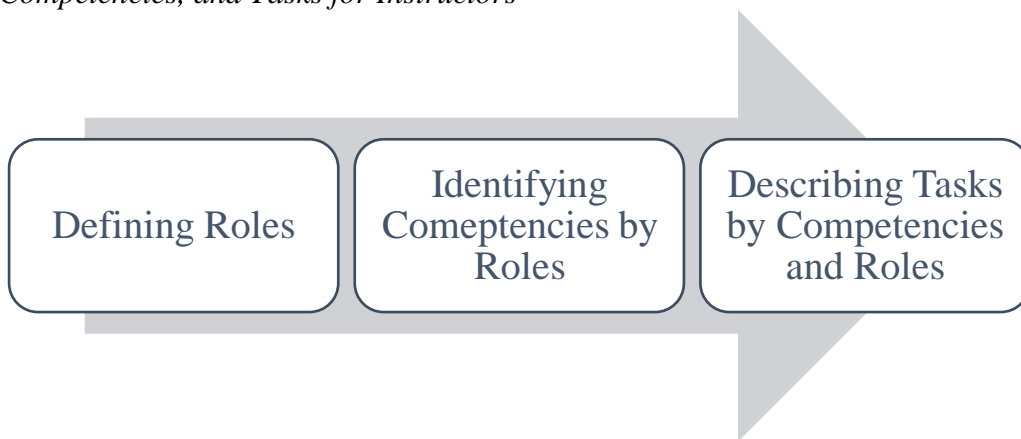
Keywords: Online teaching, online instructors, instructor roles, instructor competencies, online higher education

Martin, F., Kumar, S., & She, L. (2021). Examining higher education instructor perceptions of roles and competencies in online teaching. *Online Learning, 25*(4), 267-295.
DOI: 10.24059/olj.v25i4.2570

The number of online courses in higher education in the United States has increased over the last two decades, resulting in a 5.6% increase of distance education students and 6.4% decrease of on-campus students (Seaman et al., 2018). This has resulted in a need for more instructors to teach in the online environment (Legon et al., 2020). Teaching in the online environment involves a shift in instructors’ roles and teaching practices as they adapt to the affordances and possibilities of online environments (Baran et al., 2011; Bennet & Lockyer, 2004; Wiesenbergs & Stacey, 2008). Instructors must teach in a student-centered manner and work in high-interaction environments (Beck & Ferdig, 2008). Online instructors require different competencies than face-to-face instructors, and this has resulted in a need for professional development for online instructors (Borup & Evmenova, 2019; Mohr & Shelton, 2017). Spector and De la Teja (2001) and Richey et al. (2001) describe competence or competency as the ability to effectively perform a job task or activity to meet the requirements of the job, while a role is defined as “the function assumed or part played by a person or thing in a particular situation” (Peters et al., 2017, p.1).

Over the last two decades, researchers have studied the functions of online teaching and the competencies needed by instructors when teaching online (Baran et al., 2011; Berge, 2009; Coppola et al., 2002; Dennis et al., 2004). The International Board of Standards for Training, Performance, and Instruction (IBSTPI) has also created a competency development model (Klein et al., 2004), where learning and development competencies are categorized by roles and performance statements. IBSTPI has competency sets for instructors, online learners, instructional designers, training managers, and evaluators. In the IBSTPI competency development model, competencies for each role are identified by domains. Each competency also includes detailed performance statements. For instructor competencies, domains include professional foundations, planning and preparation, instructional methods and strategies, assessment and evaluation, and management. Alvarez et al. (2009) used a model of identifying roles, specific competencies, and tasks for university instructors. Figure 1 includes this visual representation of defining roles, identifying competencies by roles, and describing tasks by competencies and roles.

Figure 1
Roles, Competencies, and Tasks for Instructors



Adapted from Alvarez et al. (2009). University teacher roles and competencies in online learning environments. A theoretical analysis of teaching and learning practices. *European Journal of Teacher Education*, 32, 323.

Given the dynamic increase in online education (Seaman et al., 2018), developments in online communication technologies, and the need for online instructor professional development in the last decade, it is important to identify the necessary competencies needed for online instructors. This study examined the competencies of online instructors in higher education and whether instructors' completion of required training or collaboration with instructional designers resulted in increased online learning competencies. The results of our research will be valuable to instructors and researchers in online education, professionals and administrators working with online instructors, and institutions of higher education engaged in professional development for online teaching.

Online Instructional Functions and Roles

Several studies have examined competencies for online instructors focused on the functions of online teaching (Berge, 2009; Coppola et al., 2002; Dennis et al., 2004; Varvel, 2007). Coppola et al. (2002) define online teaching functions as cognitive, affective, and managerial. Cognitive relates to helping students process and store information efficiently; affective relates to creating a deeper connection with students and allowing them to show their emotions, and managerial relates to keeping the classroom structured and organized as well as to monitoring students. In line with the affective function, it is paramount for the instructor to accommodate individual needs, encourage self-directed learning, undertake a review of the teaching and learning process, and offer multiple perspectives (Lee, 2011). Similarly, Berge (1995) stated that the pedagogical function consists of facilitating discussions, the social function consists of encouraging and promoting collaborative work, the managerial function shows that instructors organize and describe the logistics of discussions, and the technical function provides a transparent technology environment to the learners. Building on these studies, Baran et al. (2011) recommended competencies for pedagogical, social, managerial, and technical functions.

On the other hand, several studies have also examined competencies for online instructors based on their roles (Aydin, 2005; Bawane & Spector, 2009; Goodyear et al., 2001; Martin et al., 2019a; Thach & Murphy, 1995; Williams, 2003). Bawane and Spector (2009) categorized online instructor roles into eight types: professional, pedagogical, social facilitator, evaluator, administrator, technologist, advisor/counselor, and researcher roles. The results of Bawane and Spector's (2009) study, in which instructors with at least two years of experience in online teaching participated, indicated that the instructor's foremost role is pedagogical. They also concluded that prior to teaching online, instructors need to be provided with competencies and roles required for successful online teaching. In their study with award-winning online instructors, Martin et al. (2019a) identified online instructor roles as aligned with various parts of the teaching process, such as course design, facilitation, and assessment, and identifying roles such as facilitator, course designer, content manager, subject matter expert, and mentor.

Table 1 lists the various online instructor roles and functions found in the literature, along with a description of the research method and participants.

Table 1
Online Instructor Functions and Roles

Online Instructor Functions/ Roles	Researchers	Research Method and Participants
Instructor, Instructional Designer, Technology Expert, Technician, Administrator, Site Facilitator, Editor, Librarian, Evaluation Specialist, Graphic Designer	Thach and Murphy (1995)	Delphi Survey Methodology (51 first round, 36 second round distance educators)

Perceptions of instructor roles and competencies in online teaching

Process facilitator, advisor/counselor, assessor, researcher, content facilitator, technologist, designer, and manager/administrator	Goodyear et al. (2001)	Report
Cognitive, affective, and managerial.	Coppola et al. (2002)	Interviews (20 faculty)
Administrative manager, instructor/facilitator, instructional designer, trainer, leader/change agent, technology expert, graphic designer, media publisher/editor, technician, support staff, librarian, evaluation specialist, site facilitator/proctor.	Williams (2003)	Delphi Questionnaire (15 distance education mentors)
Pedagogical, communicational, discipline, expertise, and technological.	Dennis et al. (2004)	Observations
Content expert, process facilitator, instructional designer, advisor/counselor, technologist, assessor, material producer, administrator	Aydin (2005)	Survey (53 mentors)
Administrative, personal, technological, instructional design, pedagogical, assessment, social.	Varvel (2007)	Literature review
Pedagogical, social, managerial, technical.	Berge (2009)	Literature review
Professional, pedagogical, social, evaluator, administrator, technologist, advisor/counselor, and researcher.	Bawane and Spector (2009)	Survey (30 teacher educators)
Pedagogical, social, managerial, and technical.	Baran et al. (2009)	Literature review
Pedagogical, managerial, technical, affective, and differentiating.	Lee (2011)	Survey (248 students)
Pedagogical, social, evaluator, administrator/manager, technologist, advisor/counselor, personal, researcher	Muñoz Carril et al. (2013)	Literature review, survey (166 instructors)
Instructional design, facilitating learning, learning assessment, technology use, administration management, content expertise, research development	Chang et al. (2014)	Survey (106 instructors)
Course designer and organizer, discussion facilitator, social supporter, technology facilitator, and assessment designer	Hung & Chou (2015)	Survey (750 students)
Facilitator, Course Designer, Content Manager, Subject Matter Expert, and Mentor	Martin et al. (2019a)	Interviews (8 award-winning instructors)

Based on the literature review, this study categorized roles as Subject Matter Expert, Course Designer and Developer, Course Facilitator, Course Manager, Advisor/Mentor, Assessor/Evaluator, Technology Expert, and Lifelong Learner.

Subject Matter Expert

Instructors are primarily seen as knowledge experts of the subjects they teach. In the Chang et al. (2014) study, online instructors viewed content expertise as the most important and frequently used role in online teaching. Being a content expert was one of the top two roles identified in Aydin's (2005) study as well. In other literature, content expertise is either explicitly identified or presumed in the pedagogical role of online instructors (Goodyear et al., 2001; Lee, 2011). Additionally, identifying appropriate resources representative of the content and designing activities to enhance student engagement and active learning are key to the instructor's role in online courses. This ensures that the course is enriching for the students and helps them take control of their learning (Caplan & Graham, 2004; Dennis et al., 2004). Likewise, course content must be adapted appropriately to provide students with constructive knowledge that is not solely textbook based (Conrad, 2004). In addition to knowledge of related subjects, online instructors are expected to be culturally neutral regarding course content and provide clear directions in multicultural online learning environments to provide effective learning opportunities for students (Lee, 2011). In online courses, the instructor's ability to use a variety of sources appears to be helpful and accessible to students. In contexts where students oversee their own learning experience and connect new knowledge with previous or current life experiences, instructors must keep in mind that activities should be geared towards the learner's active participation by being task or problem-centered (Gibbons & Wentworth, 2001).

Course Designer or Developer

The role of the instructor as course developer or instructional designer was identified in much of the literature (Aydin, 2005; Goodyear et al., 2001; Hung & Chou, 2015; Williams, 2003; Varvel, 2007). In an online course, instructors must identify learning goals and define smaller units and learning objectives, aligning activities with unit and course objectives for the desired learning outcomes. The course designer may be considered as a project manager, editor, and web developer, as they ensure that the alignment between the course layout and the selected course materials are properly and clearly linked (Caplan & Graham, 2004). It is paramount to structure to select relevant activities that correspond to course content as well as to design effective assessments (Yuksel, 2009). Inclusive design that uses interactive and globally accessible materials as well as multimedia resources with various formats allows students to engage with course content in various forms (Caplan & Graham, 2004). Course design also includes planning all aspects of design, including learning activities and communications that will promote interactions among students and between student and instructor (Alvarez et al., 2009). It involves design and planning before, during, and after the course, including course improvement to improve student learning. In addition to designing interactive learning experiences and structuring a course clearly, the regular updating of course materials and sharing of course experiences with colleagues is important (Liu et al., 2005). Liu et al. (2005) state that course designs can also be shared with other colleagues from the same institution to ensure consistency and collaboration among instructors.

Course Facilitator

In an online environment, instructors must facilitate, interact, and engage rather than lecture, so that the instructor's role shifts from being teacher-centered to student-centered (Beck & Ferdig, 2008). One of the most important roles of online instructors has thus been described as that of a facilitator (Ryan et al., 2004) or facilitator of the learning process (Aydin, 2005). While Dennis et al. (2004) discussed the role of the online instructor as a content designer as well as a process facilitator, Goodyear et al. (2001) described the process facilitator as implementing

online activities, especially those involving higher order thinking to support student learning. Hung and Chou (2015) define the instructor's role more specifically to be one of discussion facilitator in this context. According to Barber and King (2016), the instructor is required to facilitate, guide, and collaborate to engage students and increase their curiosity towards learning and the use of technology. When students first log in to the class, instructors must guide them efficiently through the course, welcome them, help them locate course resources, and clarify what the course will entail. This may be done through a variety of actions such as a welcome video or email and through the syllabus (Caplan & Graham, 2004).

Martin et al. (2018) summarized several facilitation strategies that instructors can use in an online course to enhance learning, engagement, instructor presence, and instructor connection. Their classification of facilitation strategies shows that instructor facilitation can support managerial, pedagogical, social, and technical functions. Providing timely feedback and responses to student questions were the two facilitation strategies highly rated as being helpful for learning, engagement, establishing instructor presence, and connection. Additionally, facilitators should accommodate the individual needs of students, help them to be self-directed, and expose them to multiple perspectives (Lee, 2011).

A facilitator can also be seen as the online community builder within the classroom (Berry, 2017; Roehm & Bonnel, 2009). To increase learners' engagement throughout the course, the online instructor also fosters relationships within the course. This develops a sense of community among learners (Maor, 2003). Facilitating the course can involve creating collaborative activities and discussions that allow students to interact and share their experiences. The instructor's role shifts from traditional lecturer to facilitator and guide for those assignments (Roehm & Bonnel, 2009). However, both student-student collaboration and instructor-student communication and dialogues must exist in an online course for active participation and cognitive presence (Dennen, 2011; Dixson et al., 2006). A course facilitator ensures clarity, understanding, and guidance among students, and monitors their progress throughout the course.

Course Manager

Online instructors are also course managers, or administrative managers, described in the literature as having managerial functions, administering an online course, or managing the learning (Aydin, 2005; Bawane & Spector, 2009; Berge, 2009; Chang et al., 2014; Coppola et al., 2002; Martin et al., 2019a; Williams, 2003). In addition to managing an online course in a learning management system by administering course policies and grades and ensuring adherence to departmental and college-level policies, instructors also manage their own course rules and structure. They are expected to remain patient and clear, manage their time, manage communication and conflict within a course, and not overload students with excessive course content and activities. As such, course managers must show effective leadership qualities and be knowledgeable of the course structure and content so they can better assist learners (Bawane & Spector, 2009).

Advisor and Mentor

Online instructors are also advisors and mentors (Martin et al., 2019a). Goodyear et al. (2001) describe this role as a consultant and counselor who advises students, while Dennis et al. (2004) and Bawane and Spector (2009) define it as an advisor and counselor, and Aydin (2005) as an online mentor. While advising is considered as a transactional process where students are advised about courses (e.g., course registration), mentoring is considered transformational and usually involves collaborative, connected, and reciprocal relationships (Johnson, 2007) during research and dissertation. Additionally, the role of the instructor is to inspire students to develop

reflective thinking and create a quality learning experience (Maor, 2003). This is captured in the affective role, where instructors who are social, provide off-task activities, develop and support learning communities, give affective support, and establish rapport have a direct impact on students' cognitive learning in online environments (Lee, 2011). Liu et al. (2005) also describe this role as that of a profession-inspirer, as an advisor who can point learners to professional organizations and promote professional dialogue related to their personal experiences in the discipline.

Assessor and Evaluator

Online instructors are also assessors and evaluators. The term *assessment* is used to emphasize the focus on learning, and *evaluation* is used to focus on teaching. Goodyear et al. (2001) describe this role as one where instructors assess student work and provide feedback, while Liu et al. (2005) emphasize the provision of timely, high quality, constructive, and formative feedback for student learning and autonomy. The role of a learning assessor was considered the third most important role of online instructors following content expertise and instructional design by instructors in the Chang et al. (2014)'s study. Dietz-Uhler et al., (2007) recommended that each instructor assess students' knowledge of online learning before the class commences to determine whether students need additional guidance in basic computer and technological knowledge. Additionally, providing students with a self-assessment tool at the end of each module to determine whether the learning outcome was achieved allows them to take control of their learning while evaluating themselves with the instructor's guidance.

In an online course, instructors need to ensure that students' progress through the course and understand the material and provide additional assistance to students not achieving course objectives (Liu et al., 2005). In addition, assessing students also means that they regularly check the course and log in to keep track of assignments, and that they are using the resources provided by the instructor. Additionally, sharing resources with other instructors can also improve quality since instructors can receive feedback and support from other colleagues.

As an evaluator, the instructor collects feedback from students to formatively and summatively evaluate the course during and at the end of the course. They do this by administering course surveys or through discussions in the course. As an evaluator, the instructor also receives feedback from peers and provides feedback to colleagues on online teaching. They also continually evaluate the course by participating in programs such as Quality Matters to evaluate their courses (Martin et al., 2019b).

Technology Expert

The online instructor is a technology expert. When working in an online environment, the instructor needs technological skills and knowledge to use the learning management system (LMS) and interactive technologies that can facilitate online interactions or receive assistance from instructional designers when necessary (Liu et al. 2005). The instructor needs to have technical capabilities to guide students through technology and make them feel more comfortable (Lee, 2011). The instructor's technical role also presumes that the instructor can effectively use video/audio tools and chat/discussion programs to develop user-friendly courses and resources to benefit learners. For an online instructor, developing course content using technology is the first action performed while teaching, when instructors first engage in e-learning (Muñoz Carril et al., 2013).

Lifelong Learner

Online instructors are lifelong learners. Participants in the Martin et al. (2019a) study emphasized the need for instructor willingness to learn, experiment, and reflect on their courses,

especially since technologies and online environments constantly change. According to Dempsey (1992), a reflective practitioner looks back and analyzes teaching practices, imagines change, and explores new teaching practices. Instructors can be scholars who inquire into their teaching strategies, exchange information with other online instructors, attend social events such as conferences, and pursue professional development opportunities. As such, instructors are also considered learning partners (Dempsey, 1992) as they must be able to help students establish reflection and social interactions.

Additionally, instructors are also learners who will learn from their peers' experiences and communities of practice (McGee et al., 2017). Online instructor competencies vary depending on their institutions, on resources provided, and training for new instructors (McGee et al., 2017). In addition to other roles, instructors can potentially be learners, as novice instructors will learn from their peers' experiences and communities of practice. Online instructors can also be researchers (Bawane & Spector, 2009; Muñoz Carril et al., 2013) or engage in research development (Chang et al., 2014) by analyzing data from their courses that can improve courses and student learning.

Other Roles

Online instructors can also adopt roles such as the librarian, graphic designer, co-learner, site facilitator and proctor, support staff, leader/change agent, systems expert/consultant (Dennis et al., 2004; Egan & Akdere, 2005; Thach & Murphy 1995; Williams, 2003). The instructor must not only serve as guide and collaborator to engage students and increase their curiosity, but also as co-learner regarding new technology tools and features. Relationships within the online course and social interactions from the beginning of the course are paramount to build a sense of learning community. This promotes a sense of community among learners and encourages them to collaborate and develop active learning. In addition to reviewing the literature for competencies by roles, the literature on required training for online instructors and collaboration with instructional designers is reviewed next.

Relationship Between Required Training and Online Instructor Competencies

Researchers have recommended the need for faculty training focusing on methodologies and facilitation to teach online (Moskal et al., 2015; Vaill & Testori, 2012). Vang et al. (2020) in a study with community college faculty found that 90% of instructors had completed the required training and found that when institutions require training, online instructors rate the online readiness competencies higher than those who do not. However, another study with faculty members in a university setting found that most faculty members did not have required training before teaching online (Martin et al., 2019c). Baran and Carrea (2014) proposed a three-tiered professional development model for online teaching. The lower level in their framework focused on teaching and included workshops/showcases, training programs, and one-to-one assistance as various professional development methods for teaching. Research is needed to determine whether required training results in increased online instructor competencies.

Relationship Between Instructional Designer (ID) Collaboration and Online Instructor Competencies

Researchers have studied the collaboration between instructional designers and faculty members. Richardson et al. (2019) examine the importance of faculty and instructional designer collaboration and conclude that instructional designers act as coaches and facilitators who guide instructors in course design. In another study, Halupa (2019) discusses the collaborative roles of faculty members and instructional designers as content experts and design experts respectively. Chao et al. (2010) in their study found that collaboration was most successful when instructional

designers have a rapport with faculty members, who were then more likely to implement ID guidelines in the design of their courses. More research is needed to examine whether online instructor collaboration with instructional designers results in increased competencies.

Purpose of This Study and Research Questions

Of the few empirical studies that have been conducted related to online instructor roles and competencies, some have used interviews and observations in a qualitative approach (Coppola et al., 2002; Dennis et al., 2004; Martin et al., 2019b), and others are survey studies (Lee, 2011; Chang et al., 2014; Hung & Chou, 2015). Almost all survey studies in the last decade have been conducted with students, except for two large-scale survey studies in Taiwan (Chang et al., 2014) and Spain (Muñoz Carril et al., 2013). Online teaching has evolved, online communication technologies and learning management systems have changed, and competencies have also changed over the years. Therefore, the current competencies of online instructors need to be examined in an ongoing fashion. This study addresses the following research questions:

1. What competencies do online instructors perform for various roles?
2. Are the factors required training and instructional designer collaboration related to increased instructor competencies for online teaching?

Methods

This section documents the details of the survey-based research, including participants, creation of the instrument, data collection, and analysis.

Participants

The sample consisted of online instructors across the United States. The researchers recruited online instructors through the Association of Educational Communications and Technology (AECT) email list and through a distance education email list at a Southeastern University. A total of 148 online instructors completed the electronic survey, of which 141 valid responses were received. The respondents from AECT and the southeastern university were not statistically significantly different from each other with respect to gender, $\chi^2(df = 4) = 5.70, p = .22$, rank, $\chi^2(df = 4) = 6.70, p = .15$, years of teaching online $\chi^2(df = 6) = 2.45, p = .87$, and learning environment taught $\chi^2(df = 4) = 1.45, p = .83$. As a result, all respondents were grouped together for further analysis. Table 2 below provides the demographic and experience details of the respondents.

Table 2

Survey Respondent Details

Demographic Variable	Demographic Details	Frequency	Percentage
Gender	Male	41	29.1
	Female	95	67.4
	Other	4	2.8
Rank	Adjunct Instructor	27	19.1
	Instructor or Lecturer	39	27.7
	Assistant Professor	21	14.9
	Associate Professor	24	17.0
	Professor	16	11.3
	Other	11	7.8
Primary Learning Environment Taught	Blended or Hybrid	35	24.8
	Online Asynchronous	65	46.1

Perceptions of instructor roles and competencies in online teaching

	Online Synchronous	21	12.1
	Other	17	14.9
Teaching Level	Undergraduate	75	53.2
	Graduate	47	33.3
	Other	16	11.3
Teaching Institution	4 year	116	82.3
	2 year	9	6.4
	Other	14	10.0
Academic Discipline	Arts	12	8.5
	Sciences	14	9.9
	Business	7	5.0
	Computer Science	6	4.3
	Education	57	40.4
	Engineering	6	4.3
	Health Sciences	12	8.5
	Law	1	0.7
	Other	25	17.7
Expertise	Novice	6	4.3
	Advanced Beginner	17	12.1
	Intermediate	35	24.8
	Proficient	55	39.0
	Expert	27	19.1
Online Teaching Experience	1-5 years	66	46.8
	6-10 years	25	17.7
	11-15 years	21	14.9
	More than 15	28	19.9
Online Courses Taught	1-5	54	38.3
	6-10	30	21.3
	11-15	19	13.5
	More than 15	36	25.5
Taught online before COVID	Yes	120	85.1
	No	20	14.2
Collaborated with ID	Yes	89	63.1
	No	47	33.3
	Not Sure	4	2.8
Training Required	Yes	52	36.9
	No	73	51.8
	Not Sure	13	9.2

Instrument

The Online Instructor Roles and Competencies (OIRC) instrument was developed based on an extensive literature review on online instructor competencies for each role and from previous qualitative research (Martin et al., 2019). The prior qualitative study revealed 38 competencies, but additional competencies identified in the literature have been added. Three

researchers discussed and refined the roles and competencies. The final list of competencies in eight different role categories was then used to create survey items. The organization of the survey was modeled on the competencies categorized by roles of the International Board of Standards for Training, Performance, and Instruction (IBSTPI) and Alvarez et al. (2009) framework. Using IBSTPI and Alvarez et al. (2009) as the guiding framework in the survey (see Appendix A), roles and competencies for online instructors were organized.

Following its creation, the survey draft underwent expert review. Five experts reviewed the draft instrument and provided feedback on content validity, construct validity, and face validity. While three of the expert reviewers were online learning experts, two of them were research methodologists. Sample comments from the experts included “This would seem like a course facilitator, rather than technology expert,” “How do you quantify this?” and “Are these different competencies?” The final list included 58 competencies under eight different roles: Subject Matter Expert, Course Designer & Developer, Course Facilitator, Course Manager, Advisor/Mentor, Assessor/Evaluator, Technology Expert, and Lifelong Learner. Respondents were asked to rate competencies based on the frequency they perform the competencies. A 5-point Likert scale item was used: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always. The Cronbach’s alpha was used to check the reliability of the internal consistency for all survey items was .87. Reliability coefficients greater than .80 are adequate and values greater than .90 are good (Kline, 2016; Nunnally & Berstein, 1995).

In addition, two open-ended questions and 11 demographic questions were included in the survey. Demographic questions included gender (male, female, transgender, other, do not wish to respond); rank (adjunct instructor, instructor or lecturer, assistant professor, associate professor, professor, other); and teaching-focused questions such as learning environment primarily taught (blended or hybrid, asynchronous online, synchronous online, other); level taught (undergraduate courses, graduate courses, other); type of institution (4-year institution, 2-year institution, other); online teaching experience (1-5, 6-10, 11-15, more than 15); academic discipline (arts, sciences, business, computer science, education, engineering, health science, law, medicine, other); expertise (novice, advanced beginner, intermediate, proficient, expert); number of courses taught online (1-5, 6-10, 11-15, more than 15); collaboration with instructional designers (yes, no, not sure); and requirement to attend training to teach online (yes, no, not sure). One open-ended question asked respondents to include roles and competencies that were not included in the instrument. The open-ended question was phrased “Have you ever taken on a role in an online course other than the ones listed?” An option identified as “other” was included at the end of each competency category by role so that additional data could be captured for additional competencies. Appendix A includes the survey.

Data Collection

Data were collected in Summer 2020. Institutional review board approval was received before the survey was distributed for data collection. Email invitations were distributed along with the link to the electronic survey. The respondents provided online consent before completing the survey. Participation in the survey was voluntary, responses were anonymous, and participants received no incentive for their participation in this electronic survey distributed through SurveyShare, an electronic survey tool used at one researcher’s university.

Data Analysis

A total of 148 responses were captured, of which seven responses had more than one-third of the responses missing. These responses were deleted, which resulted in 141 valid cases. Missing Completely at Random (MCAR) analysis was performed, revealing that among the 141

valid cases, data were missing at random as Little's (1988) MCAR test was not statistically significant. Missing data were replaced with series mean for the Likert Scale data. To answer the first research question, descriptive statistics and frequencies for various roles and competencies are reported in Table 4. In addition, thematic analysis was used to analyze the few responses to the two open-ended questions. Responses were thematically coded, which led to the emergence of two categories—other competencies and explanations or comments—which are described in the results. To answer the second research question, multivariate analysis of variance (MANOVA) was used to see whether the perceptions of online instructors vary across instructors' experience working with instructional designers and requirement to attend training.

Results

The results section discusses the various competencies online instructors perform and whether participation in required training or collaborating with an instructional designer made a difference in their competencies.

Online Instructor Competencies

Respondents were asked to rate the frequency with which each competency was demonstrated. The item was worded as "Please indicate the frequency with which you perform the following competencies in your online courses." Means and Standard Deviations are reported for the competencies categorized by each role as shown in Table 4. All eight roles had a categorical mean above 4.00 which showed that most of these roles were used "often" by online instructors. The lowest frequently rated role was advisor and mentor, which was rated at M=4.02. However, this was still rated above 4.00, which shows that online instructors also served as advisors and mentors.

Table 4

Descriptive Statistics by Various Online Instructor Roles

	Role	Mean	SD
	Subject Matter Expert		
1	Demonstrate content expertise	4.64	0.56
2	Stay current with research and theories in the field	4.39	0.72
3	Contribute relevant content to course outcomes	4.51	0.67
4	Collaborate with instructional designers to develop the course	2.83	1.37
5	Ensure that the course content is accurate	4.66	0.61
		4.21	0.50
	Course Designer and Developer		
6	Establish learning objectives	4.27	1.13
7	Develop learning activities	4.52	0.85
8	Include existing instructional resources (texts, OERs, videos)	4.40	0.88
9	Develop digital learning materials	3.98	1.15
10	Ensure alignment between objectives, content and, assessment	4.57	0.79
11	Develop a course on the Learning Management System	4.07	1.35
12	Provide consistent course structure	4.53	0.82
13	Design intuitive course navigation	4.10	1.12
14	Consider culturally inclusive content	4.13	0.98
15	Ensure accessibility and ADA-compliance	3.92	1.03

Perceptions of instructor roles and competencies in online teaching

		4.25	0.70
	Course Facilitator		
16	Create a welcome message (announcement, video)	4.65	0.75
17	Check in with students frequently	4.56	0.68
18	Help students develop self-regulated learning skills	4.02	0.95
19	Host synchronous sessions if applicable	3.66	1.26
20	Hold online office hours	4.08	1.17
21	Facilitate online discussions	4.26	1.03
22	Use active learning strategies to engage learners	4.41	0.79
23	Provide timely and substantive feedback	4.49	0.70
24	Foster interaction among learners	4.34	0.81
25	Interact in a culturally sensitive manner	4.45	0.87
26	Offer multiple perspectives	4.31	0.84
27	Encourage student reflection	4.47	0.81
28	Creating a sense of community amongst students from the same course	4.24	0.90
		4.30	0.60
	Course Manager		
29	Monitor learner participation	4.51	0.86
30	Provide clear instructions to learners	4.65	0.74
31	Be responsive to individual student needs	4.56	0.77
32	Enforce course and institutional policies	4.53	0.80
33	Resolve potential conflicts among learners	3.85	1.10
34	Connect students with institutional support services	3.92	1.10
		4.34	0.71
	Advisor/Mentor		
35	Advise learners on their academic development.	3.88	1.01
36	Advise learners on their professional development.	3.58	1.13
37	Motivate the students to succeed.	4.41	0.78
38	Guide students to be self-directed and responsible for their course work	4.38	0.81
39	Guide students to access resources when needed	4.46	0.75
40	Mentor other colleagues who teach online	3.42	1.17
		4.02	0.72
	Assessor/Evaluator		
41	Use a variety of assessments (quizzes, projects)	4.53	0.73
42	Align assessment to objectives and activities	4.60	0.80
43	Establish clear grading criteria for assessments	4.57	0.73
44	Assess students' work	4.74	0.60
45	Monitor individual student and group progress	4.50	0.76
46	Proctor online tests if applicable	2.64	1.62
47	Continually improve the course	4.53	0.80
		4.30	0.62
	Technology Expert		
48	Ensure that students are comfortable in the learning environment	4.22	0.97
49	Orient the students to the online course	4.36	0.96
50	Use appropriate technology to support learning	4.42	0.85
51	Provide students with resources for technical help and support	4.27	0.97
		4.32	0.83
	Lifelong Learner		
53	Integrate best practices from research into online teaching	4.46	0.70
54	Engage in professional development on online learning	4.22	0.81
55	Share and learn from peers about online teaching practices	4.25	0.83
56	Use data from the online course for continuous improvement	4.23	0.91
57	Use data from the online course for continuous improvement	4.23	0.91
58	Keep pace with the advances in educational technologies	4.16	0.75
		4.27	0.64

The categorical means for the roles were all above 4.0 and ranged between 4.02 and 4.34, which demonstrated minimal differences (between 0.02 and 0.32) on the overall competencies by the roles, although differences existed in the ratings of individual competencies. The ratings on individual competencies ranged between 2.83 and 4.74, and the highest and least rated individual competencies are discussed below. Of the 58 individual competencies, 48 were rated above 4.0. Five competencies were rated above 4.6: assess students work (M=4.74); ensure that the course content is accurate (M=4.66); create a welcome message (M=4.65); provide clear instructions to learners (M=4.65); and demonstrate content expertise (M=4.64). Ten competencies were rated below 4.0: proctor online tests if applicable, (M=2.64); collaborate with instructional designers to develop the course (M=2.83); mentor other colleagues who teach online (M=3.42); advise learners on their professional development (M=3.58); host synchronous session if applicable (M=3.66); resolve potential conflicts among learners (M=3.85); advise learners on their academic development (M=3.88); ensure accessibility and ADA-compliance (M=3.92); connect students with institutional support services (M=3.92); and develop digital learning materials (M=3.98).

Other Roles and Competencies

When asked in an open-ended question whether online instructors have served in any other roles, some additional roles were identified: online student; providing professional development support for other instructors; ensuring the quality of online courses; disciplinarian for academic integrity violation and holding students accountable for their actions; program coordinator; and peer evaluator.

At the end of each role category, participants were asked whether any competencies were not listed. Two competencies were mentioned: a) Subject Matter Expert (SME) collaborations with other content experts and b) setting up individual or 1:1 online meetings with students in a flexible manner, not just online office hours (Course Facilitator role). Eight participants shared that they did all their course design themselves, with one participant stating, “I am responsible for all of it,” and another explaining there were no funds for instructional designers. The importance of ADA-compliance and accessibility was highlighted by six participants who stated that often this was the sole responsibility of the instructor. Four participants indicated a lack of control over course content, for instance, that they could not change prescribed learning objectives in an accredited program, or that they did not develop the courses they taught. One participant wrote “As a lecturer, I often just deliver prepared content.” Four participants also specified that they did not teach courses where online proctoring was needed.

Differences Based on Training requirement and Collaboration with Instructional Designers

Descriptive statistics are provided for the various roles based on these two significant factors training required and collaboration with instructional designers in Table 5.

Table 5
Descriptive Statistics for Training Required and Instructional Design Collaboration

		Subject Mater Expert	Course Designer and Developer	Course Facilitator	Course Manager	Advisor/ Mentor	Assessor/ Evaluator	Tech Expert	Lifelong Learner
Training Required	Yes	4.37 (0.52)	4.24 (0.71)	4.33 (0.73)	4.51 (0.67)	4.23 (0.77)	4.40 (0.65)	4.34 (0.92)	4.35 (0.66)
	No	4.10 (0.45)	4.27 (0.67)	4.27 (0.54)	4.27 (0.67)	3.90 (0.68)	4.23 (0.61)	4.34 (0.72)	4.21 (0.64)

Instructional Designer Collaboration	Yes	4.34 (0.47)	4.35 (0.57)	4.37 (0.51)	4.36 (0.72)	4.08 (0.64)	4.35 (0.55)	4.38 (0.69)	4.34 (0.56)
	No	3.97 (0.50)	4.05 (0.90)	4.18 (0.75)	4.31 (0.73)	3.90 (0.87)	4.17 (0.72)	4.18 (1.05)	4.15 (0.75)

A multivariate analysis was conducted to examine differences between respondents who were required to take training and those who were not, and those who collaborated with instructional designers and those who did not. Differences were examined for these categories only for those who responded Yes or No. The data for those who responded as unsure were not used. Both of these analyses (training required and not; collaborated with instructional designers and did not) resulted in significant differences ($p < .05$). Online instructors required to participate in training rated the competencies significantly higher than those who did not have to participate in required training $F(8,111) = 2.658$, Wilk's $\Lambda = 0.839$, partial $\eta^2 = .16$. Online instructors who collaborated with instructional designers rated the competencies significantly higher than those who did not $F(8,111) = 2.303$ Wilk's $\Lambda = 0.858$, partial $\eta^2 = .14$.

Discussion

This section discusses the overall ratings of competencies, and highest and least rated competencies in online teaching. Also discussed are the connections among research and practice, required training, and instructional designer collaboration relationships for online instructor competencies.

Overall Ratings of Competencies

This study showed no differences in ratings based on roles. In addition, 48 of the 58 total competencies were rated above 4.0, where the Likert scale 4.0 was for “Often” and 5.0 was “Always.” This shows the importance of the competencies identified in this study. All competencies in the technology expert and lifelong learner roles were rated above 4.0, while one or two competencies rated low in the other roles. While the list of competencies included both asynchronous and synchronous online teaching, some competencies specifically focused on synchronous teaching and may not be applicable for asynchronous only courses (e.g., host synchronous sessions and proctor tests online).

Highest Rated Competencies

In this section, we discuss the five top-rated competencies. The five competencies rated the highest by online instructors all related to course content, communication with students, and assessment: assess students’ work ($M=4.74$); need to ensure course content is accurate ($M=4.66$); create a welcome message ($M=4.65$); provide clear instructions to learners ($M=4.65$); and demonstrate content expertise ($M=4.64$).

Assess Student Work—Assessor

Assessing student work was the highest-rated competency among the 58 items. This indicates online instructors’ involvement in assessing student work in online courses. Martin et al. (2019b) in their study with award-winning online instructors described online instructors as assessors and recommended that online instructors use a variety of assessments, using traditional and authentic assessments and rubrics for assessments in their role as an assessor.

Ensure Course Content is Accurate—Subject Matter Expert

Online instructors may, in some situations, only be involved in facilitating a course but not in designing it, while in other situations they are involved both in online course design and delivery. Participants' open-ended comments raised this point in this survey. However, in both instances, online instructors see themselves as subject matter experts who ensure the veracity of the course content and facilitate the delivery of the online course. This is consistent with Chang et al.'s (2014) findings that content expertise was rated highest in e-instructors' perceptions and practice.

Create a Welcome Message—Facilitator

Online instructors rated welcome messages highly. Research has identified that using a recorded welcome video helps to provide expectations, create a community of learning, and enhance social presence (Khan et al., 2017). The research of Martin et al. (2018) examined facilitation strategies where both course orientation and weekly announcements were included as helpful facilitation strategies. Additionally, weekly announcements were rated highly by both instructors and students in comparison to the course orientation.

Provide Clear Instructions to Learners—Manager

Providing clear instructions received high ratings. In a face-to-face classroom, instructions can be provided instantly and clarified whereas in an online setting it is important for instructions to be clear ahead of time to avoid confusion. While some students' hesitation to ask for clarification hinders their learning, others might contact the instructor with a number of questions which results in an increased work load for the instructor. When instructions and navigation is unclear it is easy to lose student participation. Rubrics have identified including clear instructions as critical to the success of online students (Quality Matters, 2020).

Demonstrate Content Expertise—Subject Matter Expert

Demonstrating content expertise was rated high by online instructors as critical for online teaching. This is consistent to the Chang et al. (2014) study on e-instructors' ratings of being content experts. Martin et al. (2019b) when interviewing award-winning online instructors found that the instructors emphasized the importance of creating content for students to achieve mastery. Conrad (2004) also recommended that course content be adapted appropriately to provide students with constructive knowledge and should not solely be textbook based. This shows the importance of online instructors being content experts and focusing on the design of the content for online delivery.

Lowest Rated Competencies

The ten competencies rated lowest by online instructors were found to be competencies that are not always relevant to all online courses (e.g., synchronous sessions or colleague mentoring). These were: proctor online tests if applicable (M=2.64); collaborate with instructional designers to develop the course (M=2.83); mentor other colleagues who teach online (M=3.42); advise learners on their professional development (M=3.58); host synchronous sessions if applicable (M=3.66); resolve potential conflicts among learners (M=3.85); advise learners on their academic development (M=3.88); ensure accessibility and ADA-compliance (M=3.92); connect students with institutional support services (M=3.92); and develop digital learning materials (M=3.98). It is important that instructors focus on these competencies even though they may not be consistently performed.

Proctor Online Tests if Applicable—Assessor/Evaluator

Proctoring online tests is not a common practice in all online courses and levels (e.g., graduate courses) since this can be expensive and includes a fee at testing centers (Cluskey et al., 2011); therefore, it is understandable that it was rated the lowest. Milone et al. (2017) studied the impact of online proctoring and found that more than half of their study participants mentioned that the use of online proctoring would influence their decision to take another online course which, in turn, could influence instructors' decision to use online proctoring. While academic integrity is important, assessments other than tests is also important (Martin et al., 2019b).

Collaborate with Instructional Designers to Develop the Course—Subject Matter Expert

While it is good practice to collaborate with instructional designers, the lack of collaboration with instructional designers reported by the respondents could be indicative of the level of support and resources available to online instructors at their institutions. Also, in some cases, faculty members may either not be aware of the presence of instructional designers on their campuses or may not consistently use the support of instructional designers. Many adjunct faculty members may not live close enough to campus to make use of the instructional design support available to them or might teach from course shells that are provided to them.

Mentor Other Colleagues to Teach Online—Mentor

Among the faculty who responded to this survey, 19% were adjunct instructors, 28% were instructors or lecturers, and 15% were assistant professors. They may not be in a position to mentor other colleagues, although they might have online teaching expertise.

Advise Learners on Their Professional Development—Advisor

Similarly, advising learners on professional development was rated low as some online instructors may not serve as advisors to their students and may only focus on academic aspects of the course. With 19% of the respondents in this study being adjunct instructors, they may not be as involved in advising learners or have an opportunity for advising learners outside the course.

Host Synchronous Sessions if Applicable—Facilitator

Hosting synchronous sessions was rated at 3.66, which is a rating of frequency between “sometimes” and “often.” Online programs in the US are mainly asynchronous in delivery (Legon et al., 2020), which was reflected in this survey where 46% of instructors taught asynchronously online and 12% entirely synchronously online. It is thus not surprising that faculty members report hosting synchronous sessions, but not “always.” It is a good practice to blend asynchronous and synchronous delivery methods in online teaching (Martin et al., 2020b).

Resolving Potential Conflicts Among Learners—Manager

This is another optional competency that might be performed by instructors when this problem arises and hence may be rated closer to “often” but not “always.” However, it is important for instructors to have the knowledge and skills to be able to resolve potential conflicts among online learners.

Advise Learners on Academic Development—Manager

There is always room for online instructors to advise students on their academic development as part of the course. Academic development includes factors that affect students' academic, personal, and social development. This was rated at M=3.88 between “sometimes” and “often.” In some cases, this is considered as the role of the academic advisor, but online instructors can also play a role in advising learners on academic development.

Ensure Accessibility and ADA compliance—Designer and Developer

Accessibility and ADA compliance are usually performed as a reactive action when a student with a special need is enrolled in the course. It could also reflect the academic discipline of the instructor and how many students with special needs the program and their institution enroll. Instead, it is important for instructors to also include accessibility and ADA compliance when online courses are designed. Guilbaud (2019) found that instructors rated their knowledge of accessibility and standards low and demonstrated a need for professional development.

Connect Students with Institutional Support Services—Manager

Similarly, it is important for online instructors to provide information that connects students with institutional support services so that students have a variety of supports for issues that may arise. Instructors do not have to try and solve all the student issues, especially when institutional support is available. Some of the support services could include Library Services, Technical Support, Writing Resource Center, Disability Services office, University Career Center, University Center for Academic Excellence, Counseling Center, and Scholarship Office.

Develop Digital Learning Materials—Designer and Developer

Finally, though rated very close to 4.0, developing digital learning materials was rated at 3.98. While instructors who re-use a course that is provided to them may not be developing digital learning materials, they can create digital learning material for course orientations and demonstrations as needed. If they are responsible for the design and facilitation of the course, digital learning materials make learning engaging compared to just text-based resources or integrating existing resources. It is helpful to have instructor-generated learning material which increases instructor presence.

Connections Between Research and Practice

In general, participants gave highest ratings to competencies related to subject matter and technology expertise; course design, development, facilitation, management, and assessment; and being a lifelong learner. Of these, the need to be a lifelong learner by, for instance, integrating best practices from research into online teaching and staying current with research and theories in the field, are often recommended but not always practiced by online instructors due to lack of time or professional development. The high ratings on these items indicate that connections between research and practice are perceived by the instructors in this survey as essential for their success. The results also highlight the need to help online instructors learn more about research and best practices and go beyond focusing on the more critical tasks important to the success of an online course, notwithstanding the importance of those tasks for student learning.

Online Instructor Competencies Ratings Differ Based on the Requirement for Training

Online instructors who participated in training to teach online rated the competencies higher than those who did not. While some higher education institutions require faculty to complete training to teach online, others do not. In this study, 37% of the respondents were required to complete training, 52% were not required, and 11% were not sure if they had to complete a required training. Vang et al. (2020) found that in the community college setting, 90% of instructors were required to participate in training before teaching online. The finding from this study shows that when institutions require training, online instructors rate the competencies higher than those who are not required.

Online Instructor Competencies Ratings Differ Based on Their Collaboration with an Instructional Designer

Online instructors who collaborated with an instructional designer rated the competencies higher than those who did not. About 63% of respondents reported that they collaborated with an

instructional designer, while 33% did not, and about 3% were not sure. This finding demonstrates the importance of collaboration with an instructional designer. Halupa (2019) discusses the importance of articulating roles in collaborative processes when instructional designer and instructor work together as design expert and subject matter expert. Brigance (2011) discusses the importance of instructional designers taking the lead in online course design. The findings of this study show the importance of collaboration with an instructional designer, which can result in increased online instructor competencies.

Limitations

This survey-based study included some methodological limitations. The sample size was small as only 141 valid responses were received. In survey-based research, there is a response bias due to the self-reported nature of the data. The instructors who chose to respond to the questions might be different from those who did not. Also, the competency and roles included in this survey may not be an exhaustive list of all possible online instructor competencies and roles. While instructor competencies were examined based on the instructors training and collaboration with the instructional designer, other variables could also be examined.

Implications and Future Research

Research on online education and best practices in online teaching has provided insight into best practices, roles, and competencies in online teaching. However, as online teaching is more widely adopted and digital technologies evolve and provide new avenues for online interactions, these online instructor competencies should be continuously revisited, redefined or refined, and adopted for online learner success. The findings of this study, built on prior research, have implications for online instructors, administrators, faculty development professionals, and students. Online instructors might benefit from the various competencies that they can perform, and by comparing their competencies against the most rated competencies and least rated competencies by online instructors in this survey. The findings can inform administrators on areas of support they can provide for online instructors at their institutions, and the competencies that might be needed by faculty appointed to teach online. Faculty development professionals can identify the areas in which they can provide support for online instructors, the competencies that instructors require and whether applicable to their contexts, and adapt these competencies based on their contexts. Some competencies listed in this survey might be relevant for certain disciplines or course levels, which is an area for future exploration. Finally, online students will benefit from this study if the online instructors are able to perform a variety of these competencies.

This study did not include an item asking online instructors whether they had also designed the online courses that they taught. It would be useful to ask such a question in a future study, to distinguish between the ratings for those who design their own courses and those who do not, and to determine whether this influences how the course designer and developer roles are rated. This instrument can also be administered in different types of 2-year or 4-year institutions, as well as globally, to identify variations in online instructor roles and competencies. Administrators can also be surveyed and interviewed to study online instructor competencies. Future research studies can also support the validation of this survey which can then be used by online instructors globally.

Declarations

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author(s) received approval from the ethics review board of the University of North Carolina—Charlotte for this study.

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Álvarez, I., Guasch, T., & Espasa, A. (2009). University teacher roles and competencies in online learning environments: a theoretical analysis of teaching and learning practices. *European Journal of Teacher Education*, 32(3), 321-336.
- Aydin, C. (2005). Turkish mentors' perception of roles, competencies and resources for online teaching. *Turkish Online Journal of Distance Education*, 6(3).
<https://dergipark.org.tr/en/pub/tojde/issue/16929/176725>
- 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>
- Barber, W., & King, S. (2016). Teacher-student perspectives of invisible pedagogy: New directions in online problem-based learning environments. *The Electronic Journal of e-Learning Volume*, 14(4), 235-243.
- Bawane, J., & Spector, J. (2009). Prioritization of online instructor roles: Implications for competency-based teacher education programs. *Distance Education*, 30(3), 383–397.
<https://doi.org/10.1080/01587910903236536>
- Beck, D., & Ferdig, R. E. (2008). Evolving roles of online and face-to-face instructors in a lecture/lab hybrid course. *TOJET: The Turkish Online Journal of Educational Technology*, 7(1).
- Bennett, S., & Lockyer, L. (2004). Becoming an online teacher: Adapting to a changed environment for teaching and learning in higher education. *Educational Media International*, 41(3), 231–248. doi: 10.1080/09523980410001680842
- Berge, Z. (2009). Changing instructor's roles in virtual worlds. *Quarterly Review of Distance Education*, 9(4), 407–415.
- Berge, Z. (1995). The role of the online instructor/facilitator. *Educational Technology*, 35(1), 22–30.
- Berry, S. (2017). Building community in online doctoral classrooms: instructor practices that support community. *Online Learning* 21(2). doi: 10.24059/olj.v21i2.875
- Brigrance, S. K. (2011). Leadership in online learning in higher education: Why instructional designers for online learning should lead the way. *Performance Improvement*, 50(10), 43-48.
- 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), 1-20.
- Caplan, D., & Graham, R. (2004). The development of online courses. *Theory and Practice of Online Learning*, 2(10), 243-264.

Chang, C., Shen, H. Y., & Liu, E. Z. F. (2014). University faculty's perspectives on the roles of e-instructors and their online instruction practice. *International Review of Research in Open and Distributed Learning*, 15(3), 72-92.

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 Distributed Learning*, 11(3), 106-126.

Cluskey Jr, G. R., Ehlen, C. R., & Raiborn, M. H. (2011). Thwarting online exam cheating without proctor supervision. *Journal of Academic and Business Ethics*, 4(1), 1-7.

Conrad, D. (2004). University instructors' reflections on their first online teaching experiences. *Journal of Asynchronous Learning Networks*, 8(2), 31-44.

Coppola, N., Hiltz, S., & Rotter, N. (2002). Becoming a virtual professor: Pedagogical roles and asynchronous learning networks. *Journal of Management Information Systems*, 18(4), 169–189. Dempsey, R. (1992). Teachers as leaders: Towards a conceptual framework. *Teaching Education*, 5(1), 113-122. <https://doi.org/10.1080/1047621920050114>

Dennen, V. P. (2011). Facilitator presence and identity in online discourse: Use of positioning theory as an analytic framework. *Instructional Science*, 39(4), 527-541.

Dennis, B., Watland, P., Pirotte, S., & Verday, N. (2004). Role and competencies of the etutor. In *Proceedings of the Networked Learning Conference*. (pp. 150-157)

Dietz-Uhler, B., Fisher, A., & Han, A. (2007). Designing online courses to promote student retention. *Journal of Educational Technology Systems*, 36(1), 105-112.

Dixson, M., Kuhlhorst, M., & Reiff, A. (2006). Creating effective online discussions: Optimal instructor and student roles. *Journal of Asynchronous Learning Networks*, 10(4), 15-28.

Egan, T. M., & Akdere, M. (2005). Clarifying Distance Education Roles and Competencies: Exploring Similarities and Differences Between Professional and Student-Practitioner Perspectives. *American Journal of Distance Education*, 19(2), 87-103.

Gibbons, H. S., & Wentworth, G. P. (2001). Andrological and pedagogical training differences for online instructors. *Online Journal of Distance Learning Administration*, 4(3).

Goodyear P., Salmon, G., Spector, J.M., Steeples, C. & Tickner, S. (2001). Competences for online teaching: A special report. *Educational Technology, Research and Development*, 49(1), 65

Guilbaud, T. C. (2019). *Faculty Perception of Knowledge and Practice in Designing and Implementing Accessible Online Courses* (Doctoral dissertation, The University of North Carolina at Charlotte).

Halupa, C. (2019). Differentiation of roles: Instructional designers and faculty in the creation of online courses. *International Journal of Higher Education*, 8(1), 55-68.

Hung, M. L., & Chou, C. (2015). Students' perceptions of instructors' roles in blended and online learning environments: A comparative study. *Computers & Education*, 81, 315-325.

Johnson, W. B. (2007). Transformational supervision: When supervisors mentor. *Professional Psychology: Research and Practice*, 38(3), 259.

Khan, A., Egbue, O., Palkie, B., & Madden, J. (2017). Active learning: Engaging students to maximize learning in an online course. *Electronic Journal of E-Learning*, 15(2), 107-115.

Klein, J. D., Spector, J. M., Grabowski, B. L., & de la Teja, I. (2004). *Instructor competencies: Standards for face to face, online, and blended settings*. IAP.

Kline, R. B. (2016). *Principles and practice of structural equation modeling (4th ed.)*. New York, NY: The Guilford Press.

Lee, D. Y. (2011). Korean and foreign students' perceptions of the teacher's role in a multicultural online learning environment in Korea. *Educational Technology Research and Development*, 59(6), 913-935.

Legon, R., Garrett, R. & Fredericksen, E.E. (2020). The changing landscape of online education (CHLOE): Navigating the Mainstream. *Quality Matters and Eduventures*.

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83(404), 1198-1202.

Liu, X., Bonk, C. J., Magjuka, R. J., Lee, S. H., & Su, B. (2005). Exploring four dimensions of online instructor roles: A program level case study. *Journal of Asynchronous Learning Networks*, 9(4), 29-48.

Maor, D. (2003). The teacher's role in developing interaction and reflection in an online learning community. *Educational Media International*, 40(1-2), 127-138. <https://doi.org/10.1080/0952398032000092170>

Martin, F., Wang, C., & Sadaf, A. (2018). Student perception of helpfulness of facilitation strategies that enhance instructor presence, connectedness, engagement and learning in online courses. *The Internet and Higher Education*, 37, 52-65.

Martin, F., Budhrani, K., Kumar, S., Ritzhaupt, A. (2019a). Award-winning faculty online teaching practices: Roles and competencies. *Online Learning Journal*, 23(1), 184-205.

Martin, F., Ritzhaupt, A., Kumar, S., & Budhrani, K. (2019b). Award-winning faculty online teaching practices: Course design, assessment and evaluation, and Facilitation. *The Internet and Higher Education*, 42, 34-43.

Martin, F., Budhrani, K., & Wang, C. (2019c). Examining faculty perception of their readiness to teach online, *Online Learning Journal*, 23(3), 97-119.

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>

McGee, P., Windes, D., & Torres, M. (2017). Experienced online instructors: beliefs and preferred supports regarding online teaching. *Journal of Computing in Higher Education*, 29, 331-352. <https://doi.org/10.1007/s12528-017-9140-6>

Milone, A. S., Cortese, A. M., Balestrieri, R. L., & Pittenger, A. L. (2017). The impact of proctored online exams on the educational experience. *Currents in Pharmacy Teaching and Learning*, 9(1), 108-114.

Mohr, S., & Shelton, K. (2017). Best practices framework for online faculty professional development: A Delphi study. *Online Learning*, 21(4), 123-140.

Moskal, P., Thompson, K., & Futch, L. (2015). Enrollment, engagement, and satisfaction in the BlendKit faculty development open, online course. *Online Learning*, 19(4), 1-12.

Muñoz Carril, P. C., González Sanmamed, M., & Hernández Sellés, N. (2013). Pedagogical roles and competencies of university teachers practicing in the e-learning environment. *International Review of Research in Open and Distributed Learning*, 14(3), 462-487.

Nunnally, J., & Bernstein, I. (1995). *Psychometric theory*. McGraw-Hill.

Peters, M.E., Nestadt, P., & McHugh, P.R. (2017). Role Induction, John Hopkins Psychiatry Guide.
https://www.hopkinsguides.com/hopkins/view/Johns_Hopkins_Psychiatry_Guide/787161/all/Role_Induction#

Quality Matters (2020). QM Rubrics and Standards. <https://www.qualitymatters.org/qa-resources/rubric-standards>

Richardson, J. C., Ashby, I., Alshammari, A. N., Cheng, Z., Johnson, B. S., Krause, T. S., ... & Wang, H. (2019). Faculty and instructional designers on building successful collaborative relationships. *Educational Technology Research and Development*, 67(4), 855-880.

Richey, R.C., Fields, D.C., Foxon, M. (2001). Instructional design competencies: The standards, third edition. ERIC Clearinghouse on Information & Technology.

Roehm, S., & Bonnel, W. (2009). Engaging students for learning with online discussions. *Teaching and Learning in Nursing, 4*(1), 6-9.

Ryan, M., Carlton, K. H., & Ali, N. S. (2004). Reflections on the role of faculty in distance learning and changing pedagogies. *Nursing Education Perspectives, 25*(2), 73-80.

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). Grade Increase: Tracking Distance Education in the United States. *Babson Survey Research Group*.

Spector, J. M., & De la Teja, I. (2001). Competencies for Online Teaching. ERIC Digest.

Thach, E. C., & Murphy, K. L. (1995). Competencies for distance education professionals. *Educational Technology Research and Development, 43*(1), 57-79.

Vaill, A. L., & Testori, P. A. (2012). Orientation, mentoring and ongoing support: A three-tiered approach to online faculty development. *Journal of Asynchronous Learning Networks, 16*(2), 111-119.

Varvel, V. (2007). Master online teacher competencies. *Online Journal of Distance Learning Administration, 10*(1). Retrieved from <http://www2.westga.edu/~distance/ojdl/>

Vang, K., Martin, F., & Wang, C. (2020). Examining community college faculty perceptions of their preparedness to teach online. *Journal of Applied Research in the Community College, 27*(1), 45-63.

Wiesenberg, F., & Stacey, E. (2008). Teaching philosophy: Moving from face-to-face to online classrooms. *Canadian Journal of University Continuing Education, 34*(1), 63-69.

Williams, P. (2003). Roles and competencies for distance education programs in higher education institutions. *American Journal of Distance Education, 17*(1), 45-57.
https://doi.org/10.1207/S15389286AJDE1701_4

Yuksel, I. (2009). Instructor competencies for online courses. *Procedia-Social and Behavioral Sciences, 1*(1), 1726-1729.

Appendix A

Online Instructor Roles and Competencies

Instructions

Please indicate the frequency with which you perform the following roles in your online courses.

[Scale: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always]

Subject Matter Expert

- Demonstrate content expertise
- Stay current with research and theories in the field
- Contribute relevant content to course outcomes
- Collaborate with instructional designers to develop the course
- Ensure that the course content is accurate
- Other:

Course Designer & Developer

- Establish learning objectives
- Develop learning activities
- Include existing instructional resources (texts, OERs, videos)
- Develop digital learning materials
- Ensure alignment between objectives, content and, assessment
- Develop a course on the Learning Management System
- Provide consistent course structure
- Design intuitive course navigation
- Consider culturally inclusive content
- Ensure accessibility and ADA-compliance
- Other:

Course Facilitator

- Create a welcome message (announcement, video)
- Check in with students frequently
- Help students develop self-regulated learning skills (time management)
- Host synchronous sessions if applicable
- Hold online office hours
- Facilitate online discussions
- Use active learning strategies to engage learners
- Provide timely, and substantive feedback
- Foster interaction among learners
- Interact in a culturally sensitive manner
- Offer multiple perspectives
- Encourage student reflection
- Creating a sense of community amongst students from the same course
- Other:

Course Manager

- Monitor learner participation
- Provide clear instructions to learners
- Be responsive to individual student needs
- Enforce course and institutional policies
- Resolve potential conflicts among learners
- Connect students with institutional support services
- Other:

Advisor/Mentor

- Advise learners on their academic development.
- Advise learners on their professional development.
- Motivate the students to succeed.
- Guide students to be self-directed and responsible for their course work
- Guide students to access resources when needed
- Mentor other colleagues who also teach online
- Other:
-

Assessor/Evaluator

- Use a variety of assessments (quizzes, projects)
- Align assessment to objectives and activities
- Establish clear grading criteria for assessments
- Assess students' work
- Monitor individual student and group progress
- Proctor online tests if applicable
- Continually improve the course
- Other:

Technology Expert

- Ensure that students are comfortable in the learning environment
- Orient the students to the online course
- Use appropriate technology to support learning
- Provide students with resources for technical help and support
- Other:

Lifelong Learner

- Integrate best practices from research into online teaching
- Engage in professional development on online learning
- Share and learn from peers about online teaching practices
- Use data from the online course for continuous improvement
- Keep pace with the advances in educational technologies
- Other:

Open-Ended Questions

Have you ever taken on a role in an online course other than the ones listed?

Demographic Information

Instructions: Please select one answer for each of the following questions.

1. I identify my gender as
 - Male (1)
 - Female (2)
 - Transgender (3)
 - Other (4)
 - Do not wish to respond (5)

2. My faculty rank is
 - Adjunct Instructor (1)
 - Instructor or Lecturer (2)
 - Assistant Professor (3)
 - Associate Professor (4)
 - Professor (5)
 - Other: (6)

3. I primarily teach in the following learning environment
 - Blended or Hybrid (1)
 - Online asynchronously (2)
 - Online synchronously (3)
 - Other (4)

4. I primarily teach
 - Undergraduate courses (1)
 - Graduate courses (2)
 - Other (3)

5. I currently teach at a
 - 4-year institution
 - 2-year institution
 - K-12 school
 - Other

6. Years of Online Teaching
 - 1-5
 - 6-10
 - 11-15
 - More than 15

7. Academic Discipline
 - Arts
 - Sciences

Perceptions of instructor roles and competencies in online teaching

- Business
 - Computer Science
 - Education
 - Engineering
 - Health Sciences
 - Law
 - Medicine
 - Other:
8. Have you worked with instructional designers at your institution to develop online courses?
- Yes (1)
 - No (2)
 - Not sure (3)
9. Does your institution require you to attend training on online teaching?
- Yes (1)
 - No (2)
 - Not sure (3)
10. In terms of online teaching expertise, I consider myself at the stage of
- Novice (1)
 - Advanced beginner (2)
 - Intermediate (3)
 - Proficient (4)
 - Expert (5)
11. How many online courses have you taught?
- 1-5
 - 6-10
 - 11-15
 - More than 15

Thank you for taking the time to complete this questionnaire. We greatly appreciate your assistance!

Using Academic Social Networks to Enhance the Student Experience in Online Education

Tiffani S. Bateman
University of Phoenix, USA

Abstract

Online universities utilize academic social networks to build connections among students, faculty, and alumni through affinity groups. This study explored how students interact in academic social networks, who they collaborate with, why they use academic social networks, and how this influences their educational experience. This qualitative, interpretive, phenomenological study explored the lived experiences of six online higher education students reporting active participation in an academic social network. Three core themes emerged from data analysis: (a) acceptance and belonging; (b) self-validation; and (c) drawing from multiple perspectives describing how academic social networking communities are formed, why students are using them, and what this means to online higher education. The essence of academic social networking as it relates to self-actualization is discussed, with insights for educational leaders regarding the use of academic social networking and affinity groups in online higher education.

Keywords: Social networking; online learning; online education; phenomenology

Bateman, T. (2021). Using academic social networks to enhance the student experience in online education. *Online Learning*, 25(4), 295-323. DOI: 10.24059/olj.v25i4.2532

Despite the sharp increase in enrollment in online learning over the past few decades, retention continues to be one of the greatest challenges educators face in distance education (Oregon, et al., 2018). Finding methods to reduce student attrition rates is critical for online higher education universities. The primary factors to consider in understanding the high dropout rates in distance education include identifying which students are dropping out and what factors influence this decision (Radovan, 2019). One of the reasons that students report dropping out of online education programs is the lack of social presence (Ali & Kohun, 2007; Ivonkova & Stick, 2007). Learning and the acquisition of knowledge is a social process. Social presence is the degree of connectedness individuals feel when communicating through any given medium across space or time (Rogers, et al, (2009). It is therefore critical to understand how students communicate and interact socially in online education, and the implications of this for student persistence.

Despite lower completion rates than traditional brick and mortar universities, student demand for online education programs is increasing (Oregon, et al., 2019). Distance learning provides students an opportunity to earn their degrees when an on-ground institution is either not an option or a desire. Different communication mediums provide for different perceptual experiences of social presence in distance learning. Academic social networks may hold the key to providing students with a perception of social connectedness, which may result in increased student satisfaction as well as increased retention rates for online higher education institutions. Therefore, institutions embrace the use of social networks, hoping to enhance the educational experience for online students (Kabilan, et al., 2010; Valdez, et al., 2020).

Students report feeling more engaged in online learning when utilizing various technologies (Educause Center for Applied Research, 2010). Communication mediums such as social networks attract millions of users and allow for a unique social experience that defies space and time. Understanding student experiences with, and attitudes toward, academic social networking may help educational leaders realize the potential of this tool in building social presence in the online university (Rajagopal, et al., 2012). Empirical research is limited in providing institutions with insights regarding the benefits or drawbacks of such a social medium (Liu, et al., 2010; Rajagopal, et al., 2012), despite finding that students with a stronger sense of social presence and community have a higher satisfaction with their learning experience (Akyol et al, 2008) which in turn may have a positive impact on student retention. This research aims to gain a better understanding of how students are using these academic social networks and what impact this has on their online learning experience.

Purpose of the Study and Research Questions

The purpose of this study is to understand the online student experience in academic social networks. By examining both posting and non-posting behavior in academic social networks, educators can better understand new forms of communication and how information is exchanged. How students use these networks may impact their perception of the education they receive as well as their sense of community within a given institution. Such experiences may directly influence the likelihood of students persisting in their education through the attainment of a degree. A responsive interviewing model was implemented to gain in-depth insight into each participant's experience. One overarching and exploratory research question was used to guide the study: What meaning does the experience of academic social networking hold for online higher education students?

Three broad sub-questions were utilized to draw out the data needed to cover the context of the phenomena of the study (Smith et al., 2009).

1. What is the student experience when using an academic social network?
2. Who or what do students observe in the academic social network?
3. What benefits or drawbacks have students experienced from using an academic social network?

Review of Relevant Literature

Academic social networking is defined as a private educational community network that allows members to collaborate, communicate, and exchange educational information, ideas, and views where members cannot otherwise meet face-to-face (Glezou, et al., 2010). Research regarding general social networking in the context of education was utilized to build a theoretical framework due to the gap in the literature on academic social networking. The framework of the study includes the socio-ecological theory, socio-constructive learning theory, and community of inquiry.

The study is framed in a socio-ecological perspective which embraces the notion of a reciprocal relationship between the student and the learning environment where the student shapes his or her intrapersonal environment while simultaneously transforming the self (Altback, et al., 2005). Student learning occurs over a wide range of contexts in informal and formal settings situated in socio-cultural theory whereas learning is “located in contexts and relationships rather than merely in the minds of individuals” (Greenhow, et al., 2009, p. 248). Epistemological assumptions surrounding socio-ecological theory include learning as a derivative of participation in communal activities tied to social experiences (Greenhow et al., 2009).

Academic social networks provide a unique virtual space where communication and collaboration unfold. As such, digital technologies such as academic social networks have the power to influence the learner and the instructor but also impact and redefine the administrative functions of institutions (Saykili, 2019). In this study, the socio-ecological lens provides a layer to explore and analyze the relationship between the student and the community.

Socio-constructivist learning theory provides a second lens to frame this research. This lens recognizes that an academic social network serves as a mediator by which students can collaborate and share ideas and form relationships. Socio-constructive learning theory is consistent with such an idea as knowledge is a product of the environment and context where learning takes place (Hofstetter & Schneuwly, 2009). The epistemological assumptions guiding socio-constructive learning theory include the idea that group interactions, experiences, and individual interactions advance knowledge through collaborations unique to the medium or environment where they occur.

The community of inquiry (CoI) theory has been used over the past decade in hundreds of studies regarding online education (Arbaugh et al., 2008) and provides the third lens for this study. Garrison et al. (2010) surveyed over 200 students across 14 educational institutions and found students perceived social presence to be a significant factor influencing cognitive presence and learner outcomes. Ke (2010) reported a positive correlation between social presence and cognitive presence in the online learning environment. Student self-perceived sense of community is also positively correlated to learning satisfaction (Ke, 2010). Social presence plays

a vital role in both teaching presence and cognitive presence which directly affects student satisfaction with learning.

The philosophical principles of phenomenology include the idea that inquiry into an experience through the perception of an individual's experience will unveil a deeper truth (Smith et al., 2009). Various perspectives allow for multi-layered perceptions of the academic social networking phenomenon. By layering academic social networking within the context of a socio-ecological framework, socio-constructive learning theory, and a community of inquiry framework, an understanding of the students' experience of academic social networking is and what this phenomenon means within the context of online learning.

History of Social Networking

A national study from Pew Internet & American Life Project reported that college students frequently utilize the internet with 73% of users reporting active social network use (Jones, 2002). Understanding how college students use social network sites for social interaction, communication, connections, and relationships provides valuable information concerning the future of social networking and academic social networking. A sample of 258 undergraduate students from a western university in the United States completed a survey administered to determine the demographic characteristics and social networking involvement (Bahk et al., 2010). Seventy-nine percent of respondents reported utilizing social networking sites approximately five hours a week.

Ilkyu and Chonggun (2014) conducted a study utilizing the social networking site Twitter for educational purposes in two classes at Yeungnam University. The experiment included students and professors utilizing Twitter for the following educational purposes: (a) students can ask questions and professor can answer and post for all the class to see, and (b) professor can suggest a non-graded discussion topic and students can post their opinions. For the two experimental classes using Twitter, findings indicated that students with more followers and followings received higher grades and students who participated received higher grades than those who did not participate.

Eiodice and Gaffin (2008) investigated correlations between Facebook postings and student achievement in a study of undergraduate Zoology students. A high correlation between photos posted on the social network site and high academic achievement revealed students more engaged and networked with peers tended to be higher achievers academically (Eiodice & Gaffin, 2008). Lower academic performance was also highly correlated with the number of Facebook applications downloaded, suggesting that applications without educational merit hold little value in academic social networks.

An online panel of 351 consumers participated in a study to identify what demographic characteristics and personality traits differed between posters and non-posters in social networking sites (Morrison & McMillian, 2010). Individuals active in social networks reported lurking behaviors, or observing the interactions of other online users, more frequently than posting content, with women reporting more frequent use of social networking sites than men. Of those participants that do visit social networking sites, participants who were older reported less activity on social networks than students under 25 years of age (Morrison & McMillian, 2010). Findings indicated individuals scoring higher on the extroversion scale were also more likely to be active in social networking, whether displaying posting or lurking behaviors (Morrison & McMillian, 2010).

Social network sites first gained popularity from colleges and universities for marketing purposes and universities began to experiment with how social network sites (SNSs) might be used as marketing tools (College Board and Art & Science Group, 2009). A small number of universities have since created their own SNS, or academic social network, allowing students to blog, tag, and access various SNS functions within the university website (Kaya, 2010). The Academic Commons of The City University of New York (CUNY) is a SNS designed for students, alumni, and faculty to create networks and communicate ideas in an evolving social community (Kaya, 2010). CUNY registered members create profiles, post information, and join groups online to collaborate with colleagues and peers from the university.

Similar academic social networks hosted by universities include the University of Pennsylvania's College of Liberal and Professional Studies Open Learning Commons, Emory University's LearnLink, and the University of Phoenix's Phoenix Connect, among others. With these newly formed academic social networks, researchers are now able to gather data concerning the user experience in academic SNSs. Such data may provide insight toward a new level of connectedness and engagement not previously explored in academia within the context of social networking.

Educational Networking

Educational networking refers to social networks used in educational environments or for educational purposes (Creative Commons Attribution Share-Alike 3.0, 2011), and over 600 educational networks exist around the globe. Some of these educational networks are academic social networks and others are places to explore technology, find educational groups, or find similar interest groups within larger social networks such as Facebook. Although so many educational networks exist, the idea is relatively new, with Vicki A. Davis first proposing the idea of using social networks for educational purposes in 2008 in an online debate on social networking technologies in education hosted by The Economist (Boyd, 2011).

Despite minimal research on academic social networks, researchers identify benefits to social networking as related to educational purposes. A study conducted by researchers at the University of Minnesota (2008) found that students using social networks for personal use are practicing the 21st-century skills educators wish to develop. Ninety-four percent of students aged 16 to 18 reported using the internet with 77% having a profile on a social network site.

Arnold and Paulus (2010) conducted a qualitative research study examining student perceptions of social networking when implemented in a course using Ning®. Perspectives from the students and instructor as well as an outside observer provided data for this investigation. The site created in Arnold and Paulus's study enabled students to upload pictures to their profiles, which students reported made them feel more a part of a community than in courses in which this feature was not available (2010). Students also reported that the site made it easier to contact peers outside of class for such needs as missed notes, help on work, or study groups (Arnold & Paulus, 2010).

Formal and Informal Learning

Informal online learning is the pursuit of knowledge, skill, or understanding occurring externally without the utilization of an imposed curricular objective or criteria which happens in daily life when accessing the Internet (Livingstone, 2001; Holland, 2019). The National Centre for Education Statistics (NCES) started collecting data on adults' informal learning in 2005,

recognizing lifelong learning to be a critical factor in the growth and development of a global knowledge economy (National Centre for Educational Statistics, 2006; Rubenson & Desjardin, 2009; Smith & Smith, 2008). Findings from analysis of international data since this conception suggest “informal learning is particularly important to support disadvantaged adults who may face barriers in accessing more structured learning activities” (Heo & Lee, 2013, p. 411).

Heo and Lee (2013) studied over 10,000 adults and found the preferred method for informal learning is through sharing and interpersonal communication. Data analysis revealed a significant difference between males’ and females’ value of informal learning. Women reported a higher level of enjoyment when participating in informal learning activities, such as informal learning on the internet, than men. Bahk, Sheil, Rohm, and Lin (2010) reported similar findings, with women reporting more frequent use of social networks than their male counterparts.

Chen and Bryer (2012) investigated the utilization of social media in formal and informal learning contexts. Formal learning makes up only 8% of learning for undergraduate students and 5% of learning during the graduate years (Banks et al., 2007). Learning happens everywhere and at any time, often because of interactions between peers, co-workers, and the environment. Social networks have the capacity to connect formal learning in the traditional classroom to informal learning in and connect students in meaningful ways (Chen & Bryer, 2012). Understanding the processes which contribute to informal learning in social networks will enable educators to create rich and meaningful learning experiences (Heo & Lee, 2013). Twenty-first century educators serve as guides, using their expertise to guide students through “coaching, mentoring, knowledge-sharing, and team teaching” (Saykili, 2019, p. 6).

Social Networking Behavior

Little documentation exists regarding lurking behavior, yet three-quarters of respondents’ report lurking behavior as opposed to posting when visiting social networking sites, suggesting that lurkers seek out social networking sites although their presence in the site goes undetected (Morrison & McMillian, 2011). Such implications raise questions as to what draws social networkers to such sites. Demographics such as household income, education, and ethnicity did not differ in the panel of consumers studied in either posters or lurkers. Lurking is the number one behavior reported in social networking (Edelmann, 2013). Edelmann (2013) challenges researchers to situate lurkers in a positive light, as valuable participants in academic social networks. Understanding why individuals lurk will provide valuable insight for online behavior in social networks.

Muller et al., (2009) suggest lurkers may be a hidden asset in online communication. Chen and Chang (2013) studied lurkers in small group online communities to better understand why these individuals visit the site and what their influence is on learning within the group. Lurkers are classified differently from study to study and not necessarily defined as individuals who have never posted (Lin & Tsai, 2011). Chen and Chang (2013) analyzed 82 small groups of senior and junior high social networkers participating in a virtual science fair. Lurkers included infrequent posters, non-posters, and sporadic posters in the social network across the 82 groups. Findings suggest lurkers “are highly contributive to collaborative knowledge building” and a valid form of participation in online communities (Chen & Chang, 2013, p. 22). Further findings suggest that, as opposed to a vicarious learner, lurkers engage in critical areas of discussion by opening complicated discussions that engage other, more frequent posters, suggesting that frequency of posting may not be the best indicator of learning in the online social network.

In response to inquiries regarding lurking behavior in online learning, the E-Listening Project was initiated in 2011 to investigate how these behaviors may influence learning. Research is focused on exploring the multidimensional aspects involved in lurking behavior and suggests a need to examine the invisible behavior of online learners in greater detail (The E-Listening Project, 2011). The notion of lurking, which suggests a negative connotation related to lack of contribution, has been replaced in recent literature with the notion of online listening.

Cyberloafing is the act of using information technology tools in a work or school environment for personal reasons (O'Neill, et al, 2014). In an education context, cyberloafing includes the time students spend in academic social networks. Studies conducted on cyberfloating in an educational context focus largely on how social networks may cause negative behaviors such as procrastination (Gerow, et al, 2010) and cognitive absorption (Tanriverdi et al, 2018). "In general, related literature is not much focused on variation of cyberloafing behaviors at education environments" (Durak, 2020, p. 540). There is a gap in research regarding the student experience when using academic social networks.

Methods

The study employed a qualitative method to explore how online higher education students experience academic social networking. An interpretive phenomenological design focused on the lived experiences of the individuals in the context of the phenomenon of study (Merriam, 2009; Smith, Flowers, & Larkin, 2009). The research is framed by the philosophical assumption that reality is socially constructed based on individual interpretations. The purpose of constructing new knowledge by combining unique ontological perspectives with consideration to the researcher's own ontological bias is consistent with a socio-constructive epistemology and phenomenological methodology (Merriam, 2009).

Specifically, an interpretive phenomenological analysis aims to focus on the details of a phenomenon and how those details are understood by individuals within a specific context (Smith, et al., 2009). Interviews serve as the data-gathering tool for the study. Data collected through interviews account for participant perceptions of lived experiences when using an academic social network and is open to interpretation based on participant ontology. The broader online population may not perceive the same experiences, which reduces the ability to generalize results to a larger population. This phenomenological study focuses on rich and detailed accounts of the experience derived from a small population, meant to explain a phenomenon as opposed to replicate or generalize the results (Neuman, 2006).

Phenomenological Approach

A phenomenological design was utilized in the study to investigate human experiences and derive knowledge from real world experiences (Merriam, 2009). A phenomenological research design is used to extrapolate common themes based on rich textural descriptions of the students' lived experiences to gain understanding about their use of academic social networks. The focus of this phenomenological study was to uncover the initial meaning behind the experience as it exists in the consciousness of the individual (Moustakas, 1994).

Participants

The study population consisted of online higher education students actively involved in an academic social network. Active enrollment includes all students who have completed a minimum of 24 consecutive credit hours and are currently enrolled in an online degree program. This population included students across various degree programs at various levels of degree completion. Participants came from international locations since the unique experience of participating in an academic social network leaves no constraints as to physical geography. The only geographic stipulation was that the university offer fully online degrees options without students having to be physically present on campus.

Students were emailed an online student survey (see Appendix A), a request for voluntary participation, and an informed consent form, which required an electronic signature. Students who returned an electronically signed informed consent form were considered when identifying the final study sample. Potential interviewees were provided a survey asking for demographic and degree program information. Information regarding time spent in an academic social network (see Table 1) was also collected. The survey contained background information regarding what constitutes active involvement in an academic social network and asked students to elaborate on their own experiences.

Table 1

Variation of Study Participants

Participant	Time Spent in Academic Social Network	# of Years in Online Education	Degree Program (Bachelor's)
1	15 min/day	4	Business Management
2	2-3 times/week	5	Information Technology
3	4-5 times/week	3	Information Technology
4	60 min/week	2	Criminal Justice
5	15 min/week	4	Business Management
6	15 min/week	3	Health Administration

Students were chosen purposefully for participation based on the information provided in the survey. Information-rich cases were selected based on the level of activity participants reported utilizing an academic social network. The most important criterion for participant selection was identifying participants who provided a detailed account of their experiences using academic social networks.

The sample size for this study was a total of six participants (n=6). Students who reported active involvement, both in posting and non-posting, or lurking, behavior were selected to participate in the study to gather multiple perspectives from different instances of the phenomenon. Students with a wide variety of backgrounds and characteristics were considered as is consistent with maximum variation sampling (Merriam, 2009).

Instrumentation and Data Collection

Incorporating the responsive interviewing model, interview questions were divided into main questions, probes, and follow-up questions throughout the interview to both clarify what was heard and gain information about gaps which came to light during the process. Students were asked to remember what they discussed with other individuals in these networks and how

that made them feel about the learning experience. The interview guide contained the following broad interview questions: (1) What are your experiences when using an academic social network? (2) Who or what do you observe in the academic social network? (3) What benefits or drawbacks have you experienced from using an academic social network?

The interview guide was reviewed by a panel of three researchers in the field of social networking and online education prior to beginning the interviews and no changes were suggested. By listening to and exploring students' lived experiences, themes emerged wherein follow-up questions allowed the interviewer to expand upon interviewee experiences relevant to the context of the research. Omissions regarding the experience led to follow-up questions or prompts which provided additional clarity.

Audio recordings were used to capture the details of participants' responses and later transcribed. Each participant was given the opportunity to review the transcript of his/her interview to fortify validity and accuracy. Each interviewee was given the opportunity to add any additional information although none did.

Data Analysis

Each individual transcript was analyzed serially beginning with student 1 (S1) and ending with student 6 (S6). Semantic language and content exploration involved a detailed analysis of each transcription. Initial noting began with the conceptual comments noted in the journal alongside the ideas bracketed off during the actual interview. Initial noting was captured in the left-hand column of the transcripts using different features such as italics, highlights, and underlining to organize which noting strategies mapped to specific text.

Several strategies aided in the listing and preliminary grouping of the text during the initial noting. Descriptive comments captured content in key words or phrases used by the participants. Conceptual comments included more overarching details of the participant's experience of the phenomenon. The analytic process of horizontalization was utilized to identify each statement, concept, and response, hence building a textual description of the phenomenon for each participant. The hermeneutic cycle is evident in this step as the whole transcript was reorganized and chunked during this process of reduction and elimination. Overlapping statements and redundancies were eliminated. Each horizon or invariant constitute was reviewed to ensure it could be labelled and was relevant to understanding the phenomena. Horizons not meeting these requirements were eliminated.

During data analysis, several similar horizons were combined and renamed as a broad understanding of the meaning behind these combined emergent themes. Horizons were clustered to develop superordinate themes within each case. In some instances, subsumption was utilized whereas an emergent theme was reorganized to become a superordinate theme. A listing of emergent themes for each participant allowed the researcher to demonstrate how clusters formed around superordinate themes.

These eight superordinate themes were analyzed across all cases, consistent with the hermeneutic cycle. Superordinate themes shared higher order concepts in some instances and were relabeled accordingly. Emergent themes such as "support network of peers with similar interests from different backgrounds," "seeking guidance," and "career networking" were combined along with other horizons and relabeled "finding a support system."

Four core themes emerged to describe the participants experience of academic social networking. Eliminating redundancies and combining like horizons eliminated 15 horizons,

leaving a total of 50 horizons. Each horizon was validated against all original participant transcripts. For each horizon, the researcher considered whether it was explicitly expressed in the complete transcription. If not explicitly expressed in all the responses, the invariant constitute was eliminated. For instance, the horizon “creating bonds and friendships” was reported by two participants explicitly, suggested implicitly by two participants, and not recognized explicitly or implicitly by two participants and was therefore eliminated as a horizon of the superordinate theme “acceptance and belonging.”

During this validation process one superordinate theme, “feeling of isolation,” and all the horizons comprising it were eliminated. Two of the six participants neither explicitly nor implicitly expressed this theme as part of their experience with academic social networking. These final three themes are the central phenomena of this qualitative study: (a) acceptance and belonging; (b) self-validation; (c) drawing from multiple perspectives.

Trustworthiness and Dependability

Disengagement from the experience is a vital initial process of data collection and analysis and is accomplished through bracketing or *epoche* (Moustakas, 1994). Phenomenological research aims to arrive at a common subjective experience, or *eidōs*, of the phenomenon through an analysis of several perspectives. In the study, a common truth of what it means to participate in an academic social network begins with bracketing off prejudgments concerning what this experience entails for the researcher. Knowledge of researcher bias and predisposition allows for a return to the conscious experience as it exists without outside perceptions attached to the meaning.

Trustworthiness is concerned with the data yielding the truth as well as the ability of the researcher to draw accurate conclusions from that data (Golafshani, 2003; Lincoln & Guba, 1985). Trustworthiness in qualitative research involves examining the truth of a phenomenon by examining a valid sample. Choosing a quality sample to draw data from was accomplished by locating online higher education students active in academic social networking and then by purposefully choosing a sample from that target population utilizing maximum variation.

Rigor was established through a selection of participants appropriate to the research question as well as the maintenance of interview quality (Smith et al., 2009). An interview guide was used to ensure that adequate depth was achieved and the topic was sufficiently covered. A panel of experts in social networking reviewed and provided feedback on the interview guide. The interview guide was also piloted using participants with similar characteristics to the sample population to aid in developing a validated and consistent interview process throughout data collection.

Limitations

On two separate occasions, 200 students were emailed requesting they volunteer to participate in the study. Ability to enter the academic social network and solicit volunteers to interview opposed to solicitation via email may have broadened the target population and generated greater interest. Several interviewees were unable to meet for the scheduled interview times. Out of the original 11 participants selected only six participated in the interviews.

Research indicates that most themes are present within the first six interviews when participants are purposefully selected: however, the next six transcripts present additional themes totaling 92% of thematic discovery (Guest, et. al, 2006). Additional interviews may have uncovered themes not represented in the six participants’ experiences. Furthermore, the homogeneity of the population may strengthen the validity of the themes found when analyzing

the six participants' transcripts. All six participants were enrolled in the same university; data regarding experiences in academic social networking across various networks may provide additional insight to this phenomenon.

Results

The purpose of this qualitative phenomenological study was to explore the lived experiences of online students participating in an academic social network. The specific problem addressed was the lack of knowledge regarding how students use academic social networks in online higher education institutions (Liu et al., 2010). One overarching and exploratory research question was used to guide the study: What meaning does the experience of academic social networking hold for online higher education students? Participants explored their unique reality of the experience of academic social networking via the interview process. Three core themes emerged from data analysis; (1) acceptance and belonging; (2) self-validation; (3) drawing from multiple perspectives. The three core themes are reinforced by the tri-lens theoretical framework: socio-ecological theory (Altback et al., 2005), socio-constructive theory (Hofstetter & Schneuwly, 2009), and community of inquiry (Arbaugh et al., 2008), and are supported by the review of literature.

Theme 1: Acceptance and Belonging

Acceptance and belonging involves a feeling of being part of a community where learning occurs through shared and interpersonal communications with peers. Contribution is organic and moves from creator of content to user of content with blurred boundaries between mentor and mentee, resulting in a sense of freedom that comes from choosing one's own role within the community. Acceptance and belonging emerged as a theme describing how students interact in an academic social network. User attitudes regarding the phenomenon suggested a reciprocal relationship between that of the individual user and that of the larger community, consistent with a socio-ecological framework (Granovetter, 1989). Socio-ecological theorists suggest that learning is situated within the context of the relationship between individuals and the community (Greenhow et al., 2009; Ziegler et al., 2013). The students formed communities based on shared interests and the communities in return reinforce the learning through the dialogue which unfolds. Informal and formal learning occur with the student playing the role of both the mentor and the mentee, dependent upon the given topic of discussion.

Communities are not specific groups started by an administrator but communities that form organically out of necessity based on the student population. For this study, the idea of community describes the feeling of acceptance and belonging acquired by both posters and non-posters when engaging in discussion surrounding certain topics of interest in the academic social network. Non-posters describe the academic social networking experience as engaging and feeling like they are part of a group (despite never actually posting any information).

Users seek out other individuals with the same questions, concerns, and characteristics they see reflected in themselves and therefore feel a sense of being in the conversation through the posts of peers with which they feel a connection. One participant explained his role of mentor as he witnessed a peer struggling in a post with a concept with which he was familiar. The student participant never actually replied, however another student in the thread posted the same answer the participant was thinking which provided a level of satisfaction that he knew how to help the peer, even if technically he did not respond to the question.

Participants reported utilizing the academic social network as a support system when in need of mentoring. Similar behaviors suggested non-posters and posters both benefited from the learning provided through the network, consistent with previous research (Xie, 2013). Non-posters found answers to questions by seeking out peers who shared similar characteristics and had similar questions.

Posters, comprising 17% of the population in this study, either searched for answers or simply posted questions. Both groups reported utilizing the network in some fashion as a medium for support when struggling either academically or seeking out similar frustrations with degree attainment or questions regarding the career field. The sense of acceptance and belonging to something larger than yourself was strengthened through the support received in the academic social network.

These findings are consistent with previous research suggesting there are implications for non-posting activity increasing student motivation towards learning (Xie, 2013). Wise et al., (2014) and Dennen (2008) recognized the need for research examining non-posting behaviors and how these behaviors interact with student learning and motivation. Findings from this study indicate that both posting and non-posting (or listening) behavior in academic social networks creates a sense of belonging and acceptance with peers that share similar interests.

Theme 2: Self-Validation

Self-validation is the realization that peers have experienced similar struggles and/or that accomplishments provide motivation toward goal attainment. When students read relatable failures or successes of peers posted to an academic social network it provides a sense of empowerment and aids with degree persistence. The academic social network provides a medium through which a participant can overcome obstacles and persist through difficult times while pursuing their degree. The participants looked for communities of individuals who shared similar career interests or were enrolled in the same degree program. Students reported seeking out peers with whom they could relate to see if they might be encountering similar obstacles toward degree completion. A sense of self-validation emerged when participants believed that their feelings and concerns were shared by others.

Community of Inquiry provided a lens to view social presence within the context of academic social networking. Rogers and Lea (2005) suggested that social presence includes personal identity as well as identity of self within a larger group or community. Findings from this study suggest students that utilize the academic social network as a medium for communication to build a connection with peers with whom they can relate. Previous studies suggested that social presence has a positive relationship with student learning satisfaction; however, insight into how social presence is successfully facilitated in online education remains unclear (Akyol & Garrison, 2008; Olesova, et al., 2011).

Once self-validation is achieved, self-efficacy—the belief that one can succeed at a given task and an influence on the degree of persistence when confronting obstacles (Bandura, 1997)—is the result. When participants saw their own thoughts and feelings reflected in the posts of peers, their sense of self-efficacy was heightened. Participants reported feeling relieved to know that others experienced similar hurdles and expressed motivation upon reading the posts of other students' successes.

The heightened self-efficacy resulting from self-validation, experienced through connections with peers, may influence student retention (Bandura, 1986). Participants connected with peers in the same degree program reported obstacles, including questions about whether

their degree program was the right fit for them, and doubts about their ability to complete a difficult course. Participants expressed that their peers' posts provided confirmation that they could persist and succeed in their goals. These findings are consistent with the work of Fisher and Baird (2005) which asserted that the integration of web-based learning communities has a "positive influence on student retention in online courses" (p. 88).

Locus of control describes an individual's beliefs about what will ultimately determine goal attainment. A strong internal locus of control coupled with self-efficacy is a strong predictor of student success in online education (Stavredes, 2012). Students with a strong internal locus of control report a belief that success and failure depend upon their own actions. Study participant responses suggest internal locus of control was experienced when describing the self-validation gained through the academic social network (Bandura, 1997).

Theme 3: Drawing from Multiple Perspectives

Drawing from multiple perspectives involves learning vicariously through the experiences of peers and utilizing various perspectives and resources to formulate new knowledge. Drawing from multiple perspectives emerged as a theme describing the essence of the academic social networking experience. Sixty-seven percent of participants reported using knowledge of others to construct new meanings, consistent with a socio-constructive learning perspective. Socio-constructive learning theorists approach learning as being situated in the social environment of the learner (Hmelo-Silver, et al., 2008). Knowledge is guided by discovery and inquiry in a socio-constructive epistemological view of learning (Phillip, et al., 2007).

Participants in this study reported utilizing the social network as a medium for the knowledge of the group to be shared. Most participants reported an appreciation for the various backgrounds and experiences of peers and used the experiences of others to build their own understanding of concepts. Participants reported searching out information simply out of curiosity, a self-guided learning experience consistent with socio-constructive learning (Phillips et al., 2007).

Participant responses described a socio-constructive learning experience whereas both the relationships formed within the community as well as the environment itself influence knowledge creation. Although 66% of participants reported not feeling there was an educational benefit from the academic social network, students gained knowledge without viewing this process as necessarily being of educational value. Participants did not always recognize an educational value, possibly because of a perceived association between education and formal process (Jung, 2011). Participants commented on the vast experiences and different backgrounds of peers and perceived a true value in the variation of sources from which information was posted and described. With the vast information available in society, some theorists report a shift in thinking about what constitutes learning (Hodkinson, 2005).

Discussion

Participant responses to the interviews demonstrate the convergence of theories which provide the theoretical framework of this study: socio-ecological theory, socio-constructive theory, and community of inquiry theory. Interview responses indicated a desire for social connection and knowledge acquisition with peers who share like interests, consistent with the review of literature. Three sub-questions were utilized to draw out the broad data needed to cover the context of the phenomena of the study (Smith et al., 2009). Interpretation of each question

situated in the theoretical framework and previous research further enhanced the understanding of the essence of the lived experiences of online higher education students utilizing academic social networks.

Sub-question 1. What is the student experience when using an academic social network?

Participants were asked about their experiences when participating in an academic social network. They reported formulating new concepts based on the varied experiences of peers consistent with the constructive orientation of the community of inquiry model (Akyol et al., 2009). Web 2.0 technologies provide a medium supporting socio-constructive learning theory which places the student at the center of the learning experience (Hofstetter & Schneuwly, 2009).

Community of inquiry provides a framework for the intersection of three presences which overlap in an online learning environment to create deep and meaningful learning: social presence, teaching presence, and cognitive presence (Garrison et al, 2010). In the CoI framework, teaching presence is defined as “the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Garrison, Anderson, & Archer, 2001, p. 5). Eighty-three percent of participant interactions were student-to-student interactions, indicating less of a need for teaching presence in the network as suggested in the CoI framework.

Participants did report taking on a mentoring role, however, with posters describing the creation of new threads to facilitate discussion on topics of interest. Sixty-seven percent of participants, both posters and non-posters, described taking on a mentoring role. Non-posters felt a sense of self-efficacy when engaging in this mentoring process when they witnessed struggling peers receive assistance (even if the study participant was not the one providing assistance).

One participant did not directly mentor another student but felt the reward of being a mentor because of the close feeling of belonging to a group. Therefore, teaching presence defined as “the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Garrison, Anderson, & Archer, 2001, p. 5) is implicit within the academic social network and emerges through student-to-student mentoring without the need for a formal faculty presence.

Educationally worthwhile learning outcomes are subjective and witnessed through the existing literature examining the community of inquiry framework in a formal educational context (Akyol et al., 2009; Garrison, Anderson & Archer, 2001). Participants in this study reported little educational advantage from academic social networking, yet responses indicated gained knowledge based on peers’ experiences. S1 described the vast depth of knowledge from peers on the network, “understanding or the breadth of knowledge that is on there ya know, from everyone that is in the community, I think that is the number one greatest experience that I get from the network.” S2 explained how she utilized the network as a support system, “when I’m frustrated when I don’t know what I am doing and then find the help to get it done it is absolutely liberating.”

S3 described the benefits of the network with student-to-student mentoring: “see if anybody has suggestions on how to approach something or um if there has been any um, I will just kind of call it student to student tutoring.” S4 explained how peers in the network provide degree program information, “to read other opinions to see what they have read about in the criminal justice field.” S4 described how networking provides additional information about her career interest: “had to do with a couple of nursing hot topics and then the other one had to do

with just frustrations.” S5 utilized the network as a support system for degree planning and stated she “read[s] some posts on where other students were discussing should they pursue their masters.”

Although participants for this study stated they did not feel a formal educational benefit from academic social networking, 100% reported utilizing the information in the network informally to assist with educational needs. In an academic social network, participants themselves choose what content is meaningful and develop discussion threads. Coroama’s (2011) research indicated a need for flexibility in online education toward an approach incorporating both informal and formal education into the curricula. Study findings suggest the academic social network provides this space for students to informally explore ideas building on previous knowledge, consistent with socio-constructive learning theory, which enhances the overall educational experience.

Sub-question 2. Who or what do students observe in the academic social network?

Participants were asked about who they observe and who they interact with when participating in an academic social network. Due to limited research regarding student activity in academic social networks, previous research regarding populations participating in social networks provided a basis for the literature review. Boyd (2007) defined a social network as a “web-based service[s] that allows individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system” (p. 211).

Social networks historically provide a virtual location for users of like interests to communicate. What common interests bring users together and how knowledge is disseminated within the network varies based on the site (Boyd, 2007). Boyd (2007) reported that social networks form communities which mirror homogeneous populations according to age, nationality, or education level. This study explored the intrapersonal and interpersonal characteristics of participants, consistent with socio-ecological and community of inquiry frameworks. While the intrapersonal characteristics of participant users illustrate attitudes toward academic social networking, the interpersonal characteristics of users illustrated why they use academic social networking.

Participants did not indicate that age or nationality influenced which peer posts were read or the communities in which posts were shared. The topic of degree program information or career interests determined the communities with which participants connected. Eighty-three percent of participant connections were 100% virtual with only 17% reporting physically meeting peers during on-ground courses within the same university prior to participating in the academic social network community. These findings concur with earlier research by Garrison, Anderson, and Archer (2010) which proposed that a shared educational context superseded personal identity and interpersonal relationships when forming connections in online education communities.

Study participants reported communities consisted of peers as opposed to faculty and alumni, who are all provided access to the same academic social network. Seventeen percent of participants reported communicating with faculty while 100% of participants reported seeking out peers sharing similar career and educational interests. Opposed to seeking knowledge from a person of authority such as faculty or a person of expertise such as alumni, peers sought to learn through individuals with whom they could relate regarding the topic of interest. These findings

are consistent with socio-constructive learning theory and suggest the learner is at the center of the experience as opposed to an objective learning experience where knowledge is transmitted from one generation to the next (Phillips et al., 2007).

Community of inquiry theory provides a process model suggesting that online learning involves the relationship between social presence, teaching presence, and cognitive presence grounded in a constructivist orientation (Annand, 2011). Social presence is represented through an emotional sense of belonging which develops through progressive stages beginning with identifying with a community, then moving toward purposefully communicating in an environment of trust, and finally developing interpersonal relationships within that community (Garrison et al., 2010).

Consistent with previous research (Annand, 2011), participants in this study described finding acceptance and belonging with peers of like interests, connecting with that community, and developing close bonds with peers within the community. Thirty-three percent of participants reported that a bond or close friendship developed with peers and 100% of that population comprised of posters. Non-posters reported feeling connected to a community however did not report feelings of close bonds with peers.

Rourke and Kanuka (2009) contended that student engagement in online experiences did not result in “deep and meaningful learning” (p. 24) as previous research by Garrison, Anderson, and Archer (2010) suggested. Annand (2011) posited that learners cannot share common values and goals which are necessary for learning to occur without engaging in group interactions. The study findings indicate that participants’ values and goals mirrored those of their peers, and that participating in posting activities was not necessary to feel a sense of engagement. Only when moving toward the last dimension of social presence, forming bonds, were posting activities described.

Sub-question 3. What benefits or drawbacks have students experienced from using an academic social network?

Participants were asked about why they participate in an academic social network. Consistent with the socio-ecological lens of the study, participants reported utilizing the network as a medium for knowledge construction. Previous research suggested activities vary among social networks (Boyd, 2007). Foster et al.’s (2010) research on virtual communities of practice examined motivations for participation in social networks, finding social connectivity and social enhancement to be the leading motivators for participation in group-based virtual communities. Ardichvili (2008) supported these conclusions, finding motivation factors for participating in communities of practice to include: (1) profession-related benefits such as increased self-esteem and relationship building, and (2) community-based considerations such as shared values and visions.

The study findings identify curiosity about what other students might be doing as a motivator for first becoming active in an academic social network. A review of literature did not present this motivator in previous research on social networking. Participant responses indicated curiosity as a driving factor, with comments such as “just to see what other people are saying,” and to “see if something catches my eye.” Participants indicated, however, that self-validation was needed to continue visiting the network.

Participants in this study described a sense of “liberation” when finding answers to questions and “wanting to keep the motivation amongst everybody and morale up.” That

participation in the network provided a sense of self-efficacy, a feeling that “if someone else can do it, so can I,” was reported across the participants. Participant responses indicated self-validation when engaging with students going through struggles similar to their own. Whether or not peers overcame the struggles was not as important to participants as a realization of shared experience. This finding differs from previous reports identifying increased self-esteem as a motivating factor for engaging in communities of practice (Ardichvili, 2008).

Participants did not report any drawbacks to academic social networking and were familiar with navigating the system. Thirty-three percent of participants did recall negative conversations on the network, but said they were not affected by them and continued to search until finding conversations of interest. Thirty-three percent of participants were forty-five or older, and 100% of that age group indicated they did not understand some of the technical features beyond simple reading and posting activities.

Self-Actualization: The Essence of the Phenomenon

One common connection found across all individual meanings when layering each of the three themes, which conveys the essence of what it means to participate in an academic social network, is self-actualization. Findings from this study indicate that academic social networks can empower students in distance education by providing a space to engage in social and democratic learning through participation in critical curiosity regarding career and educational goals while enhancing individual growth. When asking what makes this phenomenon unique and why is it important to understand in the context of education, it was discovered that students’ view of the world and of their place in the world through participation in the network changed, whether posting or not posting. Acceptance and belonging, self-validation, and multiple perspectives thematically describe the phenomenon of academic social networking as a catalyst to self-actualization.

The findings of this study suggest that the academic social network is organic and in constant flux, driven by individuals who choose to utilize it as part of their educational experience. The resulting communities address various topics that range from career attainment to assignment frustrations to “hot” topics in a career field, and much more. The posts are as broad and differentiated as the participants bring insights from many perspectives based on different experiences, backgrounds, and knowledge.

Students seem to utilize the academic network as a medium for self-growth in an environment where they can control both the area and type of growth desired. Maslow’s work, *Motivation and Personality* (1987), explains a hierarchy of needs individuals must attain before moving forward to the goal of self-actualization. Lower levels of needs include physiological attainment (such as food, water, sleep), safety (security, resources), love and belonging (friendship, family), and esteem (confidence, achievement, respect). According to Maslow, all lower-level needs must be fulfilled before moving to the next level toward the highest level, self-actualization (1987), where an individual’s full potential takes place.

Maslow’s focus is primarily on the self; however, individuals participating in an academic social network are meeting their needs while also influencing the other participants in the network, forming an ecosystem. The findings from this study suggest that students not only contribute to satisfying their own needs to attain self-actualization but also meet the needs of other members in the community in an organic and circular manner resulting in others’ heightened sense of acceptance, belonging, and self-validation.

Academic social networking sites challenge the epistemological assumptions that constitute knowledge and learning due to their organic and ecological nature. Academic social networking places users in a unique position of both creator and user of content. These sites are a self-organized medium for communication which manifest complex group interactions, demographics and socioeconomic status disappear, and new learning unfolds.

Recommendations

While enrolment rates continue to rise in online education, persistence toward degree completion is consistently lower than in traditional brick-and-mortar universities. There is a need for education practitioners in online and adult education to share their experiences and lead this paradigm shift toward a collaborative and learner-centered approach to knowledge acquisition in the online environment (Hoskins, 2011). Specifically, the growth in online education warrants a closer examination of how communities form in academic social networks and how influential these communities and the relationships formed in them are regarding student persistence toward degree completion. Peer-to-peer mentoring may be both highly regarded by students and have a distinct effect on retention (Boyle, et al., 2010). Findings from this study support previous research and suggest a socio-constructive and socio-ecological framework for peer mentoring which develops naturally in an academic social network, and which may have implications for student retention, resulting in long-term cost savings for online universities.

Recommendations for Leaders in Education

Education leaders are encouraged to experiment with social networking outside the purview of marketing, but rather as a tool to foster relationships which support both informal and formal learning outside of the classroom environment. One example may be a mentoring program for incoming freshman who are introduced to peers during the first course of the program. Leaders must be willing to transcend challenges by trying new approaches and utilizing feedback for continual improvement in a fluid organization. Educational leaders need to explore how students are sharing knowledge and educational strategies reflecting best practices within academic social networks in online education.

Traditional universities benefit from a physical connection of the student body to the campus while online universities lack that sense of physical connectedness and social presence. Social integration and community involvement are associated with student persistence and degree completion (Heaney & Fisher, 2011). Findings suggest that students participating in an academic social network perceive they are accepted and belong to a community of peers whether involved in posting or non-posting behaviors. Education leaders are encouraged to find a virtual space for students to network and create support systems. The costs associated with implementing an academic social network may be offset by an increase in retention rates.

Recommendations for Future Research

This study provided an understanding of the essence of what it means to participate in an academic social network for online higher education students. Findings from this phenomenological study resulted in recommendations for future research to address unanswered questions. Suggested research will bring a deeper understanding to the findings of this study. Further research is recommended based on the scope and limitations of this qualitative phenomenological study. A gap in literature regarding academic social networking prompted the need for a better understanding of the essence of the experience of online higher education students participating in academic social networks. With the exponential growth in online

education and subsequently academic social networking the depth of this phenomenon remains unclear.

This study focused on a population in the United States; however, academic social networking is a global phenomenon with institutions utilizing social networking for education and learning in Asia and Europe, among others. Examining the essence of this experience from a global perspective would provide additional context to what it means to participate in an academic social network. Building on this idea, researchers need to examine what learning means in academic social networks and how informal and formal learning interact and unfold in these networks.

Findings were unclear as to whether participants were purposefully seeking out knowledge from various sources reflective of an epistemological belief that knowledge comes from many as opposed to coming from an elite few as is consistent with classical or objectivist learning theory (Tucker & Courts, 2010). Further research to understand how technological advancements influence epistemological beliefs about what constitutes knowledge is warranted. Cultural and political aspects of human behavior should be examined from a socio-historical theoretical framework to provide an understanding of how knowledge is perceived and what that means for education on a global scale.

Further research is needed to understand non-posting behavior or listening in academic social networks. Specifically, what motivates listeners to participate in academic social networks and what are the differences between the experiences of listeners and posters? Quantitative research would provide insight into how listening behaviors influence student learning and persistence in degree completion. Study findings do not indicate whether students who have a high degree of internal locus of control are more likely to seek validation through the network or whether the network provides a medium for students to feel self-validated resulting in a greater sense of self-efficacy and internal locus of control. Quantitative research is needed to define characteristics of students who participate in the academic social network. More research is needed to fully understand why some students participate in these networks while others do not participate. Additional recommendations based on the study's findings suggest research in the following areas to assist educational leaders and researchers in gaining a deeper knowledge base: (a) social presence and the relationship between social presence and student satisfaction with learning, and (b) the relationship between participation in academic social networks and self-efficacy. Quantitative research is suggested to examine cause and effect relationships to deepen the understanding of the findings from this study.

Conclusion

Educational leaders are challenged to meet the student demand for online education opportunities while maintaining a rigorous curriculum leading to degree attainment. Academic social networks provide a collaborative medium for communication across time and space. Understanding student experiences of, and attitudes toward, academic social networking can assist educational leaders in realizing the potential of this Web 2.0 tool in the online university. Findings on academic social networking can provide education leaders with guidance when making decisions regarding the use of academic social networks in a university. Educational leaders can assist students toward degree completion by better understanding the student experience and factors that present themselves as challenges in distance education. Academic

social networks have the capability to assist students with collaboration and build relational communities within the online university.

Declarations

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author received approval from the ethics review board of University of Phoenix for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Ardichvili, A. (2008). Learning and knowledge sharing in virtual communities of practice: Motivators, barriers, and enablers. *Advances in Developing Human Resources*, 10(4), 541-554. <https://doi:10.1177/1523422308319536>
- 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, 3-4.
- Ali, A., & Kohun, F. (2007). Dealing with social isolation to minimize doctoral attrition – a four stage framework. *International Journal of Doctoral Studies*, 2, 33-29. <http://www.ijds.org/Volume1/IJDSv1p021-033Ali13.pdf>
- Annand, D. (2011). Social presence within the community of inquiry framework. *International Review of Research in Open and Distance Learning*, 12(5), 40-56.
- Altbach, P. G., Berdahl, R. O., Gumport, P. J. (2005). *American higher education in the twenty-first century: Social, political, and economic challenges* (2nd ed.). John Hopkins University Press.
- Arbaugh, J. B., Cleveland-Innes, M., Diaz, S., Garrison, D. R., Ice, P., & Richardson, J. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *Internet and Higher Education*, 11, 133–136. <https://doi.org/10.1016/j.iheduc.2008.06.003>
- Arnold, N., & Paulus, T. (2010). Using a social networking site for experiential learning: Appropriating, lurking, modeling and community building. *Internet and Higher Education*, 13(4), 188-196. <https://doi.org/10.1016/j.iheduc.2010.04.002>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. Worth.
- Banks, J., Au, K., Ball, A., Bell, P., Gordon, E., Gutierrez, K., Heath, S., et al. (2007). Learning in and out of school in diverse environments (Consensus Report). *Learning in Informal and Formal Environment (LIFE) Center*. http://life-slc.org/docs/Banks_etal-LIFE-Diversity-Report.pdf
- Bahk, C., Sheil, A., Rohm, C., & Lin, F. (2010). Digital media dependency, relational orientation and social networking among college students. (English). *Communications of the IIMA*, 10(3), 69-78.
- Boyle, F., Kwon, J., Ross, C., & Simpson, O. (2010). Student–student mentoring for retention and engagement in distance education. *Open Learning: The Journal of Open, Distance and e-Learning*, 25(2), 115-130. <https://doi.org/10.1080/02680511003787370>
- Boyd, D. (2011, January 15). The economist debate on social networking [Web log post]. http://www.zephorias.org/thoughts/archives/2008/01/15/the_economist_d.html

- College Board and Art & Science Group (2009). Social Networking Sites. *Student Poll*, (7)2, <http://professionals.collegeboard.com/data-reports-research/trends/studentpoll/social-networking>
- Coroama, L. (2011). Reconsidering the relation between the formal and informal learning of the English language in the higher education system. *Euromentor*, 2(4), 85-91.
- Creative Commons Attribution Share-Alike 3.0 (2011). Educational Networking [Weblog post]. <http://www.educationalnetworking.com/>
- Dennen, V. P. (2008). Looking for evidence of learning: assessment and analysis methods for online discourse. *Computers in Human Behavior*, 24(2), 205-219. <https://doi.org/10.1016/j.chb.2007.01.010>
- Durak, H. Y. (2020). Cyberloafing in learning environments where online social networking sites are used as learning tools: Antecedents and consequences. *Journal of Educational Computing Research*, 58(3), 539–569.
- Edelmann, N. (2013). Reviewing the definitions of “lurkers” and some implications for online research. *Cyberpsychology, Behavior & Social Networking*, 16(9), 645-649. <https://doi.org/10.1089/cyber.2012.0362>
- EDUCAUSE: Center for Applied Research (2010). The ECAR study of undergraduate students and information technology. Educause. <http://www.educause.edu/Resources/ECARStudyfUndergraduateStuden/217333>
- Eodice, M. & Gaffin, D. (2008). Let’s face Facebook. *The National Teaching & Learning Forum*, 17(6), 1-4.
- Foster, M. K., Francescucci, A., & West, B. C. (2010). Why users participate in online social networks. *International Journal of E-Business Management*, 4(1), 3-19.
- Fisher, M. & Baird, D. E. (2005). Online learning design that fosters student support, self-regulation, and retention. *Campus-Wide Information Systems*, (22)2, Emerald Group Publishing. <https://doi.org/10.1108/10650740610587100>
- 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. <http://www.journals.elsevier.com/the-internet-and-higher-education/>
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring casual relationships between teaching, cognitive and social presence: Student perceptions of community of inquiry framework. *Internet and Higher Education*, 13, 31-36. <https://doi.org/10.1016/j.iheduc.2009.10.002>

- Gerow, J. E., Galluch, P. S., & Thatcher, J. B. (2010). To slack or not to slack: Internet usage in the classroom. *Journal of Information Technology Theory and Application*, 11(3), 5–24.
- Glezou, K., Grigoriadou, M., & Samarakou, M. (2010). Educational online social networking in Greece: A case study of a Greek educational online social network. *The International Journal of Learning*, 17(3), 399-420. <http://ijl.cgpublisher.com/product/pub.30/prod.2668>
- Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Learning, teaching, and scholarship in a digital age. *Educational Researcher*, 38(246-258). <https://doi.org/10.3102/0013189X09336671>
- Guest G., Bunce A., Johnson L. (2006). How many interviews are enough? an experiment with data saturation and variability. *Field Methods*. (18) pp. 59–82.
- Heaney, A., & Fisher, R. (2011). Supporting conditionally admitted students: A case study of assessing persistence in a learning community. *Journal of the Scholarship of Teaching & Learning*, 11(1), 62-78. <http://josotl.indiana.edu/issue/view/166>
- Heo, G. & Lee, R. (2013). Blogs and social network sites as activity systems: Exploring adult informal learning process through activity theory framework. *Journal of Educational Technology & Society*, 16(4), 133-145.
- Hmelo-Silver, C. E., Chernobilsky, E., & Jordan, R. (2008). Understanding collaborative learning processes in new learning environments. *Instructional Science*, 36(5-6), <https://doi.org/10.1007/s11251-008-9063-8>
- Hodkinson, P. (2005). Learning as cultural and relational: moving past some troubling dualisms. *Cambridge Journal of Education*, 35(1), 107-119. <https://doi.org/10.1080/0305764042000332524>
- Holland, A. A. (2019). Effective principles of informal online learning design: A theory-building metasynthesis of qualitative research. *Computers & Education*, 128, 214–226. <https://doi.org/10.1016/j.compedu.2018.09.026>
- Hofstetter, R., & Schneuwly, B. (2009). Knowledge for teaching and knowledge to teach: two contrasting figures of new education: Claparede and Vygotsky. *Paedagogica Historica*, 45, 605-629. <https://doi.org/10.1080/00309230903100973>
- Hoskins, B. (2011). Demand, growth, and evolution. *Journal of Continuing Higher Education*, 59(1), 57-60.
- Ilkyu, H., & Chonggun, K. (2014). Understanding user behaviors in social networking service for mobile learning: A case study with twitter. *Malaysian Journal of Computer Science*, 27(2), 112-123.

- Ivankova, N. V., & Stick, S. L. (2007). Students' persistence in a distributed doctoral program in educational leadership in higher education: A mixed methods study. *Research in Higher Education*, 48(1), 93-135. <https://doi.org/10.1007/s11162-006-9025-4>
- Jones, S. (2002). The internet goes to college. Pew Internet & American Life. *USDLA Journal*, 16(10).
- Jung, Y. (2011). Education as a ubiquitous learning web, immersed in living. *Journal of Unschooling & Alternative Learning*, 5(9), 38-56.
- Kabilan, M. K., Ahamad, N., & Abidin, M. J. (2010). Facebook: An online environment for learning of English in institutions of higher education? *Internet and Higher Education*, 13, 179-187. <https://doi.org/10.1016/j.iheduc.2010.07.003>
- Kaya, T. (2010). New College Social Networks, Unlike Facebook, Foster Academic Interaction. *The Chronicle of Higher Education*. <http://chronicle.com/article/New-College-Networks-Unlike/124871/>
- Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*. 55(4), 808-820. <https://doi.org/10.1016/j.compedu.2010.03.013>
- Livingstone, D. W. (2001). Adults' informal learning: Definition, findings, gaps and future research. Canada: Human Resources Development. Center for the Study of Education and Work. <https://tspace.library.utoronto.ca/retrieve/4484>
- Liu, M., Kalk, D., Kinney, L., & Orr, G. (2010, October). How Web 2.0 technologies are used in higher education: An updated review of literature. In *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 2604-2615). Association for the Advancement of Computing in Education (AACE).
- Lowenthal, P. R. (in press). Social presence. In P. Rogers, G. Berg, J. Boettcher, C. Howard, L. Justice, & K. Schenk (Eds.), *Encyclopedia of distance and online learning* (2nd ed.). Information Science Reference. <http://www.patricklowenthal.com/publications/socialpresenceEDOLpre-print.pdf>
- Marshall, C., & Rossman, G. B. (2006). *Designing qualitative research* (4th ed.) Sage Publications.
- Maslow, A. H. (1987). *Motivation and personality* (3rd. ed.). Harper Collins Publishers.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. Revised and expanded from qualitative research and case study applications in education. John Wiley & Sons, Inc.

Morrison, M., & McMillan, S. (2010). Oh, user, who art thou: An examination of behaviors and characteristics of consumers in the context of user generated content. *American Academy of Advertising Conference Proceedings*, 77.

Morrison, M., Hyuk Jun, C., & McMillan, S. J. (2011). Shading in the gray: Profiling media use patterns of posters, lurkers, and networkers. *American Academy of Advertising Conference Proceedings*, 56-58.

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage Publications.

Muller, M. J., Freyne, J., Dugan, C., Millen, D. R., & Thom-Santelli, J. (2009). Return On Contribution (ROC): A metric for enterprise social software. In *ECSCW 2009* (pp. 143-150). Springer.

National Center for Educational Statistics (2006). Adult education survey of the 2005 National Household Education Survey Program. <http://nces.ed.gov/pubs2006/2006077.pdf>

Neuman, W. (2011). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Allyn & Bacon.

Olesova, L. A., Weasenforth, D., Richardson, J. C., & Meloni, C. (2011). Using asynchronous instructional audio feedback in online environments: A mixed methods study. *Journal of Online Learning and Teaching*, 7(1). http://jolt.merlot.org/vol7no1/olesova_0311.htm

O'Neill, T. A., Hambley, L. A., & Chatellier, G. S. (2014). Cyberslacking, engagement and personality in distributed work environments. *Computers in Human Behavior*, 40, 152–160.

Oregon, E., McCoy, L., & Carmon-Johnson, L. (2018). Case analysis: Exploring the application of using rich media technologies and social presence to decrease attrition in an online graduate program. *Journal of Educators Online*, 15(2), 103–115. <https://doi.org/10.9743/jeo.2018.15.2.7>

Phillips, P. Wells, J., Ice, P., Curtis, R., & Kennedy, R. (2007). A case study of the relationship between socio-epistemological teaching orientations and instructor perceptions of pedagogy in online environments. *Electronic Journal for the Integration of Technology in Education*, (6) 3-27.

Radovan, M. (2019). Should I stay, or should I go? Revisiting student retention models in distance education. *Turkish Online Journal of Distance Education*, 20(3), 29–40.

Rajagopal, K., Brinke, D. J., & Sloep, P. B., (2012). Understanding personal learning networks: Their structure, content and the networking skills needed to optimally use them. *First Monday*, (17)1. <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/3559/3131>

Rogers, P., Berg, G., Boettcher, J. Howard, C., Justice, L., & Schenk, K. (2009), *Encyclopedia of distance and online learning* (2nd ed.). Information Science Reference. Hershey, NY.

Rogers, P. & Lea, M. (2005). Social presence in distributed group environments: The role of social identity. *Behavior & Information Technology*, 24(2): 151-158.
<https://doi.org/10.1080/01449290410001723472>

Rubenson, K. & Desjardins, R. (2009). The impact of welfare states' regimes on barriers to participation in adult education. *Adult Education Quarterly*, 59(3), 187–207.

Rourke, L., & Kanuka, H. (2009). Learning in communities of inquiry: A review of the literature. *Journal of Distance Education*, 23(1), 19–48.

Saykili, A. (2019). Higher education in the digital age: The impact of digital connective technologies. *Journal of Educational Technology and Online Learning*, 2(1), 1-15.

Scarlett-Ferguson, H. (2011). Leadership in Distance Education: Do We Need a Leadershift? In Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2011 (pp. 2249-2253). AACE.

Smith J. A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. Sage Publications.

Smith, S., Salaway, G., Caruso, J., & Katz, R. N. (2009). The ECAR study of undergraduate students and information technology. EDUCAUSE Center for Applied Research, (6).
<http://www.educause.edu/ecar>

Smith, M. C. & Smith, T. J. (2008). Low-education adults' participation in informal activities: Relationships with selected demographic characteristics. *Adult Basic Education and Literacy Journal*, 2(2), 67–73.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. John Wiley & Sons.

Stavredes, T. (2014). *Effective online teaching, foundations and strategies for student success*. John Wiley & Sons, Inc.

Tanriverdi, O. & Daraca, F. (2018). Investigating the relationships between adolescents' levels of cognitive absorption and cyberloafing activities according to demographic characteristics. *The Turkish Journal on Addictions*. 5(2), 285-315.

The E-Listening Project (2011). *E-Listening: Research Project*.
<https://www.sfu.ca/~afw3/research/e-listening/index.html>

Valdez, G. F. D., Cayaban, A. R. R., Al-Fayyadh, S., Korkmaz, M., Obeid, S., Sanchez, C. L. A., Ajzoon, M. B., Fouly, H., & Cruz, J. P. (2020). *The utilization of social networking sites, their perceived benefits and their potential for improving the study habits of nursing students in five countries*. *BMC Nursing*, 19(1), 1–14. <https://doi.org/10.1186/s12912-020-00447-5>

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, 19, 52-90. <https://doi.org/10.1177/0093650212438097>

Wise, A.F., Hausknecht, S.N. & Zhao, Y. (2014). Attending to others' posts in asynchronous discussions: Learners' online "listening" and its relationship to speaking. *International Journal of Computer Supported Collaborative Learning*. (9), 185–209. <https://doi.org/10.1007/s11412-014-9192-9>

Xie, K. (2013). What do the numbers say? The influence of motivation and peer feedback on students' behaviour in online discussions. *British Journal of Educational Technology*, 44(2), 288-301. <https://doi.org/10.1111/j.1467-8535.2012.01291>

Appendix A

Academic Social Networking

I am looking for participants who are actively involved in an academic social network, whether that means posting, reading others posts, starting communities, or whatever activities you may take part within the network. I will be choosing a small sample to interview based on responses received in this survey. Thank you for participating in my short survey. An academic social network is social network within online university. Only students attending the university, faculty, and possibly alumni have access to this network. These social networks are available for students to collaborate and communicate with each other as well as faculty and alumni. Participation in an academic social network includes observing others posts and interactions as well as posting and sharing information.

Which best describes the amount of time you spend actively involved in the university's academic social network?

- I participate in the academic social network less than one time per week.
- I participate in the academic social network to see what is new at least once a day.
- I participate in the academic social network several times throughout the day.

Describe in greater detail what you typically do in the academic social network. Do you prefer to read others posts and see what is going on or do you post and interact with other users? You may do a combination of both, or another activity not described here.

What degree program are you currently enrolled in?

What year are you in your degree program?

- 1st
- 2nd
- 3rd
- 4th
- Other

Which of the following age ranges do you fall under?

- 18-24
- 25-30
- 31-34
- 35-40
- 41-45
- 46+

What is your gender?

- Male
- Female

Understanding the Roles of Personalization and Social Learning in a Language MOOC Through Learning Analytics

Napat Jitpaisarnwattana

Hayo Reinders

Pornapit Darasawang

King Mongkut's University of Technology Thonburi, Thailand

Abstract

In the last decade, there has been a great deal of interest in language MOOCs (LMOOCs) and their potential to offer learning opportunities for large audiences, including those in disadvantaged communities. However, experiences and research have shown MOOCs to suffer from several challenges. Chief among these have been low participation and completion rates, which are often attributed to limitations in how opportunities for personalisation and social interaction are implemented. For the current study, a dedicated LMOOC was designed and implemented, called the “Social and Personal Online Language Course (SPOLC).” This language learning environment incorporates a recommendation system and emphasizes personalisation and social interaction. The study identified the types of learning behaviour that were related to course completion and observed how 270 learners in the LMOOC used the various course features. The data were collected using learning analytical methods and analysed using binary logistic regression and feature extraction prediction model. The results demonstrated that working in groups and creating a learning plan were important factors associated with course completion, while interacting with other learners online was not. We conclude with several suggestions and implications for future LMOOC design, implementation, and research.

Keywords: Language MOOCs, personalisation, social learning, learning analytics

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. DOI: 10.24059/olj.v25i4.2509

There has been a great deal of interest in Massive Open Online Courses for language learning (LMOOCs), as they hold considerable potential for addressing some of the existing practical challenges in online language learning, such as issues of accessibility and affordability (Hill, 2012). The open and free nature of most LMOOCs has contributed to addressing some of these practical challenges. However, a number of pedagogical issues have emerged from MOOC implementations and research studies. These include the teacher-centric nature of many courses, low attendance and completion rates, and limited interaction among MOOC learners. Of these, low completion rates have received widespread attention and have often been cited as the scale-efficacy tradeoff of the MOOC educational model (Onah, Sinclair, & Boyatt, 2014). In the context of LMOOCs, issues of participation, completion, and interaction are often attributed to a lack of personalisation and opportunities for social interaction for learners (Perifanou, 2015).

Personalisation involves giving learners choices in learning approaches, content, and pace in order to accommodate individual learning differences. Given the heterogeneous nature of LMOOCs, personalisation is crucial as learners from different backgrounds with different needs, goals, and preferences participate. Likewise, interaction with other learners has been seen as a key component for success in online L2 learning (Yang, 2011). LMOOC environments offer opportunities for learners to interact with other learners in the course given that there are by definition both large numbers of participants and multiple communication channels, including synchronous (e.g., chat facilities) and asynchronous (e.g., forums for communication) (Sokolik, 2014). However, studies of LMOOCs have shown interaction to be quite limited (Martin-Monje, Barcena & Read, 2013; Martin-Monje, Castrillo & Rodriguez, 2018; Rubio, 2015). There is thus a need for investigating how different design elements of LMOOCs may contribute to increased interaction.

One approach that has often been adopted is the use of an adaptive learning system that offers learners personalized feedback and content sequencing. This allows learners to be directed to the most appropriate learning materials based on their profiles (Godwin-Jones, 2014; Perifanou, 2015). Such intelligent systems have been implemented in many MOOCs. However, solely providing learners with adaptive or recommended content may not be enough. Rather, such a system needs to be placed in a learning environment that is also social and personalizable by the learner (Moreira Teixeira & Mota, 2014; Sokolik, 2014). There need to be ample opportunities for learners to interact with other learners through various types of collaborative work, peer assessment, discussion forums and other communication platforms. Furthermore, the personalized LMOOCs should afford learners enough freedom to tailor the way in which they want to participate in each course, thus allowing for personal learning (Downes, 2012) as well as engagement with a personal learning environment (Godwin-Jones, 2009, 2017) to manifest. The current study investigates the Social and Personal Online Language Course, or SPOLC, a MOOC-type language learning environment that deals primarily with essential English language skills for delivering presentations. This LMOOC incorporates a recommendation system and personalizable and social aspects into its design. The study aims to observe how learners in the SPOLC make use of the learning opportunities afforded by the course design and identify the types of learning behaviour that are related to course completion using learning analytical methods.

The next section of this paper discusses the concepts of personalisation and socialisation in LMOOC contexts and provides an overview of research and practices. After this, the steps taken in designing and implementing the SPOLC will be described; the results of the data

analysis will be reported and discussed in the later sections. Finally, implications for LMOOC implementation and practical applications will be raised considering the findings.

Review of Related Literature

Language MOOCs and Their Challenges

Barcena and Martin-Monje (2014) define LMOOCs as “dedicated web-based online courses for second languages with unrestricted access and potentially unlimited participation” (p.1). Despite early proliferation, their educational model has sometimes been criticized as “problematic” for language learning (Barcena & Martin-Monje, 2014, Barcena et al., 2015; Sokolik, 2014), with the majority of LMOOCs being based on xMOOC pedagogy and focusing on transmission of knowledge. This may not be suitable for the skill-based learning that language learning requires. The essential components of language acquisition, including ample L2 input, opportunities for L2 output and a scaffolded environment for L2 interaction, appear to be missing from most of the currently available LMOOCs. Further, as anyone can enroll in LMOOCs, their demography is extremely heterogeneous. Participants differ in their proficiency levels, interests, and learning styles, which pose significant challenges for developers. Currently, LMOOCs are not yet successful in personalizing learning experiences, which may be one of the reasons for their high drop-out rates (Loizzo et al., 2017). Another important challenge is the lack of interaction and socialisation in most LMOOCs (Rubio, 2015; Schulze & Scholz, 2018), as they mostly rely on discussion forums integrated into the course and often do not incorporate other communication tools. This can prevent learners from interacting with each other (Perifanou, 2015). Therefore, we propose that it is both theoretically important and empirically feasible for LMOOCs to start addressing these issues to maximize their potential.

Personalization and Social Interaction in LMOOCs

Personalisation refers to instruction that is tailored to learning needs, preferences and interests of different learners (Downes, 2016). Efforts to improve personalisation have received increased attention in recent years, helped by developments in educational technology. LMOOC environments hold considerable potential for increasing personalisation as a result of their online infrastructure and their adaptability to different pedagogical approaches. In addition, in online platforms learners can be encouraged and supported to create their own personal learning environment (PLE), or a learner-organized language learning environment in which learners can combine digital tools and resources to support different aspects of their learning process, from goal setting to materials selection to assessment (Author, 2014). According to Attwell (2007), PLEs afford learners with opportunities to be fully involved in the learning process by allowing them to be the co-creators of their knowledge. In CALL, the notion of PLEs has been widely adopted and examined in different contexts, including online and blended courses, mobile learning (Pegrum, 2014) and social media (Devedzic, 2016).

The vast amount of data LMOOCs generate allows for the creation of learner profiles, which can be used to direct learners to learning resources that are suitable for their proficiency levels, learning goals and content preferences (Bull & Wasson, 2016). A concrete example of this is the use of a recommendation system, in which learners are presented with suggested learning materials or learning plans based on their profiles. A recommendation system has been utilized in various studies examining different language skills such as reading ability (Hsu, Hwang & Chang, 2013) and vocabulary (Nikiforovs & Bledaite, 2012). Since the PLE notion has often been adopted under the connectivist MOOC (cMOOC) model and the recommendation system has often been associated with a more structured xMOOC model, we argue that

personalisation in LMOOCs could benefit from addressing both forms of personalisation. In other words, LMOOC personalisation should provide personalized learning in the form of recommendations based on learner profiles, but at the same time allow learners to create and personalize their own learning pathways.

Interaction has been a mainstay in online language learning. Research into interaction in online courses has provided well-documented, positive results. Several meta-analyses demonstrate that learning is more effective when interaction and collaboration are facilitated and that interaction is positively correlated with learning outcomes (Bernard, et al. 2009; Ducate & Lomicka, 2008). Although researchers and practitioners are in general agreement that interaction is crucial and forms the basis for effective practices in online language learning environments (Bernard et al., 2009; Yang, 2011), interaction is a complex phenomenon and there are several key factors contributing to its successful integration in an online language course. Types of interaction are one of these key factors. Moore (1989) identified three components of critical interaction in educational contexts: learner–content interaction (L-C), learner–instructor interaction (L-I) and learner–learner interaction (L-L). In Moore’s definition, L-C interaction encompasses reading texts, watching videos, searching for information, completing assignments and working on projects. For L-I interaction, learners interact with the course instructor either synchronously or asynchronously through emails or discussion forums. In L-L interaction, learners interact with other learners either individually or in groups and such interaction often takes place using through synchronous computer-mediated communication (CMC) tools (e.g., instant messaging) as well as asynchronous computer-mediated communication tools (e.g., emails and discussion forums).

These types of interaction provide a useful framework for LMOOC instructors and designers to understand what to consider when developing and delivering an LMOOC. Moore (1989) suggests that course designers maximize each type of interaction and provide suitable types of interaction in different subject areas. We argue that in LMOOC contexts where L-C interaction is almost a necessity and its ‘massive’ element makes L-I extremely difficult, L-L interaction has become a key design principle. The key design feature of current LMOOCs regarding interaction centres around encouraging participants to engage in forum discussion and providing peer feedback to other participants (Martin-Monje et al., 2018; Rubio, 2015). Despite its well-documented benefits for language learning (Blake, 2009; Harrison & Thomas, 2009; Wu et al., 2011), previous LMOOC designs have not yet been successful in facilitating L-L interaction and research studies on LMOOCs and interaction are unanimous in their observation that the level of L-L interaction is still quite low (Martin-Monje et al., 2013; Rubio, 2015; Martin-Monje et al., 2018). The types of interaction investigated in these studies included both exchanges in the discussion forums and peer feedback. Therefore, facilitating L-L interaction remains a challenge for LMOOC designers.

Personalisation and Social Interaction in LMOOCs: Research and Practice

LMOOCs offer learners opportunities to interact with a large number of peers from different countries. Despite studies of interaction in LMOOCs reporting a fairly high level of L-C and L-I interaction, the level of L-L interaction both in learning activities and discussion forums, is quite low (Martin-Monje et al., 2018; Rubio, 2015). In his study, Rubio (2015) compared learners’ interaction in an LMOOC with the other two formats of delivery (blended and online) and found that, in the LMOOC format, the L-L interaction was quite low compared with L-C and L-I interaction. The study also reported a positive correlation between interaction levels and course outcomes. A similar finding emerged in a study looking at online interaction

(Martin-Monje et al., 2018) in that learners who were active in their participation and interaction were more likely to be successful in the LMOOC. Interestingly, however, participation in discussion forums and providing peer feedback were not factors associated with students' success.

In terms of course design, several personalisation initiatives have been implemented in the LMOOC context. One example of this is SpanishMOOC, which incorporates Instreamia, an adaptive learning system (Godwin-Jones, 2014). The system provided personalized feedback and content sequencing to the learners. Other intelligent systems have also been implemented. The Open Learning Initiative (OLI), which makes use of cognitive and example-tracking-tutors, offers self-study learning resources in several languages. The "open learners' profiles", in which learners' interactions with the system are collected and used to develop a more effective adaptive learning system were also used (Godwin-Jones, 2014). Although these efforts to offer personalized learning in LMOOCs were a good starting point, they have not yet been investigated empirically. On the basis of the above initiatives, we can conclude that despite initial efforts, it remains unclear to what extent personalisation can contribute to language learning in LMOOC environments and enhance course completion.

The available platforms have not yet succeeded in personalizing learning experiences and providing sufficient opportunities for social interaction and there is still considerable room in the LMOOC architecture for improvement. This study tackles this challenge by reporting on the development and outcomes of a Social and Personal Online Language Course (SPOLC), a MOOC-type language learning platform, that aims to provide a personalized learning experience within a social learning environment. This study is guided by three research questions:

1. To what extent can a specialised LMOOC environment encourage learners to personalize their learning?
2. To what extent can a specialised LMOOC environment encourage learners to interact with other learners?
3. What is the correlation between learning behaviours in an LMOOC and course completion?

Method

Design of the SPOLC

The SPOLC, an LMOOC-type course, was specifically designed for this study. It was developed on *Moodle* with additional plug-ins and a recommendation system. The design of the SPOLC is grounded in two primary theoretical foundations: personalisation and social learning. For personalisation, we align ourselves with Moreira-Teixeira & Mota (2014) and Sokolik (2014), who proposed that an optimal approach to designing an LMOOC is to provide an adaptive learning or a recommendation system in a personalizable learning environment. This idea allows for the combination of personalized learning with personal learning. The former refers to learning materials suggested to learners by a computer system, while the latter refers to learners' choices and decisions in planning their learning (Downes, 2012, 2016). For social learning, the SPOLC allows learners to work either individually or in a group on the final project. Several learning activities also encourage the use of peer feedback and peer assessment using provided rubrics.

The course delivered through the SPOLC is called *Presentation@work* and aims to help learners develop their English presentation skills in either a professional or educational context. The learning architecture of the SPOLC was based on a framework for operationalization and

implementation for learner autonomy proposed by Reinders (2010), in which self-directed learning is divided into seven stages: identifying needs, setting goals, planning learning, selecting resources, selecting learning strategies, practice, monitoring progress, and assessment and revision. The learning architecture of the SPOLC is visualized in Table 1 below.

Table 1
The Learning Architecture of the SPOLC

Learning stages in the framework	Learning stages in SPOLC	Learning activities	SPOLC design principles
	Registration	Create profiles	Personalized learning (Data collected for learner model)
	Stage 0: General	<ul style="list-style-type: none"> • Instruction on how to learn in the course and how to use features and tools in the platform 	
Identifying needs + setting goals	Stage 1: Identify the type of presentation	<ul style="list-style-type: none"> • Identify the type of presentation they want to do 	Personalized learning (Data collected for learner model)
Identifying needs	Stage 2: Self-evaluation and Identifying what you need	<ul style="list-style-type: none"> • Self-evaluation • Upload videos and get feedback from peers • Reflect on past experience with the topic and identify what needs improvements 	Personalized learning pathway (PLP) generated and presented to learners Peer feedback and assessment
Setting goals + Planning learning + Selecting resources	Stage 3: Planning your learning	<ul style="list-style-type: none"> • Set their learning goals and create their learning plan • Discuss plan with their peers (for group) • Find additional learning resources outside of SPOLC 	Personal learning and group learning
Selecting learning strategies and practice	Stage 4: Learning activities	<ul style="list-style-type: none"> • Learn and practice with a wide range of activities • Work on presentation • Get feedback from their peers 	Personalized learning Personal learning Group learning Peer feedback and assessment
Monitoring progress and assessment and revision	Stage 5: Rehearsal	<ul style="list-style-type: none"> • Upload final presentation for feedback for them to improve upon 	Group learning Peer feedback and assessment
Monitoring progress and assessment and revision	Stage 6: Final presentation	<ul style="list-style-type: none"> • Upload improved presentation • Uploaded videos are rated by other learners 	Group learning Peer feedback and assessment

After registering and creating a profile, learners complete a series of learning activities. In stage 0, learners familiarize themselves with the platform, its structure, and features. Then they start thinking about the type of presentation that would be most beneficial for them, ranging from English academic presentations to annual company reports to a three-minute sales pitch. In stage 2, they self-evaluate different aspects of presentation skills, including delivery, engagement, and visual aids. They also upload their first video to get feedback from other learners (based on the rubrics provided). This is when the personalized learning pathway (PLP) based on their profiles and self-evaluation is generated by the system and provided to them.

The PLP provides each learner with a unique learning pathway, including recommended learning activities and the types of activities that would be most appropriate for their perceived ability. It is created by the system based on the data from the participants' profiles and their self-evaluation results. In stage 3, learners create an Individual Learning Plan (ILP), which includes deciding on their specific goals for the project, allocating a certain amount of time every week, and choosing whether to work alone or with others. They also consider what resources other than those available within the SPOLC they want to use, such as colleagues, English-speaking friends, favorite websites, etc. In other words, the system-generated PLP identifies the most suitable activities and sequence for completing these within the SPOLC, and the ILP, is learners' chosen program of study (or to put it metaphorically, the PLP is a recommended itinerary and the ILP the travel plan learners choose to follow, including how many stops to make and what to do in each place). For those opting to work in a group, they can hold meetings with other group members through their own personal communication channels at this stage. In stage 4, learners are given complete freedom to choose any activities that they want to learn. They can either opt to follow the personalized learning pathway or follow their own learning plan or they can follow neither. They can also work on the type of presentation that is most relevant to them. In stage 5, they upload their presentation to get feedback from other learners in the form of comments. The learners can use these comments to improve their presentation before resubmitting them in stage 6 when all the presentations are rated and ranked as part of the competition.

Participants

There was a total of 403 registered participants in this course. As this LMOOC was open to anyone, the background of the participants, gathered from learners' profiles, was highly diverse. There were 133 undergraduate students (33.01%), 98 graduate students (24.31%) and 172 working professionals (42.68%), including nurses, architects, engineers, medical staff, salespersons, teachers, and researchers. Although the majority of the participants were Thai, there were participants from the Philippines, Mexico and China as well. As for gender, 253 participants were female (62.78%) and 124 were male (30.77%), while 26 participants did not identify their gender (6.45%). However, only 270 participants started the course and we only focused on these participants in this study. The participants completed a self-evaluation questionnaire of their current knowledge of delivering a presentation in English, the focus of the course. The questionnaire asked the participants to evaluate their skills related to giving a presentation in English, including language, delivery, engagement, visual aids, and overall presentation. The evaluation classified the participants into four categories: 1) need overall improvement (39.9%) 2) need improvement in some areas (15.9%) 3) overall fairly good (41%) and 4) overall very good (3 %).

Data Collection and Analysis

The data were collected over a period of five weeks between October and November 2019 and involved the use of quantitative techniques. Learning-related data were logged using

the analytics system of the MOOC platform, in which data on activity completion, time spent in the course, following/not following the personalized learning pathway, devising/not devising their own individual learning plan, type of participation (group vs. individual), and their interaction in the forums and with other learners’ videos were collected. The data set was processed using Microsoft Excel software and descriptive statistics on the use of personalisation features and interaction in the MOOC were generated using SPSS. Then two statistical approaches were applied: a binary logistic regression and a feature extraction prediction model.

A binary logistic regression model was developed and performed to evaluate the relationship between each learning factor and course completion. However, participating in an LMOOC is a complex non-linear process and there are several hidden learning patterns. Therefore, machine learning techniques were utilized to develop a prediction model that can identify the learning behaviours that affect course completion. As Al-Shabandar et al. (2017) note, machine learning is an effective analysis technique that can be applied to learning analytics because it can help to discover hidden patterns of students’ learning behaviours and to analyze complex, non-linear relationships. In this study, the primary data set is made up of the *clickstream*, which means learners’ behaviours relating to activity completion, posts in forums, interaction with peers’ videos, access time, learning pathways, learning plans, and course completion. A brief description of the dataset attributes is given in Table 2.

Table 2
Data Collected

Features	Description
Course completion	The submission of the final presentation encoded as 1 (Yes) / 0 (No)
Follow PLP	Whether the participants followed the personalized learning pathway presented to them 1 (Yes) / 0 (No)
Create an ILP	Whether the participants created their own learning plan 1 (Yes) / 0 (No)
Access Time	A collective amount of time each participant spent in the MOOC
L-L Interaction	Whether the participants interacted with other learners in forums and video comments 1 (Yes) / 0 (No)
Number of messages	The number of messages each participant contributed
Activity completion	Whether the participants completed each learning activity (60 activities in total) / encoded as 1 (completed) / 0 (not completed)
Type of work	The type of work that the participants opted to do / 1 (individual) and 0 (group)

The model developed in this paper employed various linear and non-linear supervised machine learning models based on feature extraction techniques. These models include logistic regression (LR), Random Forest (RF), Recursive Feature Elimination (RFE), Chi-square test (Chi-2), Pearson’s (r), and LightGBM. The machine learning prediction model can provide a computational prediction for the type of learner who is likely to complete the MOOC based on their learning behaviours. In other words, it provides a behavioral analysis in order to predict the participants’ learning outcome (operationalized as completing the course).

Results

To what extent can a specialised LMOOC environment encourage learners to personalize their learning?

In investigating how the participants personalized their learning, the data were generated by the course’s learning analytics tool, on which descriptive statistics were performed. Table 3 shows whether the participants followed the personalized learning pathway (PLP) provided to them at the beginning of the course.

Table 3

Participants’ Use of the Personalized Learning Pathway (PLP)

Number of students	Followed PLP	Did not follow PLP
270	78 (28.9%)	192 (71.1%)

The majority of the participants (71.1%) chose not to follow the PLP provided to them, while only 28.9 % did so. Also, as described above, participants had a further choice—whether to complete their individual learning plan (ILP). The data on whether the participants created an LP is depicted in Table 4 below:

Table 4

Participants’ Creation of an Individual Learning Plan (ILP)

Number of students	Created ILP	Did not create ILP
270	155 (57.4%)	115 (42.6%)

More than half of the participants created their ILP for the course, whereas slightly more than 40% opted not to. From the above, four different personalisation patterns are possible: follow PLP and create ILP, follow PLP but not create ILP, not follow PLP but create ILP, and neither follow PLP nor create ILP. The descriptive data on these four personalisation patterns are presented in table 5 below:

Table 5

Types of Personalisation

Number of students	Follow PLP and create ILP	Follow PLP but not create ILP	Not follow PLP but create ILP	Neither follow PLP nor create ILP
270	68 (25.2%)	10 (3.7%)	87 (32.2%)	105 (38.9%)

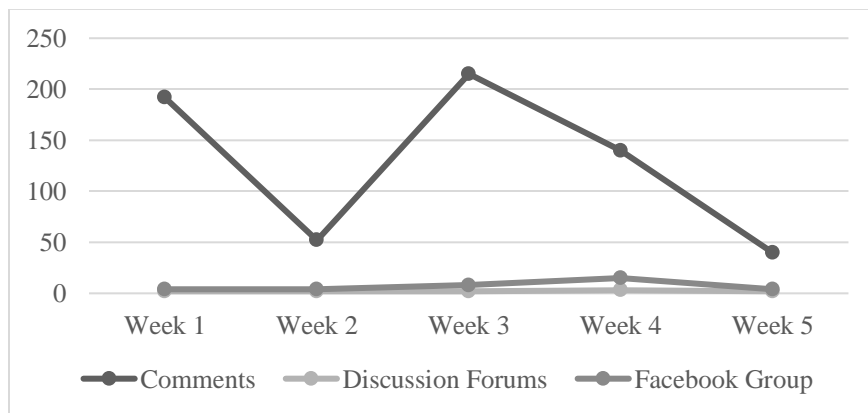
As shown, the largest proportion (38.9%) of the participants did not follow the personalized learning plan provided to them, nor created their individual learning plan (as visible in the course analytics). A slightly smaller number of participants (32.2%) chose not to follow the PLP, but devised their ILP, while only 3.7 % of the participants followed the PLP without creating their ILP learning plan. Further, a quarter of the participants opted to use both features. These results demonstrated that although the participants were not so keen on following the provided PLP, creating an ILP was a fairly popular personalisation feature. This also suggests that when given choices, participants were more likely to “personalise” their own learning (ILP) rather than following the recommended pathways (PLP).

To what extent can a specialised LMOOC environment encourage learners to interact with other learners?

The course design allowed the participants two options for learning in the course: working individually or working as a group. The group learning option allowed participants to either form a group with their colleagues and join the course together or form a group with other learners online. It was found that a larger number of the participants opted to work as a group than to work individually at 61.1% (n = 165) and 38.9% (n = 105) respectively. Of those working as a group, the majority joined the course with their colleagues (94.54%), while only 5.46 % formed a group online. In addition, the course design provided the participants with several interaction opportunities including commenting on other learners’ videos, participating in discussion forums and posting in a Facebook group. There was a total of 677 posts from the participants over the five-week period, or an average of 2.51 posts per person. The median number of posts was two and the mode was one, meaning that most of the participants posted only once. These posts were classified according to three different interaction channels. The majority of posts (93%) (n= 630) was in the form of comments on the videos of other learners, meaning an average of 0.46 comments per person per week, while only a very small number of posts were present in the discussion forums and the Facebook group at 1.8 (n = 12) and 5.2 % (n =35) respectively. The frequencies of the posts mean that the design of the current LMOOC could not encourage the majority of the participants to interact with other participants. Another important thing to take into consideration is how the interaction levels were spread across different phases of the course. The results are illustrated in Figure 1.

Figure 1

Pattern of Posts in Three Interaction Channels



It is clear from the data that the pattern of the participants’ comments coincides with the type of activities they engaged each week. Learning activities in weeks 1 and 3 encouraged the participants to give feedback on their peers’ videos, whereas in week 2 most of the activities were individual. However, it is worth noting that there was a sharp decline in the number of posts in weeks 4 and 5 despite having similar learning activities as weeks 1 and 3. The number of posts in the Facebook group and the discussion forum were low across the weeks. The spread of the posts showed that the type of learning activities and the stages of the LMOOC might be factors affecting the participants’ choices to interact with others in the course.

What is the correlation between learning behaviours in an LMOOC and course completion?

Of the 270 participants who started, 180 went on to complete the course (operationalized as submission of the final presentation), while 90 dropped out after starting the course—most (73.33%) in weeks 2 and 3. This gives the course a completion rate of 66.6%. This is, of course, a good completion rate compared with other LMOOCs and MOOCs in general. What is more interesting, however, is which factor(s) contributed to the participants completing the course. This section investigates this using two statistical techniques: a binary logistic regression and a computational machine learning prediction model.

Logistic regression analysis

The logistic regression model was computed to investigate the factors that are statistically associated with completing the course. The model was developed based on two sets of data: the characteristics of the participants (e.g., following a personalized learning pathway or working as a group) and participation in learning activities (e.g., completing learning activity 1.1). The analysis of the participants’ characteristics is presented in Table 6 below:

Table 6
Logistic Regression Analysis of the Characteristics of the Participants

Characteristics	B	S.E.	Wald	df	Sig.	Exp(B)
Following the PLP	17.462	2724.069	0	1	0.995	38323829
Creating the ILP	4.777	1.41	11.485	1	0.001*	118.785
Time spent	0.025	0.013	3.815	1	0.051	1.026
Interaction	-4.741	4.124	1.322	1	0.250	0.009
Number of messages	2.228	1.891	1.387	1	0.239	9.278
Type of participation	-6.858	1.442	22.624	1	0.000*	0.001
Learning Forum	-0.379	12.816	0.001	1	0.976	0.684
Constant	-11.347	2724.07	0	1	0.997	0

Note: B = the coefficient for the constant, S.E. = the standard error around the coefficient for the constant, Wald = Wald chi-square test, Df = degree of freedom Sig. = Significant, Exp (B) = the exponentiation of the B coefficient

It can be seen from the analysis that creating an ILP and the type of participation are statistically significant to course completion (0.05). This means that the participants who created their own personal learning plan had a higher likelihood of completing the course. The negative coefficient in the type of participation means that the participants who opted to work as a group were more likely to complete the course than those who worked individually. However, other factors

including time spent in the LMOOC, following the PLP, interacting with other learners, the number of messages they posted, and participating in the learning forums did not statistically affect course completion.

In addition to the characteristics of the participants, participation in the learning activities is another important factor. Table 7 shows the results of the logistic regression analysis.

Table 7
Logistic Regression Analysis of the Participation in Each Learning Stage

Learning stages	B	S.E.	Wald	df	Sig.	Exp(B)
Learning stage 0	.047	0.116	0.165	1	0.685	1.048
Learning stage 1	1.194	0.965	1.533	1	0.216	3.302
Learning stage 2	0.596	0.163	13.431	1	0.000*	1.814
Learning stage 3	-0.159	0.178	0.792	1	0.374	0.853
Learning stage 4	0.047	0.033	2.009	1	0.156	1.048
Learning stage 5	-0.475	0.282	2.842	1	0.092	.622
Learning stage 6	0.581	0.156	13.782	1	0.000*	1.787
Constant	-3.763	.829	20.623	1	0.000*	0.023

Note: B = the coefficient for the constant, S.E. = the standard error around the coefficient for the constant, Wald = Wald chi-square test, Df = degree of freedom Sig. = Significant, Exp (B) = the exponentiation of the B coefficient

The analysis shows that participating in learning stage 2 (doing self-evaluation and uploading a presentation for feedback) is statistically related to the participants completing the course (Sig. < 0.05), meaning that participants who complete activities in learning stage 2 are more likely to complete the course (learning stage 6 is the submission of the final presentation). It should be noted that completing learning stage 5 (Rehearsal) also gives the participants a higher likelihood of completing the course, though less so than the first two variables (Sig. < 0.1). Nevertheless, completing activities in learning stages 0, 1, 3, and 4 does not affect course completion. In addition, a logistic regression analysis was performed with each learning activity in each learning stage (n = 54). The results of the analysis are shown in table 8 below:

Table 8
Logistic regression analysis of participation in each learning activity

Learning Activities	B	S.E.	Wald	df	Sig.	Exp(B)
Uploading the presentation for feedback (2.3.1)	4.030	1.394	8.352	1	0.004	56.528
Evaluating yourself (2.2)	3.593	1.777	3.964	1	0.046	34.416
Instruction for the final presentation (6.1)	2.513	1.427	3.101	1	0.078	12.344
How good is a good presentation (4.1.2)	3.436	2.092	2.697	1	0.101	31.017
Watch and rate your peers' videos (2.3.2)	-2.600	1.682	2.389	1	0.122	0.74
Constant	-3.763	.829	20.623	1	0.000	0.023

Note: B = the coefficient for the constant, S.E. = the standard error around the coefficient for the constant, Wald = Wald chi-square test, Df = degree of freedom Sig. = Significant, Exp (B) = the exponentiation of the B coefficient

The results demonstrate that uploading their presentation for feedback and self-evaluation are statistically significant to participants completing the course (Sig. < 0.05), meaning that participants who self-evaluated and uploaded their first presentation for feedback were more likely to complete the course than those who did not. However, participating in other learning activities did not statistically significantly affect course completion.

Feature of Importance Prediction Model

Participating in an LMOOC is a complex, non-linear process and there are patterns that may be hidden. To identify these, a machine learning prediction model, using several feature extraction techniques was developed to provide a more comprehensive analysis of the participants’ behaviours. As Al-Shabandar et al. (2017) posit, a machine learning model can be an effective technique to discover hidden patterns of students’ learning behaviours and to analyze complex, non-linear relationships in MOOC context. The building of such a prediction model could also show a more holistic picture of factors that may lead to learners completing the MOOC. The techniques applied in the model include Pearson correlation, Chi-square, recursive feature elimination (a feature selection technique), random forest (a type of decision tree algorithm), LightGBM (another type of decision tree algorithm) and logistic regression. The results of the analysis are presented in Table 9 below.

Table 9
The Feature Extraction Techniques and Results

Techniques	Features	Sig.*	Coefficient	Feature of Importance	Ranking
Pearson	<i>Type of work</i>		0.857		
	<i>Creating an ILP</i>		0.773		
	<i>Learning activity 2.2</i>		0.687		
	<i>Learning activity 2.4</i>		0.666		
	<i>Learning activity 2.1</i>		0.650		
Chi-Square	<i>Creating an ILP</i>	0.01			
	<i>Interaction</i>	0.01			
	<i>Type of work</i>	0.01			
	<i>Learning activity 6.1.1</i>	0.01			
	<i>Learning activity 6.1.2</i>	0.01			
RFE	<i>Following a PLP</i>				1
	<i>Creating an ILP</i>				1
	<i>Interaction</i>				1
	<i>Type of work</i>				1
	<i>Learning activity 6.1.1</i>				1
RF	<i>Creating an ILP</i>		0.159		
	<i>Type of work</i>		0.146		
	<i>Time spent</i>		0.121		
	<i>Learning activity 2.2</i>		0.063		
	<i>Learning activity 2.3</i>		0.033		

LightGBM	<i>Time spent</i>	244***
	<i>Creating an ILP</i>	66
	<i>Type of work</i>	58
	<i>Learning activity 0.1</i>	58
	<i>Learning activity 0.4</i>	57
LogisticR	<i>Creating an ILP</i>	2.994
	<i>Type of work</i>	2.245
	<i>Following a PLP</i>	0.875
	<i>Learning activity 4.1.10</i>	0.614
	<i>Interaction</i>	0.527

* Statistically significant at level 0.01
 ** only five most important features are presented
 *** More numbers = more important

It is clear from the table that these feature extraction techniques yielded different results and each technique required different statistical interpretation of the importance of each of the features. For Pearson correlation, the analysis suggests that the type of work and creating a personal learning plan are the most important features affecting course completion, followed by the three learning activities. In addition, despite the type of work and creating an ILP being important, Chi-square analysis considers interaction in the course and participating in learning activities 6.1.1 and 6.1.2 as important features. Recursive feature elimination (RFE) is an algorithm that selects features of importance by recursively considering smaller and smaller features. In the process, the least important features are eliminated until the desired number of features is reached. The analysis demonstrates that the five most important features are following the PLP, creating a personal learning plan, type of work, interaction, and learning activity 6.1.1.

Random Forest (RF) is a type of decision tree algorithm that offers importance scores based on the reduction of criterion. The analysis shows that creating a learning plan, the type of work, and time spent in the LMOOC are the three most important features. Another algorithm included in creating the model is LightGBM, a type of decision tree algorithm. The model demonstrates that time spent in the LMOOC is the most important feature, followed by creating a personal learning plan, type of work, and learning activities 0.1 and 0.4 respectively. The final technique utilized was the logistic regression model, which showed similar results; creating a learning plan and the type of work the participants chose were the most important features. Subsequently, these six models were combined to create a prediction model for the types of learning behaviours that are likely to lead to completing the LMOOC. The model is illustrated in Table 10 below:

Table 10
The Prediction Model for Learning Behaviours in the Course

Features	Pearson	Chi-Square	RFE	RF	LightGBM	LogisticR
<i>Type of work</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Creating an ILP</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Time spent</i>	No	No	No	Yes	Yes	No

<i>Interaction</i>	No	Yes	Yes	No	No	No
<i>Following a PLP</i>	No	No	Yes	No	No	Yes
<i>Learning Activity 2.2</i>	Yes	No	No	No	Yes	No

As shown in Table 8, in this prediction model, only the type of work and creating an ILP are statistically associated with participants completing the course (i.e., they are considered important in all the models), while other features do not seem to be a probable predictor for course completion. It is interesting, perhaps, to discover that none of the learning activities are important features for course completion. From a learning analytics perspective, it is possible to say that, in this LMOOC, the participants who created their individual learning plan and who opted to work in a group are more likely to complete the course than those who did not.

Discussion

This study has attempted to determine how participants make use of the personalisation and interaction opportunities in an LMOOC and to identify the types of learning behaviours that are likely to lead to course completion. Regarding personalisation opportunities, participants were far less likely to follow a personalized learning pathway (PLP) (through a recommendation system) than to create their own individual learning plan (ILP). There are many factors that might influence this: individual preferences, expectations, or even the practicality of following the recommended plan. This, to a certain degree, resonates with Downes (2012, 2016), who argues for the importance of personal learning in the MOOC education model and reminds us that individual preferences might outweigh statistically oriented recommendations such as adaptive learning. Moreover, from an evaluative perspective, the fact that only about a quarter of the participants (28.9%) chose to follow the recommended learning pathway suggests that the pathway might not fit with what they needed in terms of the types of presentation they wanted to deliver, the number of activities they had to complete, and the amount of time they needed to invest in following the plan. Besides, over a third of the participants (38.9%) opted for neither option, a choice that was associated with diminished likelihood of completing the course.

In terms of social interaction opportunities, it is evident that the participants were active in commenting on their peers’ videos, but not in the discussion forum and Facebook group. One possible explanation is that commenting on other participants’ videos was seen as a part of the whole learning journey, while engaging in the forums and Facebook group was regarded as an extra activity, requiring additional effort. Furthermore, communicating in English might be a challenge for many participants, which may have prevented them from contributing more (something also noted in Sokolik (2014) and Martin-Monje et al., (2018). This might have been different if there had been minimum requirements for registration (e.g., B2 on CEFR level). Taking a more cultural perspective, since the majority of the participants are Thai, it might appear “unnatural” or “awkward” for them to communicate with other Thais in English beyond giving feedback, something we have observed in our own teaching in the country. In addition, despite a moderate number of posts per participant (2.51), the mode number of posts was still very low (N=1). This means that though some participants were active in posting comments, the majority of the participants were not.

As for the learning behaviours contributing to course completion, both the logistic regression analysis and the feature extraction prediction model yielded a similar result; the type of participation (working in group) and creating an ILP were the two factors that were statistically significantly associated with course completion. Regarding group learning, the collaborative experience that the participants had with their groups might have motivated them to keep learning in the LMOOC. Previous studies have shown that group learning could not only increase students' satisfaction, but also reduce drop-out rates (Sanz-Martínez et al., 2017; Bayeck, 2016). However, it is interesting to discover that participants' interaction in the course did not contribute significantly to course completion. This is contrary not only to our previous assumption when designing the course that L-L interaction should be a key feature of an LMOOC, but also with research in MOOCs in general that participation in forum discussions is a good indicator of course completion (Martin-Monje, 2017; Goldwasser et al., 2016). In the case of creating an individual learning plan, it is clear that providing the participants with the freedom to personalize their learning could encourage them to complete the course. The fact that participants can take different learning paths that lead to completion might give them a sense of "making learning your own'," keeping them in the LMOOC until completion. This analysis also empirically confirms Martin-Monje et al.'s (2018) contention that the LMOOC structure should be flexible and include numerous options to cater to a wide variety of participants. Since personalisation and social learning are imperative in LMOOC contexts, it is perhaps possible that there is an interplay between these two contributing factors and that the collaborative process within a personalizable learning environment is key to learning in such an environment. This relationship, however, needs to be investigated further in future studies.

Limitations and Conclusion

There are some limitations of this study that should be pointed out. First, although the LMOOC could be registered for by anyone in the world, the current demography is still largely localized, with most of the participants being Thai. Therefore, LMOOC designers should be cautious about adopting this design in other contexts. Also, as this LMOOC, to a certain extent, served as a laboratory to investigate a design concept, the number of LMOOC participants was smaller than in regular LMOOCs and as such the results may not be generalizable. Further studies might want to adopt the design principles of the current study and implement them with a larger group of participants and in different contexts.

In sum, this study examined the effects of personalisation and social learning on course completion in an LMOOC. Clearly, working in groups and creating an individual learning plan were important factors associated with course completion. Though the link is clear, it may be a stretch to claim that there is a causal relation between the two. What we can say, however, is that those participants who took up the personalisation and social learning opportunities were more likely to complete the course. The results relating to *personal* learning suggest that future LMOOC designers should consider making LMOOCs more flexible in terms of their course structure. Also, as the demography of LMOOC participants is becoming more diverse globally, it is advisable that future LMOOCs provide more options for participants to select different pathways for their learning.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received approval from an ethics review board for this study.

The authors received no financial support for the research, authorship, and/or publication of this article.

References

- Al-Shabandar, R., Hussain, A., Laws, A., Keight, R., Lunn, J., & Radi, N. (2017, May). Machine learning approaches to predict learning outcomes in Massive open online courses. *In 2017 International Joint Conference on Neural Networks (IJCNN)* (pp. 713-720). IEEE.
<https://doi.org/10.1109/IJCNN.2017.7965922>
- Attwell, G. 2007. Personal learning environments—the future of eLearning? *eLearning Papers* 2(1): 1–8.
- Barcena, E., & Martin-Monje, E. (2014). Language MOOCs: An Emerging Field. In E. Martin-Monje & E. Barcena (Eds.), *Language MOOCs: Providing learning, transcending boundaries* (pp. 1–10). Berlin: De Gruyter Open. <https://doi.org/10.2478/9783110420067.1>
- Bayeck, R. Y. (2016). Exploratory study of MOOC learners’ demographics and motivation: The case of students involved in groups. *Open Praxis*, 8, 223–233.
<https://doi.org/10.5944/openpraxis.8.3.282>
- Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R. M., Surkes, M. A. & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research*, 79(3), 1243–1289.
<https://doi.org/10.3102/0034654309333844>
- Blake, C. (2009). Potential of text-based internet chats for improving oral fluency in a second language. *The Modern Language Journal*, 93(2), 227–240. <https://doi.org/10.1111/j.1540-4781.2009.00858.x>
- Bull, S., & Wasson B. (2016). Competence visualisation: Making sense of data from 21st-century technologies in language learning. *ReCALL*, 28(2), 147–165.
<https://doi.org/10.1017/S0958344015000282>
- Devedzic, V. (2016). Not fade away? Commentary to paper education and the semantic web. *International Journal of Artificial Intelligence in Education*, 26(1), 378–386.
<https://doi.org/10.1007/s40593-015-0051-2>
- Downes, S. (2016). Personal and Personalized Learning. *EMMA Newsletter*, Online, European Multiple MOOCs Aggregator. <https://www.downes.ca/cgi-bin/page.cgi?post=65065>
- Ducate, L., & Lomicka, L. (2008). Adventures in the blogosphere: From blog readers to blog writers. *Computer Assisted Language Learning*, 21(1), 9–28.
<https://doi.org/10.1080/09588220701865474>
- Godwin-Jones, R. (2009). Personal learning environments. *Language Learning & Technology*, 13(2), 3–9.
- Godwin-Jones, R. (2014). Global reach and local practice: The promise of MOOCs. *Language Learning & Technology*, 18(3), 5–15.

Godwin-Jones, R. (2017). Scaling up and zooming in: Big data and personalization in language learning. *Language Learning & Technology*, 21(1), 4–15

Goldwasser, M., Mankoff, C., Manturuk, K., Schmid, L., & Whitfield, K. (2016). Who is a student? Completion in Coursera courses at Duke University. *Current Issues in Emerging eLearning*, 3, 125–137.

Harrison, R., & Thomas, M. (2009). Identity in online communities: Social networking sites and language learning. *International Journal of Emerging Technologies and Society*, 7(2), 109–124.

Hill, P. (2012). Four Barriers That MOOCs Must Overcome to Build a Sustainable Model. <http://mfeldstein.com/four-barriersthat-moocs-must-overcome-to-become-sustainable-model/>

Hsu, C.K., Hwang, G.-J., & Chang, C.-K. (2013). A personalized recommendation-based mobile learning approach to improving the reading performance of EFL students. *Computers & Education*, 63, 327–336. <https://doi.org/10.1016/j.compedu.2012.12.004>

Loizzo, J., Ertmer, P., Watson, W., & Watson, S. (2017). Adults are self-directed and determined to set and achieve personal learning goals in MOOCs: learners' perceptions of MOOC motivation, success, and completion. *Online Learning*, 21(2) <https://doi.org/10.24059/olj.v21i2.889>

Martin-Monje, E., & Barcena, E. (Eds.). (2014). *Language MOOCs: Providing learning, transcending boundaries*. Berlin: De Gruyter Open. <https://doi.org/10.2478/9783110420067>

Martin-Monje, E. (2017). Mind the L in LMOOCs: The importance of language learning in massive courses. Paper presented at the DILLE Conference, Venice, Italy. https://www.researchgate.net/publication/313368938_Mind_the_L_in_LMOOCs_The_importance_of_language_learning_in_massive_courses

Martin-Monje, E., Castrillo, M. D., & Mañana-Rodriguez, J. (2018) Understanding online interaction in language MOOCs through learning analytics. *Computer Assisted Language Learning*, 31(3), 251–272. <https://doi.org/10.1080/09588221.2017.1378237>

Moore, M. (1989). Editorial: Three types of interaction. *The American Journal of Distance Education*, 3(2), 1–7. <https://doi.org/10.1080/08923648909526659>

Moreira Teixeira, A., & Mota, J. (2014). A proposal for the methodological design of collaborative language MOOCs. In E. Martin-Monje & E. Bárcena (Eds.), *Language MOOCs: providing learning, transcending boundaries* (pp. 33–47). Berlin: De Gruyter Open. <https://doi.org/10.2478/9783110420067.3>

Nikiforovs, P., & Bledaite, L. (2012), Personalized sequential language vocabulary learning recommender system. <https://pdfs.semanticscholar.org/d901/b5dcf47db028f1e56b60b931b72d8767cb6a.pdf>

- Onah, D.F.O., Sinclair, J., & Boyatt. (2014). Dropout rates of massive open online courses: behavioral patterns *Proceedings of the 6th International Conference on Education and New Learning Technologies (EDULEARN14)*: 1–10. <https://doi.org/10.13140/RG.2.1.2402.0009>
- Pegrum, M. (2014). *Mobile learning: Languages, literacies, and cultures*. Palgrave Macmillan. <https://doi.org/10.1057/9781137309815>
- Perifanou, M. (2015). Research report on the current state of language learning MOOCs worldwide: exploration, classification and evaluation. *LangMOOC project*. <http://www.langmooc.com/?cat=7>
- Reinders, H. (2010). Towards a classroom pedagogy for learner autonomy: A framework of independent language learning skills. *Australian Journal of Teacher Education*, 35(5), 40-55.
- Reinders, H. (2014). Personal learning environments for supporting out-of-class language learning. *ELT Forum*, 52(4), 14-19.
- Rubio, F. (2015). The role of interaction in MOOCs and traditional technology-enhanced language courses. In E. Dixon & M. Thomas (Eds.), *Researching language learner interactions online: From social media to MOOCs*. Computer Assisted Language Instruction Consortium Series, 13 (pp. 63–68). CALICO.
- Sallam, H., Martín-Monje, E., & Yan, L. (2020). Research trends in language MOOC studies: a systematic review of the published literature (2012-2018), *Computer Assisted Language Learning*. 33 1-28. <https://www.tandfonline.com/doi/full/10.1080/09588221.2020.1744668>
- Sanz-Martínez, L., Martínez-Monés, A., BoteLorenzo, M., L., Muñoz-Cristóbal, J. A., y Dimitriadis, Y. (2017). Automatic group formation in a MOOC based on students' activity criteria. *Proceedings of the 12th European Conference on Technology Enhanced Learning, EC-TEL 2017*. 179-193. https://doi.org/10.1007/978-3-319-66610-5_14
- Sokolik, M. (2014). What constitutes an effective language MOOC? In E. Martin-Monje & E. Barcena (Eds.), *Language MOOCs: Providing learning, transcending boundaries*. (pp. 6–32). Berlin: De Gruyter Open. <https://doi.org/10.2478/9783110420067.2>
- Schulze, M., & Scholz, K. (2018). Learning trajectories and the role of online courses in a language program. *Computer Assisted Language Learning*, 31(3), 185–205. <https://doi.org/10.1080/09588221.2017.1360362>
- Wu, W., Yen, L. L., & Marek, M. (2011). Using online EFL interaction to increase confidence, motivation, and ability. *Journal of Educational Technology & Society*, 14(3), 118-129.
- Yang, Y. F. (2011). Engaging students in an online situated language learning environment. *Computer Assisted Language Learning*, 24(2), 181-198. <https://doi.org/10.1080/09588221.2010.538700>

“An Overwhelming Cloud of Inertia”: Evaluating the Impact of Course Design Changes Following the COVID-19 Pandemic

Joann S. Olson

Rita Kenahan

University of Houston-Victoria, USA

Abstract

In the wake of the COVID-19 pandemic, beginning in March 2020, educators at all levels faced the challenge of responding to student needs and utilizing technology for instruction. While much of the emerging research highlights the experiences of students and instructors as they shifted from face-to-face to remote learning, this study explored the experiences of students in a fully online graduate program as the scope of the pandemic was growing. What is the best way to maintain a community of inquiry when so much is changing? This case study explored the impact of a variety of course design changes that sought to help students meet learning objectives while also seeking to alleviate the unanticipated pressures created by external forces. Ultimately, the findings suggest that increased flexibility with due dates and access to course materials were the most helpful strategy for helping students deal with the disruptive events of the semester. In addition, managing the disruptions and finding a sense of balance were important for both instructors and students.

Keywords: COVID-19, online, asynchronous, student success, course design

Olson, J. S., Kenahan, R., (2021). “An overwhelming cloud of inertia”: Evaluating the impact of course design changes following the COVID-19 pandemic. *Online Learning*, 25(4), 344-361.

DOI: 10.24059/olj.v25i4.2444

In early March 2020, the COVID-19 pandemic necessitated extraordinary responses at all levels of education. These shifts were disruptive and have been widely discussed in news and other outlets (e.g., Blumenstyk, 2020; Johnson et al., 2020; Parnia, 2020). Faculty and students alike made countless adjustments in the hopes of salvaging the semester and meeting learning objectives. Advice such as “How to create a minimum viable semester in the midst of a global pandemic” (Mazak, 2020) and “Please do a bad job of putting your classes online” (Barrett-Fox, 2020) encouraged faculty to be realistic in determining what could be done and what should be expected.

For the most part, the conversation focused on how to navigate the shift from in-person learning to remote/online learning. For instructors wanting to maintain continuity throughout the shift (Baker, 2020), being reminded that the best of online teaching draws from a different set of tools and strategies than face-to-face instruction was important. And yet, this focus neglected the impact of the pandemic on course design and delivery for those already teaching and learning online. Given the growth of online education and the near certainty of future pandemics, natural disasters, or other cataclysmic events, it is important to consider how to best serve online students well in these situations, a consideration that has often been overlooked in campus disaster planning (Holzweiss et al., 2020; Van et al., 2010). This case study explores the experiences of graduate students as they navigated the COVID-19 pandemic while enrolled in a fully online master’s degree program.

Literature Review

In setting the stage for this study, it is important to consider three key areas of existing research: disaster response/crisis planning, time management for online student persistence, and the extent to which assumptions about best practices for online learning are applicable to crisis situations.

Disaster Response and Crisis Planning for Online Learning

Research is beginning to emerge related to the impact of COVID-19 on higher education. Abdelmatloub (2020) found that students identified uncertainty over end-of-semester exams as their highest stressor. Those students also “urg[ed] their lecturers to use different means of assessment even if they have to work on more different assignments” (p. 105). In addition, 11% of Abdelmatloub’s participants indicated having issues with online connectivity. Furthermore, Dushkevych et al. (2020) surveyed students during March 2020 and emphasized that keeping to a schedule “creates a sense of continuity [that] ... reduces student anxiety and frustration to uncertainty” (p. 76). Morgan (2020) highlighted the importance of clear communication and also suggested that ensuring equity and responding to the emotional toll of the pandemic would be critical to meeting students’ needs during the crisis. Perotta and Bohan (2020) explored the experiences of online faculty who were teaching during this event, highlighting the importance of access to professional development as well as concerns about faculty isolation and academic freedom.

Of course, institutions of higher education have previously faced similar disruptive events. In the wake of the H1N1 (“swine flu”) pandemic of 2009, colleges and universities began conversations regarding continuity-of-learning plans, which often included identifying technology and training deficiencies (Davis & Ash, 2009). In some cases, this planning and evaluation led to “leaders think[ing] more strategically about how e-learning could be part of their overall emergency plan” (Robelen, 2009, p. 18). However, while Meyer and Wilson (2011) found that websites of “flagship institutions” of higher education did instruct faculty, staff, and

students how to address the H1N1 pandemic, two-thirds of those institutions did not provide any guidance on how to include online learning as a strategy for course continuity.

Holzweiss et al. (2020) extended this exploration of crisis planning for online students through the lens of Hurricane Harvey, which occurred at the beginning of the fall semester in 2017. At the institution that was the focus of their case study, courses were converted from traditional 15-week semesters to an accelerated 7.5-week semester. Faculty were incentivized to make this switch with a \$1,000 stipend/instructor. Focusing on the experiences of the online support team, Holzweiss et al. found that work-around strategies and insufficient access to campus resources (e.g., the student information database) created the greatest challenge. This study also highlighted that students needed additional time to manage the details of their changing course format, while they also dealt with the impact of the hurricane on their personal and family lives. These studies highlight the importance of clearly communicating with students and being responsive to the demands of an emerging situation. In the case of COVID-19, educators and administrators worked to meet the needs of students in the moment. The current study focuses specifically on the experiences of students who were already enrolled in fully online (asynchronous) courses and the impact of mid-semester course design changes.

Time Management for Online Learner Persistence

Although many factors have an impact on whether students complete their intended course of study (e.g., financial aid, as demonstrated by Qayyum et al., 2019), online students often identify time management as a key challenge to academic success and persistence. This occurs with both undergraduate students (Al-Asfour, 2012; Baker et al., 2019; Elvers et al., 2003; Wandler & Imbriale, 2017) and graduate students (e.g., Jiang et al., 2019). Procrastination in online courses has been shown to have a negative relationship on class performance (Michinov et al., 2011). Because of this tendency and the potential for negative outcomes, Kesner (2013) suggested that posting deadlines for all work would help keep students on track. Likewise, Wandler and Imbriale (2017) encouraged the use of incremental deadlines for larger assignments as a way to foster student momentum.

Fetzner (2013) researched the experiences of unsuccessful online students. Among these participants, 43.2% of respondents in Fetzner's study indicated they were not aware that they were expected to start their online coursework on a pre-determined date, suggesting a miscommunication regarding time expectations. Participants were also asked to share the advice they would give to potential online students (Fetzner, 2013). Among the top 13 pieces of advice, the top four clearly connect to time management (e.g., stay up with the course activities—don't get behind; use good time management skills; set aside specific times during each week for your online class).

At the same time, students often approach their learning and course assignments pragmatically, choosing to focus on activities that are directly related to graded activities (Murray et al., 2012). Therefore, some instructors have found value in allowing students to redo assignments, to “[allow] room for learning and growth at their own pace” (p. 308). Some have even chosen to drop assignment deadlines altogether (Barrett, 2019). Glenn (2018) suggested that providing clear outlines and timetables helps students stay on track because the workload feels manageable. ACUE (2020) described this as “establish[ing] a rhythm for participation” (p. 1) in the class that helps students successfully complete the course.

Instructional Design Considerations during a Pandemic

Garrison et al. (2000) suggested that online learning could be conceptualized as a “community of inquiry” (CoI) wherein teachers and students interact with course content and each other in three

distinct ways: cognitive presence, social presence, and teaching presence. Cognitive presence speaks to participants' efforts and ability to create meaning from the content presented, a component that Garrison et al. referred to as "most basic to success in higher education" (p. 89). Garrison et al. highlighted the role of social presence—the ways in which learners interact with each other and share enough of their personal characteristics to be perceived as "real people" (p. 89)—as primarily supporting the cognitive activities of the course. Teaching presence includes designing instruction and facilitating the educational discourse. Anderson et al. (2001) expanded teaching presence to also include direct instruction.

A number of design elements emerge from the CoI framework, and the effective design and practice of online education has been the subject of much research (c.f., Sun & Chen, 2016). Jiang et al. (2019) surveyed graduate-level students in a statistics course who identified having access to recorded lectures with PowerPoint slides (i.e., "direct instruction") as the key to their success in the course. Those same students also indicated that course design—the "spiraling nature of the lessons" (p. 306)—helped them to learn course content effectively. In addition, the students highlighted the importance of online question and answer session with the instructor and other peers (i.e., facilitating discourse). Stone and Springer (2019) found that strong teacher presence and well-designed course materials led to greater student engagement and retention in online classes. Chen and Liu (2020) highlighted the importance of multidimensional discussions to creating social presence, which are sparked by well-designed discussion questions and a clear set of expectations and requirements for discussion forum interaction. For the participants in Terras et al.'s (2018) study, connectivity (i.e., social presence) with the instructor and other advisors was highly valued—more so than connections with other students.

However, what happens to these design "standards" and best practices (e.g., Debattista 2017; Marshall, 2015) when conditions are less than ideal? In the case of COVID-19, the crisis management efforts (e.g., "safe at home" orders, the move to remote learning for K-12 students, and other shutdowns) created additional cognitive load for students and faculty alike. Those changes also affected students' normal strategies for time management. Furthermore, social patterns were disrupted, as were normal modes of teaching. Holzweiss et al. (2020) emphasized the importance of crisis management and swift response to meet the needs of students; they also highlighted the impact of the crisis on instructional design and support staff. This study explores the impact of course design changes on students in an online program in the wake of COVID-19 pandemic during spring semester 2020 asking the research question: To what extent to mid-semester course design changes promote student persistence in a fully online course?

Methods

At CoastalU (a pseudonym), the institution's response to COVID-19 began with closing two days before the regularly scheduled spring break and eventually led to the decision to deliver all courses through online formats during the rest of the semester. Data for this case study (Stake, 1995) were collected at the end of the spring semester. Surveys were completed near the end of the semester, but no data were analyzed until after the instructors posted final course grades.

Course Design and Pandemic Response

The adult and higher education (AHED) master's degree program at CoastalU is fully online. By design, and for the convenience of students, courses are delivered in an asynchronous format with weekly content and discussion posts as well as periodic assignments with specific due dates throughout the semester. Instructors in the program are committed to the CoI framework, and courses are designed to foster student interaction and cognitive presence. Courses are delivered

with a strong emphasis on teacher presence and interaction. Although course *delivery* was not altered by pandemic-related shifts on campus, as the impact of the pandemic spread, faculty in the program discussed course *design* and schedule changes to best meet the needs of students. Most students work full-time and were facing shifting employment conditions; many work in education and were navigating the uncertainty of the pandemic at their own jobs; and many have young families and were responding to the additional load of facilitating the remote learning of their own children.

In one course (taught by the second author of this article), no changes were made because the program faculty members felt that course content (program planning and design) required a sequential, incremental, and scaffolded approach to best accomplish learning objectives. In the other three courses offered by the department (taught by the first author of this article), the instructor enacted a number of course design changes to give students flexibility in meeting course requirements and learning objectives. Those course changes included: opening all course content folders at once (rather than the typical week-by-week schedule); removing all due dates, deadlines, and penalties for submitting assignments after the posted deadline; changing the grading scale in a way that gave students flexibility to skip two or three discussion forums; and giving students the opportunity to propose an alternative to one of the regular assignments. Temporary university policy also allowed students to choose either satisfactory/unsatisfactory grading or traditional letter grading, a process that occurred separate from the instructor's involvement or knowledge.

Data Collection and Analysis

We were interested in student response and performance in light of these events and the course design changes. After Institutional Review Board approval (the study was determined to be "exempt"), students enrolled in any of the four AHED classes were invited to fill out a survey that explored their responses to course changes. There were 49 students enrolled in one or more of the four AHED classes offered in spring 2020; 29 survey responses were received, for a 59% response rate.

Those who chose to participate were asked the extent to which COVID-19 and the corresponding responses (e.g., work changes, social shutdowns, etc.) felt disruptive. They also identified the course design changes that they (a) utilized, (b) found most helpful, and (c) found least helpful. Participants enrolled in the unmodified course were asked which course design change *would* have been most helpful. In addition, participants responded to several open-ended prompts: the impact of COVID-19 on work and home life, the grading option they chose (satisfactory/unsatisfactory or traditional letter grading), and an open-ended "other comments." In addition, students who were enrolled in at least one modified course and the unmodified course were solicited for semi-structured, qualitative interviews. These interviews explored the students' experience with navigating both modified and unmodified courses. Of the 11 students who were potential participants for this phase of the study, three responded and were interviewed; interviews ranged from 27 to 59 minutes (41 minutes average). See the Appendix for the complete survey instrument and semi-structured interview prompts.

Survey data were collected via Microsoft Forms and downloaded into an Excel spreadsheet for initial analysis. Additional analyses were completed using SPSS 26. Qualitative data from open-ended questions and interview transcripts were transcribed verbatim and analyzed using NVivo 10. Qualitative analysis began with initial coding looking for "repeated patterns of meaning" (Braun & Clarke, 2006, p. 86). This step has as its goal the creation of "pithy labels for important features of the data" (Clarke & Braun, 2013, p. 121) from the interview transcripts. In addition,

constant comparison (Patton, 2015) was used to connect participant responses to the research questions to better understand “behavior, issues, and contexts with regard to [this] particular case” (Stake, 1995, p. 78). Following the initial rounds of coding, codes were arranged and rearranged into themes to highlight “coherent and meaningful pattern[s]” (Clarke and Braun, 2013, p. 121) in the data. Through this process, three themes were identified.

Findings

Of the 29 students who completed the survey, 19 were enrolled in only classes that were modified; 7 had one unmodified and one modified class; 3 were in enrolled in only unmodified classes. Students reported having earned between 6 and 36 credits at CoastalU. For 7 students (24.1%), spring 2020 was their first semester as a graduate student, and 3 students (10.3%) reported that spring 2020 was their last semester.

The Impact of the Pandemic on Work, School, and Home Life

Participants were also asked about disruptions they experienced during the semester. Fourteen participants (48.3%) indicated they had children engaged in learning at home “in a way that had an impact on your schedule.” In addition, as outlined in Table 1, participants were asked how the emerging pandemic had affected their jobs. Participants were able to select as many of the employment outcomes as applied. Participants reported an average of 1.76 (SD = 0.87) disruptive outcomes.

Table 1
Employment Outcomes Reported by Participants

<u>Survey Prompt (N = 29)</u>	<u>Responses</u>	<u>Percentage</u>
Begin to work from home	24	82.8%
Disruptions to the way you “normally” do your job (e.g., limitations to travel, changed work schedule, increased hours, etc.)	21	72.4%
Significant reduction in hours or salary	4	13.8%
Complete loss of employment (for either yourself or a spouse/partner with whom you share expenses)	2	6.9%
None of these apply to me	2	6.9%

The survey also provided a Likert-type scale to indicate the impact of pandemic-related restrictions such as “stay safe/stay home” orders or changes in shopping or eating on daily life. Students were given a 7-point scale ranging from 1 = “I noticed very little difference” to 4 = “It was somewhat disruptive, but manageable” to 7 = “It felt disruptive in every way.” In response to this question, no participants selected 1, 2, or 3. The mode was 4 and 7; the median was 5; the average was 5.48 (SD = 1.30), suggesting that all participants found the pandemic at least “somewhat disruptive,” while many found it significantly disruptive to life, work, and school. Intuitively, the number of negatives reported would be related to the reported “impact” of the pandemic. A Spearman correlation showed a low positive, but statistically significant correlation between these two variables ($r_s(29) = .387, p < .05$).

Responses to open-ended questions in this section of the survey highlighted the impact of schooling children at home, changes in housing situations, and limited time. Participants also described the challenge of balancing work and life. One participant noted “learning how to pull away from work” because working from home made it “easy to just keep working.” Another stated:

I had an overwhelming cloud of inertia. I have had clinical depression before, and it’s not like that. I have had chronic fatigue syndrome, and it’s not like that. My plants are dying, and it feels like a chore to take care of my dogs (who I love dearly). It’s just really strange.

Based on these responses, the “novel” coronavirus, as it often called (SARS-CoV-2), also led to “novel” experiences for those seeking to navigate work, school, and life.

The Response to Course Design Changes

We were primarily interested in how students responded to the various course design changes. Survey questions asked which changes they took advantage of, which options they found most/least helpful, and how they would have managed course requirements without these options. Participants were instructed to select all that applied; Table 2 shows the extent to which student utilized the various options. On average, students reported utilizing 2.75 options (SD = 0.89). A Spearman correlation found no significant relationship between student self-reported “impact” of the pandemic and the number of course design changes students took advantage of ($r_s(29) = .232, p = .232$).

Table 2
Student Utilization of Course Design Changes

<u>Survey Prompt (N = 29)</u>	<u>Participants who took this option</u>	<u>Percentage</u>
Removing deadlines for other assignments (i.e., turning in assignments after their originally posted due date)	24	82.8%
Removing deadlines for discussion forums and responses (i.e., working on discussion forums at a slower pace)	21	72.4%
Opening all course content at the same time, to allow you to work at your own pace (i.e., working ahead of schedule)	18	62.1%
Skipping a discussion forum or two (as made possible by the reduction in the total number of points in the class).	12	41.4%
Exploring the option of swapping a given assignment with a work-related assignment.	2	6.9%
None. I completed the course according to the originally posted schedule.	0	0.0%

To further explore participants’ responses to the course design changes, we asked them which changes were most and least helpful (see Table 3). Of those enrolled in the unmodified course, 4 indicated that opening all the content at the same time would have been most helpful; 4 indicated that nothing would have been the most helpful; 1 indicated removing assignment deadlines and another indicated changing the discussion date deadlines would have been most helpful.

Table 3
Most and Least Helpful Course Design Changes

<u>Survey Prompt (N = 28)</u>	<u>MOST helpful</u>		<u>LEAST helpful</u>	
	<u>Count</u>	<u>Percent</u>	<u>Count</u>	<u>Percent</u>
Removing deadlines for other assignments	16	55.2%	0	0.0%

Opening all course content at the same time, to allow you to work at your own pace	7	24.1%	1	3.4%
Skipping a discussion forum or two	3	10.3%	5	17.2%
Removing deadlines for discussion forums and responses	2	6.9%	1	3.4%
Exploring the option of swapping a given assignment with a work-related assignment.	0	0.0%	19	65.5%
No response or n/a			2	6.9%

We also asked participants to speculate on how they would have approached their coursework if no course design changes had been made (Table 4). Participants could check as many options as applied to their situation.

Table 4
Options Participants Would Have Explored if No Course Design Changes Had Been Made

	<u>Count</u>	<u>Percent</u>
Tried to complete the course	18	62.1%
Talked with the professor about changes in due dates and deadlines	16	55.2%
Taken an incomplete in the course	5	17.2%
Considered dropping the course	4	13.8%
Probably dropped the course	2	6.9%

In addition to the course modifications described here, CoastalU issued an institution-wide policy allowing students to “opt in” to Satisfactory/Unsatisfactory (S/U) grading, rather than receiving a traditional letter grade. Only one participant indicated taking advantage of this option. Among the reasons provided (in an open-ended prompt) for choosing traditional letter grading, several indicated concern for their overall GPA (if they took the S/U option) and a concern related to how a S/U grade would be perceived if they wished to pursue further doctoral studies. A few responses suggested that students did not understand the logistics of requesting S/U grading. Many participants indicated that they did not feel it would be necessary, with some explicitly mentioning the assistance provided by the course modifications. As one participant noted, “Despite my appalling procrastination, [the professor] worked with us to ensure that we could be successful if we did the work. I felt that there would be no reason not to finish out the semester given every opportunity she offered us.”

The Experience of Mid-Course Design Changes

In addition to surveying participants, three students agreed to be interviewed. These students were enrolled at least one class that modified its course design and one that did not. Qualitative data analysis on the interview transcripts led to the identification of three themes: managing the class, meeting learning objectives, and mitigating academic stress.

Managing the Class

Interview participants, like many other students, found themselves managing significant upheavals of work, personal, and academic matters. Two of the three participants work in student services within higher education; the third participant teaches sixth grade. Their work environments changed drastically in response to the pandemic, and each participant found they were also navigating personal challenges such as losing a second job or managing a child’s autoimmune disease.

In discussing the differences between the modified course and unmodified course, one participant described the differences between the two as “jarring.” Another participant recalled that initially she wanted both classes to move to a set-your-own-deadlines model; however, by the end of the semester, she was grateful that one of the classes had maintained the original schedule, because it helped her stay on track. The third participant was in the last semester of her graduate program and found the differences between the two classes to be challenging to manage. In the end, she said of the modified class: “You have no idea how those changes impacted my whole educational outcome... I probably would have dropped out, stopped going to school.”

Meeting Learning Objectives

Participants also talked about the process of learning and meeting learning objectives—even though so many things were changing and shifting in response to the pandemic. They discussed the challenging aspects of major assignments in each of the classes. One survey respondent indicated that they wanted the professor

To shorten the assignments or remove 1-2 papers. I believe having the assignments in place was not considerate of students’ circumstances. It is awkward to have to request this from a professor and tell personal business that I am going through just to have the professor consider the option. I am a private person with much stress but should not have to share with a stranger.

Interview participants discussed the process of getting the work done and they highlighted aspects of particular assignments that were challenging. One participant recalled how “the finance class scared me” at the beginning of the semester, but she indicated that by the time the class was finished, she “learned so much” and had a “firm grasp” of the course concepts. For another interviewee, finishing the class was a point of pride: “When I start something, I finish what I start.”

Mitigating Academic Stress

In discussing this particular semester and their experience as students, interview participants describe various sources of atypical stress. They found themselves caring for their own children and coworkers in new ways. As educators, they were managing significant shifts in their own work. One participant works in residence life, and he indicated that the response to the pandemic meant that

We’ve started adding a lot more sort of work, a lot of extra precautions, a lot of checking up on students, and just checking up on our RAs [resident assistants], seeing how they’re doing. It just doesn’t give me enough time to focus on my academics as I normally am used to.

Both interview participants and survey respondents highlighted the importance of flexibility for helping them navigate the semester. Based on the open-ended responses, it seems that one of the most helpful moves made was removing incremental deadlines and eliminating late penalties. This provided a “feeling of a safety net to ensure that I’m able to excel in the course” for one survey respondent.

It is interesting to note that interview participants highlighted the benefit of having modified and unmodified courses simultaneously. The modifications in one course provided a bit of a relief valve, as students could work, more or less, at their own pace through the semester. At the same time, having a schedule and timeline to follow in the other course provided structure and a bit of urgency that kept them on track for completing both classes. As one participant indicated, it was important to find a schedule to “keep the hours turning.”

Discussion

In many ways, research conducted in the immediate wake of COVID-19 is an exploration of an “extreme case” that creates a “once-in-a-lifetime opportunity to contribute” (Yin, as cited in Patton, 2015, p. 52) to the body of knowledge. Best practices and assumptions are tested in a new set of circumstances, allowing for a more comprehensive understanding. In this case, the mid-semester modifications to course design represented the instructors’ best efforts to facilitate student persistence “in the moment.” This follow-up study sought to understand the impact of those modifications.

Helping Students Manage Disruptions

While many of the news reports highlighted the impact of COVID-19 and related closures on students who suddenly found themselves shifting from in-person instruction to learning remotely (Baker, 2020; Johnson et al., 2020), this study demonstrates that students already studying online also experienced disruptions at work, school, and home. Of these participants, 82.8% were required to work from home, and 72.4% reported having to do their jobs differently. In addition, 20.6% experienced either a significant reduction in salary or a complete loss of employment, and many now found themselves responsible for shepherding children through remote learning. Morgan (2020) emphasized communicating with students throughout this crisis. Perhaps this is an element of social presence (Garrison et al., 2000) that is always important but that becomes critical in extreme situations. Helping students interact with each other as “real people” (p. 89) who are all managing coursework and chaos may be just as important as presenting content and grading assignments. While the mode of learning may not have changed for these fully online students, the pandemic was no less disruptive than for those who started the semester face-to-face.

Giving Students Options

Weimer (2013) and others have suggested that students should be given greater control over selecting and designing course assignments. While this introduces an element of uncertainty that many instructors may find uncomfortable, for the students in this study, having greater control over the course schedule and assignment due dates proved helpful. Among these participants, 82.8% indicated taking advantage of relaxed deadlines for assignments, and 72.4% elected to work on “weekly” discussion forums at a slower pace; 55.2% indicated that the removal of deadlines was the most helpful change made to the course design. In addition, students in the modified courses had the freedom to skip two or three discussion forums without affecting their final grade. And—although only one student took advantage of the option—students were given the freedom to suggest alternative assignments. Student response to these design changes runs counter to previous research that highlights the importance of helping students stay on schedule (Kesner, 2013; Wandler & Imbriale, 2017). In addition, the instructor of the modified courses faced a lot more grading at the very end of the semester, rather than incrementally throughout the semester, which effectively reduced the feedback students received on their assignments. However, these changes gave students the freedom to integrate their coursework into work and family schedules that were in flux and the agency to manage the demands of the course in a way that worked best.

Finding Balance

Glenn (2018) found that when instructors infuse a “human touch” into their classes, students who face “life events” (p. 390) that have the potential to derail academic progress will be more likely to approach an instructor to seek assistance. Garrison et al.’s (2000) framework allows for this

(social presence) while also maintaining a focus on the academic (cognitive presence) and instructional (teaching presence) mandate of a college course.

It can be challenging to find the right balance in this, especially during extreme events. Early in the pandemic, Mazak (2020) suggested an approach to teaching in crisis that fostered both “empathy for students and grace for yourself.” Woven through participants’ responses was a similar sense of managing competing demands and finding balance. When work or family demands required more effort, school took a back seat. When life settled into a bit of a routine, academics could be the focus. Those who were enrolled in both a modified and an unmodified course even described how the two different approaches complemented each other: Students could focus on the class that had due dates, but those due dates also served as a reminder that assignments for the modified course would eventually need attention. Giving students the agency to allocate their time individually enabled them to meet learning objectives and complete their classes successfully.

Limitations and Future Research

This is a small study, conducted with students in a single online program. Furthermore, the focus of the study—mid-semester course design changes—is narrow and the larger historical and social context in which the study was conducted is unique. As such, the findings presented here are not generalizable. Future research should explore the long-term impact of crisis responses to understand the effect of course concessions in one semester on student success in later semesters. This study also focused on graduate students; future studies should explore how undergraduate students respond to mid-semester course design changes and how they manage their own learning during extreme situations.

Conclusion

Non-traditional students have often been described as “one crisis away” from dropping out (e.g., Henry, 2020; Hensley, 2013). For many students, the COVID-19 pandemic created a cascade of crises. For the students in this study, where changes were made, students experienced those changes as a sort of release valve, allowing them to work out how to allocate their time to complete the course and manage the impact of the pandemic on their academic pursuits. That flexibility gave students the ability to control their own learning during a season when so much had spun out of control.

Declarations

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author received approval from the ethics review board of the University of Houston—Victoria, USA for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Abdelmatloub, R. (2020). Online learning during the COVID-19 pandemic and academic stress in university students. *Revista Romaneasca pentru Educatie Multidimensionala*, 12(1Sup2), 100–107. <https://doi.org/10.18662/rrem/12.1sup2>
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1–17.
- Association of College and University Educators (ACUE). (2020). *Establish a rhythm for participation*. https://acue.org/wp-content/uploads/2020/03/Section-3_PG3_Predictable-Rhythm_CFIN.pdf
- Al-Asfour, A. (2012). Online teaching: Navigating its advantages, disadvantages and best practices. *Tribal College Journal of American Indian Higher Education*, 23(3).
- Baker, K. J. (2020). Panic-gogy: A conversation with Sean Michael Morris. *The National Teaching & Learning Forum*, 28(4), 1–2. <http://doi.org/10.1002/ntlf>
- Baker, R., Evans, B., & Li, Q., & Cung, B. (2019). Does inducing students to schedule lecture watching in online classes improve their academic performance? An experimental analysis of a time management intervention. *Research in Higher Education*, 60(4), 521–552. <https://doi.org/10.1007/s11162-018-9521-3>
- Barrett, D. (2019, January 31). How one professor learned to stop worrying and drop the deadline. *The Chronicle of Higher Education*. <https://www.chronicle.com/newsletter/teaching/2019-01-31>
- Barrett-Fox, R. (2020, March 12). Please do a bad job of putting your courses online. *Any Good Thing*. <https://anygoodthing.com/2020/03/12/please-do-a-bad-job-of-putting-your-courses-online/>
- Blumenstyk, G. (2020, March 15). Why coronavirus looks like a “Black Swan” moment for higher ed. *Chronicle of Higher Education*, 66(25).
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101.
- Chen, L.-T., & Liu, L. (2020). Social presence in multidimensional online discussion: The roles of group size and requirements for discussions. *Computers in the Schools*, 37(2), 116–140. <https://doi.org/10.1080/07380569.2020.1756648>
- Davis, M. R., & Ash, K. (2009). Swine-flu plans put e-learning in the spotlight. *Education Week*, 29(3), 1.

- Debattista, M. (2017). A comprehensive rubric for instructional design in e-learning. *The International Journal of Information and Learning Technology*, 35(2), 93–104. <https://doi.org/10.1108/IJILT-09-2017-0092>
- Dushkevych, M., Barabashchuk, H., & Hutsuliak, N. (2020). Peculiarities of student distance learning in emergency situation condition. *Revista Romaneasca pentru Educatie Multidimensionala*, 12(1Sup2), 71–77. <https://doi.org/10.18662/rrem/12.1sup1/248>
- Elvers, G. C., Polzella, D. J., & Graetz, K. (2003). Procrastination in online courses: Performance and attitudinal differences. *Teaching of Psychology*, 30(2), 159–162.
- Fetzner, M. (2013). What do unsuccessful online students want us to know? *Journal of Asynchronous Learning Networks*, 17(1), 13–27. <https://doi.org/10.24059/olj.v17i1.319>
- 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)
- 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>
- Henry, L. (2020). *Experiences of hunger and food insecurity in college*. Palgrave Macmillan.
- Hensley, K. P. (2013). *Student retention in BSN programs* [Doctoral dissertation, Old Dominion University]. ODU Digital Commons. https://digitalcommons.odu.edu/efl_etds/128
- Holzweiss, P. C., Walker, D. W., Chisum, R., & Sosebee, T. (2020). Crisis planning for online students: Lessons learned from a major disruption. *Online Learning*, 24(2), 22–37. <https://doi.org/10.24059/olj.v24i2.2135>
- Jiang, M., Ballenger, J., & Holt, W. (2019). Educational leadership doctoral students' perceptions of the effectiveness of instructional strategies and course design in a fully online graduate statistics course. *Online Learning*, 23(4), 296–312. <https://doi.org/10.24059/olj.v23i4.1568>
- Johnson, N., Veletsianos, G., & Seaman, J. (2020). U.S. faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning Journal*, 24(2), 6–21. <https://doi.org/10.24059/olj.v24i2.2285>
- Kesner, R. M. (2013). Blending an asynchronous learning experience: A practiced approach to online course development. *The Journal of the World Universities Forum*, 6, 13–24.
- Marshall, H. J. (2015). *Faculty members' best practice standards in the design of higher education online courses* [Doctoral dissertation, University of Toledo]. https://etd.ohiolink.edu/apexprod/rws_etd/send_file/send?accession=toledo1438618742&disposition=inline

Mazak, C. (Host). (2020, March 15). How to create a minimum viable semester in the midst of a global pandemic (“Bonus” episode) [Audio podcast episode]. In Academic Womxn Amplified. <https://www.cathymazak.com/podcast/>

Meyer, K. A., & Wilson, J. L. (2011). The role of online learning in the emergency plans of flagship institutions. *Online Journal of Distance Learning Administration*, 4(1). https://www.westga.edu/~distance/ojdl/spring141/meyer_wilson141.html

Michinov, N., Brunot, S., Le Bohec, O., Juhel, J., & Delaval, M. (2010). Procrastination, participation, and performance in online learning environments. *Computers & Education*, 56(2011), 243–252. <https://doi.org/10.1016/j.compedu.2010.07.025>

Morgan, H. (2020). Best practices for implementing remote learning during a pandemic. *The Clearing House*, 93(3), 135–141. <https://doi.org/10.1080/00098655.2020.1751480>

Murray, M., Pérez, J., Geist, D., & Hedrick, A. (2012). Student interaction with online course content: Build it and they might come. *Journal of Information Technology Education: Research*, 11, 125–140. <http://www.jite.informingscience.org/documents/Vol11/JITEv11p125-140Murray1095.pdf>

Parnia, A. (2020). As COVID-19 batters higher education, a proposal to move online fast. *New England Journal of Higher Education*. <https://eric.ed.gov/?id=EJ1261473>

Patton, M. Q. (2015). *Qualitative research and evaluation methods: Integrating theory and practice* (4th ed.). Sage.

Perotta, K., & Bohan, C. H. (2020). A reflective study of online faculty teaching experiences in higher education. *Journal of Effective Teaching in Higher Education*, 3(1), 51–66.

Qayyum, A., Zipf, S., Gungor, R., & Dillon, J. M. (2019). Financial aid and student persistence in online education in the United States. *Distance Education*, 40(1), 20–31. <https://doi.org/10.1080/01587919.2018.1553561>

Stake, R. E. (1995). *The art of case study research*. Sage.

Stone, C., & Springer, M. (2017). Interactivity, connectedness and ‘teacher-presence’: Engaging and retaining students online. *Australian Journal of Adult Learning*, 59(2), 146–169.

Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research*, 15, 157–190. <http://www.informingscience.org/Publications/3502>

Terras, K., Mahar, P., Chiasson, K., Schroeder, S., & Baker, M. (2017). Graduate student perceptions and experiences with connectivity in an asynchronous, online distance degree program. *Journal of Higher Education Theory and Practice*, 18(4), 60–73. <https://doi.org/10.33423/jhetp.v18i4.574>

Van, D., McLaws, M-L., Crimmins, J., MacIntyre, C. R., & Seale, H. (2010). University life and pandemic influenza: Attitudes and intended behaviour of staff and students towards pandemic (H1N1) 2009. *BMC Public Health*, 10(130), 1–9. <http://www.biomedcentral.com/1471-2458/10/130>

Wandler, J. B., & Imbriale, W. J. (2017). Promoting undergraduate student self-regulation in online learning environments. *Online Learning*, 21(2), 1–14. <http://doi.org/10.24059/olj.v21i2.881>

Weimer, M. (2013). *Learner-centered teaching: Five key changes to practice* (2nd ed.). Jossey-Bass.

Appendix A Research Instruments

Student Survey

<informed consent as the opening screen>

Background Information

1. Which graduate program are you enrolled in?
 - a. Adult and Higher Education
 - b. Master of Arts in Interdisciplinary Studies
 - c. Other _____
2. How many graduate credits have you earned at UHV (include credits you were enrolled in for Spring 2020)?
3. Please indicate which AHED classes you were enrolled in during Spring 2020. (select all that apply)
 - a. AHED 6331—Program Planning in AHED
 - b. AHED 6346—Introduction to Student Services
 - c. AHED 6335—Diversity in Adult and Higher Education
 - d. AHED 6354—Higher Education Finance
4. Do any of these apply to you?
 - a. This is my first semester at UHV
 - b. This is my first semester as a graduate student at UHV
 - c. I took classes outside the AHED department in Spring 2020, such as English or Criminal Justice
 - d. This is my last semester at UHV
 - e. I took my AHED comprehensive exams in March 2020
 - f. None of these apply to me

Impact of COVID-19 on your work and other circumstances

5. As a result of COVID-19 quarantine, self-isolation, or other factors, did you experience any of the following *employment* outcomes, during the Spring 2020 semester (select all that apply):
 - a. Complete loss of employment (for either yourself or a spouse/partner with whom you share expenses)
 - b. Significant reduction in hours or salary
 - c. Disruptions to the way you “normally” do your job (e.g., limitations to travel, changed work schedule, increased hours, etc.)
 - d. Begin to work from home
 - e. None of these apply to me
6. As a result of COVID-19, did your children (including college-aged children) engage in learn-at-home education/school in a way that had an impact on your schedule?
 - a. Yes
 - b. No
 - c. n/a

7. What impact did COVID-19 restrictions (e.g., “stay safe, stay home,” changes in shopping/eating, etc.) have on your daily life (On a scale of 1-7: 1-I noticed very little difference; 4-it was somewhat disruptive, but manageable; 7-it felt disruptive in every way)?

8. Do you have any additional comments on the impact COVID-19 had on your work or homelife?

Impact of COVID-19 on your academic pursuits

9. During Spring Break, Dr. Olson made significant changes to the course design in AHED 6335 (Diversity), AHED 6346 (Student Services), and AHED 6354 (Higher Ed Finance). Which of these changes did you take advantage of? (choose all that apply)
 - a. Removing deadlines for discussion forums and responses (i.e., you worked on discussion forums at a slower pace)

- b. Removing deadlines for other assignments (i.e., you turned in assignments after their originally posted due date?)
 - c. Opening all course content at the same time, to allow you to work at your own pace (i.e., you worked ahead of schedule)
 - d. Exploring the option of swapping a given assignment with a work-related assignment.
 - e. Skipping a discussion forum or two (as made possible by the reduction in the total number of points in the class).
 - f. None. I completed the course according to the originally posted schedule.
10. During Spring Break, Dr. Olson made significant changes to the course design in AHED 6335 (Diversity), AHED 6346 (Student Services), and AHED 6354 (Higher Ed Finance). Of these changes, which was the **most** helpful to you (choose only one)?
- a. Removing deadlines for discussion forums and responses (i.e., you worked on discussion forums at a slower pace)
 - b. Removing deadlines for other assignments (i.e., you turned in assignments after their originally posted due date)
 - c. Opening all course content at the same time, to allow you to work at your own pace (i.e., you worked ahead of schedule)
 - d. Exploring the option of swapping a given assignment with a work-related assignment (i.e., you talked or e-mailed with Dr. Olson regarding an alternative assignment)
 - e. Skipping a discussion forum or two (as made possible by the reduction in the total number of points in the class).
11. During Spring Break, Dr. Olson made significant changes to the course design in AHED 6335 (Diversity), AHED 6346 (Student Services), and AHED 6354 (Higher Ed Finance). Of these changes, which was the **least** helpful to you (choose only one)?
- a. Removing deadlines for discussion forums and responses (i.e., You worked on discussion forums at a slower pace)
 - b. Removing deadlines for other assignments (i.e., You turned in assignments after their originally posted due date)
 - c. Opening all course content at the same time, to allow you to work at your own pace (i.e., You worked ahead of schedule)
 - d. Exploring the option of swapping a given assignment with a work-related assignment (i.e., you talked or e-mailed with Dr. Olson regarding an alternative assignment)
 - e. Skipping a discussion forum or two (as made possible by the reduction in the total number of points in the class).
12. If you were a student in AHED 6331 (Program Planning), what *one* course design change would have been the most helpful to you (choose only one)?
- a. Removing deadlines for discussion forums and responses (i.e., working on discussion forums at a slower pace)
 - b. Removing deadlines for other assignments (i.e., turning in assignments after their originally posted due date)
 - c. Opening all course content at the same time, to allow you to work at your own pace (i.e., working ahead of schedule)
 - d. Exploring the option of swapping a given assignment with a work-related assignment (i.e., talking with or e-mailing Dr. Kenahan regarding an alternative assignment)
 - e. Skipping a discussion forum or two (as made possible by the reduction in the total number of points in the class).
 - f. Nothing. The course design worked fine for me.
13. If no course changes had been offered (in 6335, 6346, 6354), do you think you would have (check all that apply)
- a. Tried to complete the course.
 - b. Probably dropped the course

- c. Considered dropping the course
 - d. Taken an incomplete in the course
 - e. Talked with the professor about options for changes in due dates and deadlines
14. Did you take advantage of the satisfactory/unsatisfactory grading option?
- a. Yes, for all of my classes.
 - b. Yes, for only one of my classes.
 - c. No, I chose to receive a (standard) letter grade.
- Please share the reason for your decision
15. During Spring 2020—specifically after spring break, when many restrictions and changes were implemented as a result of COVID-19—what I needed most, academically, was: _____
16. Please share any other comments you have regarding your experience as a graduate student during Spring 2020 and course design changes that were made following the COVID-19 pandemic.

Semi-structured Interview Prompts

- Talk a bit about the impact of COVID-19 (and the related closures and public health requirements) on your academic experience this semester.
- If you could tell your pre-spring break self, one thing (i.e., before COVID-19 really took hold), what would you say?

We are primarily interested in exploring the impact of course design changes mid-semester. As a student who was enrolled in a class that did not make changes (AHED 6331) and at least one class that did make changes (AHED 6335, 6346, 6354), you are uniquely qualified to help us understand the student experience of these changes.

- What was the most positive aspect of your experience in 6331 (Program Planning)?
- What was the most challenging aspect of your experience in 6331?
- How were you feeling about AHED 6331 before spring break?
- What impact did COVID-19 have on the “community” in the classroom?
- Did you find it difficult to stay “on track” with discussion forums and assignments? Why or why not?
- Why do you think the instructor chose to maintain the original class schedule, due dates and deadlines?
- What was the most positive aspect of your experience in the other class (6335, 6346, 6354)?
- What was the most challenging aspect of your experience in this “other class”?
- How were you feeling about the “other class” (6335, 6346, 6354) before spring break, before the course design changes?
- What impact did COVID-19 (and the course design changes) have on the “community” in the classroom?
- Did you find it difficult to stay “on track” with discussion forums and assignments? Why or why not?
- What was it like for you, juggling two classes—one with a more structured timeline and one that was more open?
- If you had to choose one approach or the other, which would you choose? Why?
- If we encountered a similar set of disruptive events again, what would you recommend in terms of course design?

Comparing the Outcomes of the Different Teaching Modes: All-in-Person, Hybrid, and Online, for Different Student Demographic Groups in a Business School

Douglas R. Moodie
Kennesaw State University, USA

Abstract

The concept of hybrid mode education is spreading. Little research compares hybrid teaching modes to online and all in person (AIP) teaching modes. Nearly all this research assumes that there is no difference in the students entering AIP, hybrid, or online sections of a course. This study used data from four years of all the courses in the Coles College of Business at Kennesaw State University. The data set, which included individual student and course section outcomes, included full student demographics and the student's university GPA at the start of the course. The results showed that for all demographics, students in hybrid course sections earned higher final course grades than those in online sections, which in turn, earned better final grades than those in AIP sections.

Keywords: hybrid, online, teaching modes

Moodie, D. R. (2021). Comparing the outcomes of the different teaching modes: All-in-person, hybrid, and online for different student demographics in a business school. *Online Learning*, 25(4), 362-387. DOI: 10.24059/olj.v25i4.2298

While much previous research has explored the outcomes of fully online teaching compared to all in person (AIP) teaching, far less research has comparing hybrid teaching to online and AIP teaching (Amparo et al., 2018; Lovern, 2010; Slavkin, 2005; Stern, 2004). Moreover, previous research has suggested that there is no difference in the characteristics of the students entering AIP, hybrid, or online sections of a course. Studies such as that of McFarlin (2008) have only considered a single course or instructor. Some research, such as Blau and Drennan (2017) has considered student satisfaction with different modes, as well as academic outcome or grades.

Hybrid teaching may become a more common instructional delivery modality. It is important to examine hybrid class results to see how the hybrid teaching mode compares to AIP and fully online delivery. For example, if the hybrid teaching modes provide superior results for certain types of students, then institutions should encourage more instructors to use a hybrid mode. Also, doing more hybrid sections has large implications for the number of classrooms that an institution needs.

In addition, there may be important differences in demographics between students who opt for one mode over the others, and that certain student demographic groups may be more successful with certain teaching formats. For example, Xu and Jagers (2013), and Cavanaugh and Jacuemin (2013) suggested that student demographics can be different for different modes.

The present study used the entering characteristics of students, a large sample of many instructors, and the final mean course grade achieved for a large business college over several years, to see if the benefits (including negative benefits) of hybrid and online over AIP depends on the characteristics of the entering student. While there are many types of hybrid and online teaching modes, the present study examined traditional hybrid (or flipped) teaching, not rotational hybrids. The online sections in the present study were all asynchronous, not synchronous. The present study analyzed secondary data to determine whether the entering characteristics of students, a large sample of many instructors, and the final grade achieved for a large business college over several years. The purpose of the research was to see whether there was a connection between the demographics of the students, the model of instruction, and the success of the student in the course.

Research Questions

Thus, the research questions that the research examined were:

1. Is there a difference (both demographic and previous academic achievement) in students learning in different modes?
2. How do different demographic characteristics affect student outcomes in different modes? This was measured as the difference in mean course final grades between different groups. Outcomes in this study included the final course grade for the section.

Literature Review

The literature will report on how previous research has examined differences in the demographics of students taking different modes. We first examine the larger research output that does not include hybrid courses, then the smaller research that includes hybrid courses.

Online to AIP Comparisons

Many studies, with sample sizes ranging from very small to very large, have compared the outcomes of online versus AIP courses. The following is a selection of some of the most recent and more relevant studies.

No Examination of Student Type

Stern (2004) examined online and AIP instruction for one course and concluded that the online instructional delivery mode worked as well as AIP if online instructors had enough time to plan and implement their courses. Sapp and Simon (2005) compared grades for online and AIP writing courses. Their findings showed that more students thrived (defined as A or A-) in AIP courses than online courses (32% to 52%). Summers et al. (2005) examined grades for online versus AIP for a statistics course. They found no significant difference between modes of teaching. Kelly (2009) reported that she could find no significant difference between student grades for online and AIP modes. Kelly did not control for entering GPA. Dell et al. (2010) found no differences between online and AIP sections of a graduate human development and an undergraduate psychology course. Ni (2013) found that there were no significant differences in outcome between online and AIP classes. Amparo et al (2018) used a very large sample (96,000 students) across two institutions to compare online and AIP results. They found that AIP students outperformed online students in course final GPA. Blau and Drennan (2017) used student's perceptions to compare different teaching formats and suggested that universities find ways to increase perceived favorability of online and hybrid courses for those that prefer AIP.

None of these previous studies examined pre-course university GPA self-selection (e.g., Do more academically able students prefer a particular mode?) Further, most of these studies failed to examine differences in pre-course GPAs or any demographics of students. Generally, these studies mentioned above all found no significant difference in final course grades or that online courses achieved worse final course grades than AIP ones.

Examination Included Student Type

Cavanaugh and Jacuemin (2013) used a large sample size (5,000 courses) in one institution. They found no significant difference overall between online and AIP classes. They did find that students with good pre-course GPA did better those who did not. Online courses increased the effect of pre-course GPA. They also found that students who usually had high grades tended to do online courses, as the mean pre-course GPA was 3.41 for online students, while only 3.02 for AIP students.

Xu and Jagers (2014) researched a very large data set of online and AIP courses (500,000 student-course sets). They did allow for differences in pre-course GPAs. They found that males, younger students, Black students, and those with lower pre-course GPAs did worse in online courses, while females and Asians had no significant differences, and older students did better in online courses. They also looked at subject matter and reported that computer science, communication, and health had no significant differences. All others had AIP doing better than online courses. The social sciences, business, law, and nursing showed the biggest differences. Teaching mode affected starting students more adversely than continuing students were.

Nguyen (2015) summarized research comparing AIP and online teaching modes. He found that generally research considers online learning is better but that there were problems with much of this research. Amro et al. (2015) showed that for their algebra courses, AIP students got higher grades than students studying online did. Although they looked at age and gender factors, they did not look at pre-course GPAs to see if the students were similar in academic ability.

Bief and Brams (2016) compared student performance in online and AIP courses. They encountered mixed results; some studies showed the AIP course were better and some the online courses. Sun and Chen (2016) did a review of 47 papers comparing online and AIP teaching modes. They concluded that online teaching works as well as or better than AIP if done properly. That is well-designed content, motivated interaction, and well prepared and supported instructors.

Most studies did not examine the effect of demographic factors. However, Cavanaugh and Jacuemin (2013) found that students that earned higher grades in traditional settings tended to choose online courses. Xu and Jagggers (2014) showed that the difference between online and AIP depends on race, gender, previous GPA, and age. In fact, they also showed that older students did slightly better in online courses. These two studies hinted that demographics and pre-course GPA might affect course outcomes. Blau et al. (2019) used the students' intent to transfer as an output measure.

Hybrid Comparisons

Studies that did not Examine Student Types

Several studies looked at comparing hybrid to either or both of and online modes. Reasons, et al., (2005) examined the three teaching formats and concluded that online was better in achieving a higher final course grade than hybrid. McFarlin (2008) examined grade results for hybrid and online sections. McFarlin found that student learning, as represented by grades, increased in hybrid and online sections compared to AIP sections. Lovern (2010) found no significant difference in outcomes between online, hybrid, and AIP sections of the same course. Much previous research did not examine pre-course GPA self-selection. Son et al. (2016) looked at a lab class that was offered in the three formats. These researchers concluded that grades were highest in a hybrid mode, and lowest in a pure online format.

Studies that Examined Student Experience

Mansour and Mupinda (2007) studied students' experiences rather than outcomes in online and hybrid classes. They found that students preferred hybrid classes, but some students preferred online courses. This maybe reflected the students' learning style. Senn (2008) reported on student perceptions the three modes for one course. He concluded that students felt that hybrid sections were more difficult for this technology heavy course.

Larson and Sung (2009) looked at hybrid sections, as well as online and AIP. Unfortunately, they used student perceptions of learning effectiveness not actual learning achieved as a variable. They did not look at whether student self-select types of course by their pre-course GPA. They showed that students preferred hybrid to online and online to AIP. Sackett (2009) compared the three modes' outcomes based on the training that the instructors had had. He found that online learners were older and had better computer competency.

Kemp and Grieve (2014) studied student preferences and outcomes between AIP and online activities. They found no difference in learning outcomes but found students preferred online for written assignments and AIP for discussions. Goerke (2018) examined the three modes of training for one Air Force course. She found no differences in student satisfaction

between the three modes. Cathorall et al. (2018) assessed student performance in hybrid and online classes. They found no difference in student grades, but higher student evaluations in online courses.

Studies that Examined Student Types

Brau et al (2010) reported on completion and success results in a course transitioning from AIP to hybrid and online modes. They found that completion rates increased significantly as did success rates. They did not think this was due to better students entering online and hybrid sections. Hybrid sections had higher completion rates than online sections.

Price et al (2016) looked at effect of factors on student performance and satisfaction across modes. They looked at age, sex, interaction, clarity, control, and motivation. They found little correlation between age or sex/gender and student outcomes. They found that course design (participant interaction, learner control, and course clarity) did affect student outcomes. Mode of instruction had no significant effect. Kim and Keuegar (2017) compared hybrid and AIP courses. They concluded that using two modes, AIP and online, in the same course can be challenging to instructors. Baum and McPherson (2019) examined learning in online and hybrid sections, taking account of the academic weakness of entering students. They suggested that students with weak academic backgrounds and other risk factors, including socioeconomic status, struggle in online classes.

Taken together, previous research investigating student demographic differences showed such differences were sometimes linked to outcomes. In addition, they found that hybrid sections often achieved better outcomes to either online or AIP sections.

Methodology

Data Set

Kennesaw State University (KSU) provided every student-course record in KSU's Banner system from Fall 2015 to Summer 2019 for all Coles College of Business undergraduate courses. The analysis did not use later data available because of COVID-19. When the pandemic closed campus buildings, all AIP and hybrid sections went completely online within 4 days. Many of our instructors had never taught online before. The administration told instructors to give the students benefit in grading for the stresses of lockdown. KSU has offered synchronous online, plus rotating hybrids, as well as standard hybrid since the initial shutdown. Many instructors had to teach online for the first time with little or no training. Thus, the course grade awarded during the shutdown because of the pandemic were skewed upwards and not useful for determining comparison of teaching modes. Therefore, data after the Fall 2019 semester was not included.

The researcher removed from the data set all student-record data that had no grade awarded, or had a grade of I (incomplete), S (satisfactory), or U (unsatisfactory), as these grades did not give an indication of student learning.

Each student-course record set originally consisted of the following:

1. An arbitrary random number instead of student name. The researcher deleted this column from the working database as not useful.
2. *Course grade in letters*. This was converted to numbers; A = 4, B = 3, C = 2, D = 1, F = 0.
3. *Previous overall university GPA of student at the start of course*. This was missing for some students. Previous GPA varied from zero to 4. Starting transfer and freshmen students would have no previous GPA.

4. *Age*. This varied from 14 to 75. The study removed all those under 18, a small number, for IRB reasons.
5. The analysis converted *Teaching Mode* – online (OL), hybrid (Hy), or All-in-Person (AIP) – to zero-one variables. That is online is [1, 0, 0], hybrid is [0, 1, 0] and AIP [0, 0, 1] for columns online, hybrid, and AIP.
6. *Term*. Fall, Spring, or Summer. Some analysis used 1 for summer and 0 for Fall or Spring. This is because the summer term is a different length (8 weeks rather than 15 weeks).
7. *Calendar year*. 2015 to 2019.
8. *Course Discipline*. Choices were accounting [ACCT], economics [ECON], entrepreneurship [ENTR], information systems [IS], information security assurance [ISA], management [MGT], or marketing [MKTG].
9. *Course number*. The first digit of course number gave Course Level (1, 2, 3, or 4)
10. *Sex of student*. This converted this to Male = 1, and Female = 0. The university does not offer students options to declare outside of these choices.
11. *Race/Ethnicity/International Student Status*. This converted an ethnicity of International, Asian, Black, Hispanic, and white to zero or one variables. For example, International Students was [1, 0, 0, 0, 0] for columns International, Asian, Black, Hispanic, and white. Other ethnicities, such as multicultural, unknown, or missing, would be [0, 0, 0, 0, 0] for International, Asian, Black, Hispanic, and white columns.
12. This analysis did not use Instructor ID. There were 232 instructors in this analysis. There were 118,280 student-course data records for the analysis.

Dataset Characteristics.

Table 1 shows the basic properties of each variable in the data set.

Table 1

Properties of All Variables with Mean and Standard Deviation or Percentage of Total Dataset.

Variable Name	Mean or %	SD
Course Grade	2.992	1.004
Previous GPA	3.143	.5317
Age	22.43	5.162
Online Mode	21.1%	
Hybrid Mode	2.23%	
All-in-Person Mode	76.67%	
Summer Term	8.97%	
Course Level	2.4138	
Sex (M=1 F=0)	57.71%	
International	2.35%	
Asian	4.77%	
Black	17.31%	
Hispanic	9.47%	
White	59.57%	
Other	6.53%	

N = 118,280

*Hybrid student-section records are a small (2.23%) part of the overall data set.

Statistical Analysis

The statistical analysis used the final grade awarded for the course as the predicted variable and all the other variables as predictor variables. The F-test for the final grade for modes was 739.85, and the t-test between AIP and Hybrid was 31.57, between AIP and online was 33.12, and between hybrid and online was 15.53. Therefore, the differences in final grades between all modes was highly significant.

The research then found the correlations in Table 2 and ran regression analyses on the main data set in Tables 3 and 4.

Table 2
Correlation of All Variables with Course Final Grade

Variable	Course Grade	Prev. GPA	Age	Sex (M)	Online	Hybrid	AIP	Su Term	Year	Level
Prev. GPA	0.4229									
Age	0.0130	-.0405								
Sex: Male	-0.0513	-.1209	-0.022							
Online	0.0886	0.0416	0.256	-0.103						
Hybrid	0.0634	0.0268	0.030	0.012	0					
AIP	-0.1076	-0.049	-0.258	.0952	0	0				
Summer	0.0342	-0.002	0.079	-0.020	0.1587	-0.022	-0.145			
Year	0.0159	0.0252	-0.067	-0.012	-0.003	-0.021	0.011	-0.021		
Level	0.1136	0.1137	0.232	-0.006	0.2940	0.1793	-0.346	.02257	-0.15	
Intn'l	0.0285	0.0344	.0104	-0.020	-0.020	0.0177	.0131	-0.003	-.017	.0286
Asian	0.0171	0.0110	-.0075	-0.020	-0.011	0.0014	.0108	0.0067	.0062	-.004
Black	-0.1226	-0.138	0.061	-0.075	-0.010	-0.0055	.0118	0.0059	.0176	-.059
Hispanic	-0.0096	-.0074	.0037	-.0178	.0278	-0.0019	.0275	-0.0091	.0179	-.013
White	0.0878	0.0982	-.0615	.0865	0.0293	-0.0009	-0.027	-0.0014	-.020	.046

The highest correlation is between course grade granted to student in the course and the student's previous GPA. It also shows that there is high correlation between course level and online and hybrid modes, as in upper division there are more hybrid and online proportionally. There is a high correlation between summer terms and hybrid sections, as there are more online sections in the summer proportionally. Most of these extra online and hybrid sections are for junior and senior courses.

There is low correlation between age and online but not hybrid modes. This is probably because older students do more online courses. Female students tend to achieve higher grades in all cases. There are low correlations between course level and final grade. There is also a negative correlation between course grades and previous GPA with claiming a Black racial identity. This correlation analysis showed nothing unexpected.

Next, the study reports the regression analysis in Table 3.

Table 3

Regression for Course Grade Using all Predictors including Previous GPA.

Regression Statistics

Multiple R	0.44022			
R Square	0.19380			
Adjusted R Squared	0.19370			
Standard Error	0.94911			
Observations	109950			
ANOVA	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	13	23805.55	1831.2	2202.3
Residual	109937	99031.37	0.901	
Total	109950	122836.9		
Variables	<i>Coefficient</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.4051	0.0274	14.7722	0.0000
Previous GPA	0.8062	0.0055	145.714	0.0000
Age	0.0011	0.0006	1.8808	0.0600
Online Mode	0	0	65535	0.0000
Hybrid Mode	0.2122	0.0198	10.7442	0.0000
AIP Mode	-0.1520	0.0076	-20.0079	0.0000
Summer Term	0.0966	0.0100	9.6160	0.0000
Course Level	0.0462	0.0036	12.8545	0.0000
Sex: Male	-0.0054	0.0059	-0.9119	0.3618
International	0.1254	0.0221	5.6608	0.0000
Asian	0.0845	0.0172	4.9038	0.0000
Black	-0.1115	0.0132	-8.4557	0.0000
Hispanic	0.0152	0.0146	1.0410	0.2979
White	0.0650	0.0118	5.5101	0.0000

This regression supported the correlation analysis. The largest predictor of a student's course final grade was the student's university GPA at the start of the course (Previous GPA). However, hybrid mode was the second biggest correlator, with AIP a negative correlator. Online was neutral. This suggests that students in the hybrid mode had reported higher course grades than in online courses. In turn, students in online courses received higher grades than students in AIP courses. Students reporting to have an international status followed those who claimed an Asian identity were received higher course grade than those identifying themselves as white. Those who reported as being Black, received lower grades. As previous GPA was the best predictor of final course grade in this study, Table 4 shows the results of predicting final course grade by previous GPA only. Some student-course records had missing previous GPA, so they were eliminated from this sample.

Table 4
Regression for Course Grade using only Previous GPA

Regression Statistics				
Multiple R	0.9534			
R Square	0.9090			
Adjusted R Squared	0.9090			
Standard Error	0.9596			
Observations	109950			
ANOVA	Df	SS	MS	F
Regression	1	1011666	1011666	1098531
Residual	109949	101255	1	
Total	109950	1112921		
	Coefficients	Standard Error	t Stat	P-value
Previous GPA	0.9518	0.0009	1048.1	0.0000

When using only previous GPA as a predictor of course GPA, the regression had an adjusted R² of 90.9%,

Analysis of Mode Effect

The initial analysis suggested that the teaching mode was related to the final course grade, making additional analysis was necessary. As Year and Age had no noticed effect on results, the study deleted that information from the following Table 5 results. The summer term and level columns are missing from most of the following tables, as the study did not consider them major factors.

Table 5
Data for All Students by Mode

Instructor Mode	n	Course Grade	Sex Male	Summer Term	Course Level	Int'l	Asian	Black	Hispanic	White
AIP	90684	2.929	60.3%	6.7%	2.246	2.5%	4.9%	17.6%	9.9%	58.8%
Hybrid	2638	3.439	61.7%	4.8%	3.457	4.1%	5.0%	15.9%	9.1%	59.3%
Online	24958	3.174	47.9%	17.7%	2.913	1.8%	4.3%	16.6%	7.9%	62.3%
All	118280	2.992	57.7%	9.0%	2.414	2.4%	4.8%	17.3%	9.5%	59.6%

Separating results by teaching mode shows that the hybrid mode leads to higher course grades over online mode (8.34%), and online over AIP (8.38%). Although previous GPA for hybrid is higher than online (1.56%), which is higher than AIP (1.81%), it appears that hybrid mode leads to higher course grades for similar previous GPA. However, these results are for all students.

Analysis for Sex

To examine the effect of different demographics, the analysis showed in Table 6 the results by various student characteristics, including the sex of the student.

Table 6
Data for All Students by Sex and Mode

Sex	Instruct Mode	% Total	Course Grade	Previous GPA	Int'l	Asian	Black	Hispanic	White
Female	AIP	30.44%	2.980	3.215	3.08%	5.41%	21.23%	10.84%	53.08%
	Hybrid	0.85%	3.509	3.278	4.67%	5.76%	22.52%	9.63%	50.84%
	Online	11.00%	3.230	3.218	1.56%	4.84%	18.82%	8.03%	59.13%
	All	42.29%	3.056	3.217	2.71%	5.27%	20.63%	10.08%	54.61%
Male	AIP	46.23%	2.807	3.160	2.38%	5.01%	21.56%	10.18%	54.01%
	Hybrid	1.38%	3.394	3.205	3.81%	4.48%	11.86%	8.78%	64.50%
	Online	10.10%	3.114	3.148	1.98%	3.68%	14.10%	7.75%	65.85%
	All	57.71%	2.945	3.087	2.09%	4.40%	14.88%	9.02%	63.20%

N = 118,280

The overall reported sex balance was 57.7% male to 42.3% at KSU. Although a lower percentage of students reported to be females than males at KSU, more females reported enrolling in more online courses than male students; 26.2% of female student-courses were reported as being online versus 17.5% for male. More male students (2.39%) reported enrolling in hybrid than female (2.02%). Table 7 summarizes Table 6.

Table 7
Percentage Male Data for all Students by Race/Ethnicity/International Student Status and Mode

Race/Ethnicity	AIP	Hybrid	Online	All
International	49.1%	55.1%	52.1%	49.9%
Asian	55.8%	54.3%	40.8%	53.0%
Black	52.0%	45.8%	40.7%	49.6%
Hispanic	59.1%	46.9%	46.9%	55.0%
Multi	59.0%	60.3%	42.7%	55.5%
White	64.2%	67.1%	50.5%	61.2%
All	60.3%	61.7%	47.9%	57.7%

This shows that Black and Hispanic have the lowest proportion of males in hybrid sections. Asian, Black, Hispanic, and Multi-ethnic/Multi-racial have the lowest proportion in online sections.

Analysis by Course Level

The study then investigated if the results varied by course level and Tables 8, 9 and 10 show the results.

Table 8
Full Data for all Students by Course Level and Mode

Course Level	Instruct Mode	Course Grade	%	Male	Int'l	Asian	Black	Hispanic	White
4000	AIP	3.182	5.96%	59.42%	4.05%	4.10%	14.05%	9.75%	61.92%
	Hybrid	3.437	1.09%	65.56%	4.49%	3.56%	12.85%	9.52%	63.54%
	Online	3.321	5.84%	46.56%	1.87%	4.47%	14.44%	8.06%	64.21%
	All	3.267	12.89%	54.11%	3.10%	4.22%	14.13%	8.97%	63.09%
3000	AIP	3.071	19.31%	61.64%	3.19%	5.14%	14.97%	9.66%	60.63%
	Hybrid	3.493	1.06%	59.24%	3.58%	6.21%	18.31%	8.92%	55.97%
	Online	3.187	8.77%	49.48%	1.92%	4.49%	15.38%	7.78%	63.43%
	All	3.121	29.14%	57.89%	2.82%	4.99%	15.22%	9.07%	61.31%
2000	AIP	2.802	39.04%	61.60%	2.01%	4.88%	18.20%	9.93%	58.69%
	Hybrid	2.690	0.07%	42.53%	6.90%	6.90%	27.59%	5.75%	43.68%
	Online	2.966	5.29%	48.01%	1.37%	3.87%	19.93%	7.94%	59.10%
	All	2.822	44.41%	59.95%	1.94%	4.77%	18.42%	9.69%	58.71%
1000	AIP	2.983	12.36%	54.55%	1.98%	4.90%	21.27%	10.34%	54.85%
	Online	3.287	1.19%	41.45%	1.85%	3.69%	20.65%	7.74%	59.69%
	All	3.008	13.55%	53.46%	1.97%	4.80%	21.20%	10.09%	55.34%

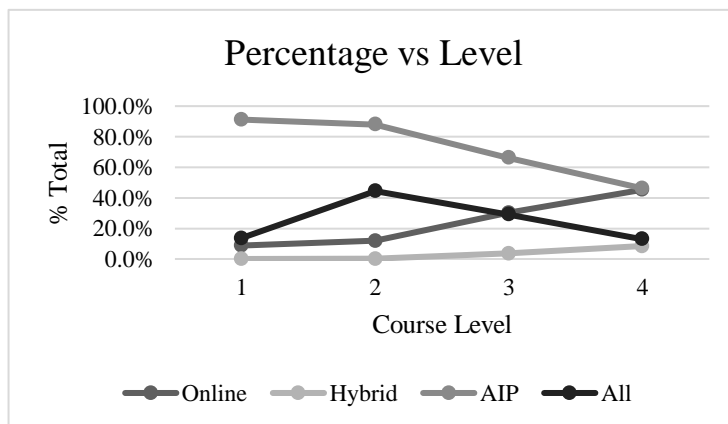
N = 118,280

Final course grade results are summarized in Tables 9 and 10, and Figures 1 and 2.

Table 9
Percentage Data for all Students by Course Level and Mode

Course Level	Online	Hybrid	AIP	All
4000	45.32%	8.48%	46.19%	12.89%
3000	30.10%	3.65%	66.26%	29.14%
2000	11.92%	0.17%	87.92%	44.41%
1000	8.80%	0.00%	91.20%	13.55%

Figure 1.
Percentage Data for all Students by Course Level and Mode



For senior year students, there are almost as many online student-courses as AIP. For first-year students (known as freshman at KSU), there are very few online courses. Both hybrid and online increase with level as a percentage of year’s total student-courses.

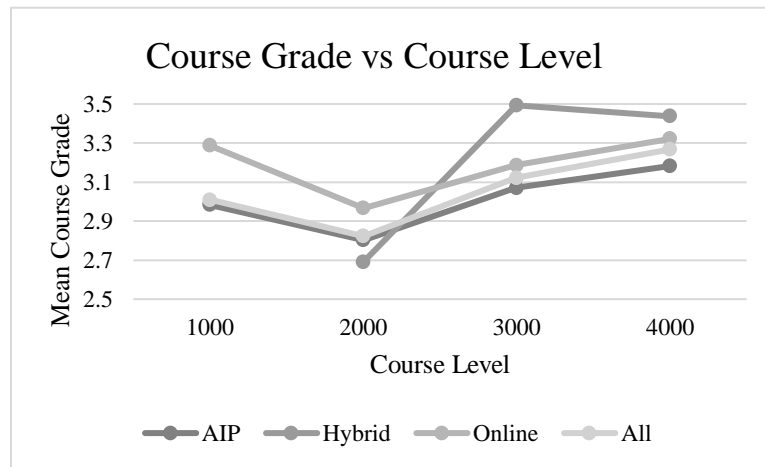
Table 10

Final Course Grade for all Students by Course Level and Mode.

Mode	1000	2000	3000	4000
AIP	2.983	2.802	3.071	3.182
Hybrid		2.690	3.493	3.437
Online	3.287	2.966	3.187	3.321
All	3.008	2.822	3.121	3.267

Figure 2.

Final Course Grade for all Students by Course Level and Modes



Grades increase slightly with level for all modes except hybrid. In senior and junior year students, hybrid modes have students that received higher final grades than grades received in online courses. Online course grades were higher than AIP. Data from hybrid courses in second year (known as sophomore year at KSU) were too small to use. The overall mean final grade for all student-courses is almost exactly a B (3.008).

Analysis for Term

There are far more online courses as a percentage in Summer than in Fall or Spring. The analysis looks in Table 11 at whether courses in summer were different to the rest of the year in outcomes.

Table 11
Data for all Students by Summer Term and Mode

Term	Instruct Mode	Course Grade	% All	Previous GPA	Sex Male	Int'l	Asian	Black	Hispanic	White
Fall, Spring	AIP	2.921	71.56%	21.611	60.43%	2.49%	4.85%	17.48%	9.95%	58.91%
	Hybrid	3.454	2.12%	23.456	61.74%	4.26%	4.94%	15.90%	9.17%	59.19%
	Online	3.167	17.36%	25.025	47.71%	1.64%	4.17%	16.43%	7.98%	62.45%
Summer	All	2.98	91.04%	22.305	58.03%	2.37%	4.72%	17.24%	9.55%	59.59%
	AIP	3.033	5.12%	22.906	58.56%	2.07%	5.55%	18.69%	9.47%	57.42%
	Hybrid	3.146	0.10%	22.897	59.87%	1.97%	5.54%	18.60%	9.49%	57.57%
	Online	3.208	3.74%	24.875	48.57%	2.33%	4.77%	17.17%	7.50%	61.94%
	All	3.107	8.96%	23.732	54.44%	2.17%	5.23%	18.03%	8.62%	59.34%

N = 118,280

Tables 12 and 13 summarize the most relevant results from Table 11.

Table 12
Percentage Data for all Students by Term and Mode

Term	Online	Hybrid	s	All
Fall	19.07%	2.33%	78.60%	91.04%
Spring				
Summer	41.74%	1.18%	57.08%	8.96%

There is a far larger percentage of online sections in summer (41.75% versus 19.7%). Hybrid declines from 2.33% in spring to 1.18% in summer, while online increases.

Table 13
Mean Final Course Grade for all Students by Term and Mode

Mode	Fall, Spring	Summer
AIP	2.921	3.033
Hybrid	3.454	3.146
Online	3.167	3.208
All	2.980	3.107

Final mean course grades for online and AIP both very slightly increase in summer, whilst hybrid mean course grades decline from 3.45 to 3.15. There does not appear to be differences in mode percentages or mode course final grades between Fall and Spring terms, so the study does not use that data further.

Analysis by Discipline

The study investigated whether the discipline influenced final grade with different modes, whose results are in Table 14.

Table 14
Data for all Students by Discipline and Mode

Discipline	Instruct Mode	% All	Course Grade	Sex Male	Int'l	Asian	Black	Hispanic	White
ACCT	AIP	13.75%	2.66	61.66%	1.93%	4.81%	18.51%	9.99%	58.46%
	Online	1.22%	2.87	47.36%	1.12%	3.20%	20.67%	7.81%	59.48%
	All	14.97%	2.67	60.50%	1.86%	4.68%	18.68%	9.81%	58.54%
BLAW	AIP	6.29%	3.19	62.92%	1.92%	4.78%	17.78%	10.20%	59.40%
	Online	0.60%	3.10	47.06%	1.66%	4.07%	20.97%	6.79%	59.13%
	All	6.89%	3.18	61.54%	1.90%	4.72%	18.06%	9.90%	59.38%
ECON	AIP	34.38%	2.82	58.23%	2.11%	4.94%	18.94%	9.96%	57.57%
	Hybrid	0.08%	2.79	45.74%	7.45%	6.38%	26.60%	7.45%	43.62%
	Online	3.42%	3.17	43.38%	1.82%	4.20%	20.30%	7.98%	58.58%
FIN	All	37.88%	2.85	56.86%	2.09%	4.87%	19.08%	9.77%	57.63%
	AIP	4.26%	2.87	61.69%	3.50%	5.62%	13.88%	10.12%	60.70%
	Hybrid	0.63%	3.18	70.23%	5.56%	4.42%	11.54%	10.68%	62.11%
IS	Online	0.66%	2.78	48.29%	2.05%	3.83%	16.01%	7.39%	63.34%
	All	5.55%	2.89	61.08%	3.56%	5.27%	13.86%	9.86%	61.17%
	AIP	6.30%	3.30	64.88%	2.83%	5.44%	17.26%	10.01%	57.92%
ISA	Hybrid	0.23%	3.64	59.04%	6.02%	7.63%	19.68%	8.43%	53.82%
	Online	4.27%	3.05	52.08%	1.63%	4.00%	16.37%	8.35%	62.42%
	All	10.80%	3.21	59.69%	2.42%	4.91%	16.96%	9.32%	59.62%
MGT	AIP	0.43%	3.01	55.77%	1.59%	4.40%	17.42%	7.89%	61.12%
	Online	0.31%	3.16	67.44%	0.86%	7.49%	18.73%	8.36%	54.18%
	All	0.74%	3.07	76.44%	0.98%	7.56%	19.63%	6.34%	55.13%
MKTG	AIP	9.03%	3.23	62.70%	3.76%	4.53%	14.56%	9.71%	60.96%
	Hybrid	1.44%	3.56	59.36%	3.02%	4.71%	16.65%	8.61%	59.80%
	Online	7.86%	3.37	49.71%	2.06%	4.68%	15.02%	7.80%	64.02%
MKTG	All	18.33%	3.32	56.87%	2.97%	4.61%	14.92%	8.81%	62.18%
	AIP	7.51%	3.09	56.28%	3.14%	4.34%	15.11%	9.69%	61.88%
	Online	4.22%	3.09	42.47%	1.52%	4.07%	14.71%	7.76%	63.94%
	All	11.73%	3.09	51.32%	2.56%	4.24%	14.96%	9.00%	62.62%

N = 118,280

These findings are further disaggregated in Tables 15 and 16.

Table 15
Percent of Student-courses in each Discipline Taught in each Mode

Discipline	AIP	Hybrid	Online
ACCT	91.9	0	8.1
BLAW	91.5	0	8.7
ECON	90.7	0.2	9
FIN	76.7	11.4	11.9
IS	58.3	2.1	59.6
ISA	58.3	0	42.3
MGT	49.3	7.8	42.9
MKTG	64.1	0	35.9

All disciplines have online sections but only IS, ISA, MGT, and MKTG have as many online as AIP students-courses. All disciplines have online mean grades similar or superior to AIP sections. Only ECON, FIN, IS, and MGT have hybrid sections.

Table 16
Mean Final Course Grade Awarded in each Discipline Taught in each Mode

Discipline	AIP	Hybrid	Online
ACCT	2.66		3.87
BLAW	3.19		3.1
ECON	2.82	2.99	3.17
FIN	2.87	3.18	2.78
IS	3.3	3.64	3.21
ISA	3.01		3.15
MGT	3.23	3.56	3.37
MKTG	3.09		3.09

In all disciplines with hybrid sections except economics, the mean final grade for hybrid is superior to online or AIP. In economics, hybrid is superior to AIP but not to online.

Analysis by Race/Ethnicity/International Student Status

The study considered in Table 17 whether different groups were better doing certain modes for their courses. Some students were “N/A” or unknown for reported group and thus the study deleted them. The resulting total data set contained 115358 student-course records.

Table 17
Data for all Students by Race/Ethnicity/International Student Status, Mode and Sex

Group	Instructor Mode	Sex	% Total	Course Grade	Previous GPA
Intn'l	AIP	Female	0.93%	3.2456	3.363
		Male	0.90%	3.1029	3.193
		All	1.83%	3.1744	3.279
	Hybrid	Female	0.04%	3.6087	3.38
		Male	0.05%	3.4576	3.254
		All	0.09%	3.498	3.279
	Online	Female	0.16%	3.4105	3.35
		Male	0.18%	3.1683	3.183
		All	0.35%	3.2778	3.257
	All Modes		2.27%	3.2000	3.27
Asian	AIP	Female	1.69%	3.0832	3.265
		Male	2.13%	2.9549	3.08
		All	3.82%	3.0111	3.161
	Hybrid	Female	0.05%	3.4138	3.319
		Male	0.06%	3.4571	3.198
		All	0.11%	3.4176	3.23
	Online	Female	0.55%	3.3291	3.266

Comparing Teaching Modes Against Student Demographics in a Business School

Black	All Modes	Male	0.38%	3.2230	3.072
		All	0.92%	3.2835	3.184
		All	4.86%	3.0720	3.165
	AIP	Female	6.62%	2.7249	3.062
		Male	7.18%	2.5743	2.89
		All	13.8%	2.6465	2.972
	Hybrid	Female	0.20%	3.2907	3.085
		Male	0.17%	3.3316	3.111
		All	0.36%	3.3039	3.091
	Online	Female	2.12%	2.9388	3.016
Male		1.46%	2.7838	2.97	
All		3.58%	2.8752	2.997	
All Modes		17.75%	2.7060	2.98	
Hispanic	AIP	Female	3.38%	2.9277	3.167
		Male	4.41%	3.4406	3.264
		All	7.79%	3.4555	3.27
	Hybrid	Female	0.08%	3.2	3.182
		Male	0.12%	3.0941	3.173
		All	0.21%	3.1491	3.176
	Online	Female	0.91%	3.1971	3.182
		Male	0.80%	3.0941	3.173
		All	1.71%	3.1491	3.176
	All Modes		9.71%	2.9589	3.128
Multi-Racial Multi-Ethnic	AIP	Female	1.34%	2.8885	3.197
		Male	1.94%	2.8421	3.026
		All	3.28%	2.8606	3.096
	Hybrid	Female	0.04%	3.3778	3.206
		Male	0.06%	3.4286	3.187
		All	0.10%	3.408	3.194
	Online	Female	0.55%	3.0758	3.122
		Male	0.41%	3.0042	3.042
		All	0.96%	3.0434	3.085
	All Modes		4.34%	2.9124	3.094
White	AIP	Female	16.56%	3.0738	3.274
		Male	29.67%	2.964	3.108
		All	46.23%	3.0033	3.167
	Hybrid	Female	0.44%	3.6238	3.351
		Male	0.91%	3.3971	3.215
		All	1.35%	3.4698	3.257
	Online	Female	6.67%	3.3245	3.282

	Male	6.82%	3.1828	3.191
	All	13.49%	3.2527	3.236
All Modes		61.08%	3.0686	3.185

N = 115358

Tables 18 and 19 summarize Table 17.

Table 18

Percentage Data for all Students by Race/Ethnicity/International Student Status and Mode

Group	Online	Hybrid	AIP
International	15.2%	4.1%	80.7%
Asian	19.0%	2.3%	78.7%
Black	20.2%	2.1%	77.8%
Hispanic	17.6%	2.2%	80.2%
Multi-racial	22.1%	2.4%	75.6%
Multi-ethnic			
White	22.1%	2.2%	75.7%

International students finished the most hybrid courses proportionally, whilst they enrolled in the fewest number of online courses. This may be because United States Visa regulations require 12 credits of “in person” classes, such as AIP or hybrid.

Table 19

Final Grade Data for all students by Race/Ethnicity/International Student Status and Mode

Group	AIP	Hybrid	Online	All
International	3.174	3.478	3.278	3.200
Asian	3.011	3.418	3.284	3.072
Black	2.647	3.304	2.875	2.706
Hispanic	3.114	3.149	3.049	3.128
Multi-racial	2.861	3.408	3.043	2.912
Multi-ethnic				
White	3.003	3.470	3.253	3.069

Students taking courses in the hybrid mode received the highest grades, except for those reporting an identity as *Hispanic*. For that group online students received higher grades than those learning AIP. The study uses the *white* race mean as the base case in the next table (Table 20) as it is the largest group.

Table 20

Final Mean Grade Data Compared to Whites. for all Students by Race/Ethnicity, and Mode

Group	AIP	Hybrid	Online	All
International	0.171	0.008	0.025	0.131
Asian	0.008	-0.052	0.031	0.003
Black	-0.356	-0.166	-0.378	-0.363
Hispanic	0.111	-0.321	-0.204	0.059

Multi-racial	-0.142	-0.062	-0.21	-0.157
Multi-ethnic				
White	0	0	0	0

The biggest differences in mean grades are highlighted in **bold**. International students and Hispanic students received grades closes to white students in AIP courses. However, for those reporting as Black, the grades they received came closest to white students in hybrid sections.

Analysis Using Previous GPA

Previous university GPA before the start of the course is an indicator of academic ability. So, one would expect students with high previous university GPA to get better final course grades. Table 21 shows the effects of previous GPA.

Table 21

Course Final Grade Data for all Students by Instructor Mode, Previous GPA and Race/Ethnicity/International Student Status (N = 109658)

Instruct Mode	Prev. GPA	% Total	Course Grade	Male	Int'l	Asian	Black	Hispanic	White
AIP	<2	1.49%	1.884	69.5%	1.2%	3.6%	31.4%	10.6%	44.3%
	2<2.5	6.72%	2.153	70.6%	1.4%	5.0%	25.6%	9.7%	50.9%
	2.5<3	18.16%	2.570	67.9%	2.0%	4.7%	21.3%	10.2%	55.8%
	3<3.5	29.08%	3.002	58.5%	2.1%	4.5%	16.1%	9.9%	61.5%
	3.5-4	20.28%	3.512	52.3%	3.3%	5.6%	11.8%	9.3%	62.9%
	All	75.73%	2.937	60.4%	2.3%	4.9%	17.3%	9.8%	59.2%
Hybrid	<2	0.01%	2.625	37.5%	12.5%	0.0%	37.5%	0.0%	25.0%
	2<2.5	0.09%	2.711	66.0%	4.1%	7.2%	20.6%	4.1%	51.5%
	2.5<3	0.55%	3.076	68.3%	3.2%	4.5%	24.1%	8.3%	53.7%
	3<3.5	1.05%	3.469	63.6%	3.3%	4.7%	13.9%	10.1%	62.2%
	3.5-4	0.68%	3.792	55.3%	5.0%	4.9%	11.7%	8.9%	62.1%
	All	2.37%	3.562	62.1%	3.8%	5.5%	11.9%	9.8%	61.5%
Online	<2	0.15%	2.216	51.9%	0.6%	7.4%	35.2%	6.8%	39.5%
	2<2.5	1.39%	2.372	53.7%	1.5%	5.5%	31.7%	5.2%	47.4%
	2.5<3	5.21%	3.006	59.0%	2.4%	4.9%	17.1%	9.6%	59.6%
	3<3.5	9.17%	3.237	46.8%	1.8%	3.9%	14.7%	8.5%	64.6%
	3.5-4	5.97%	3.654	43.7%	2.2%	4.9%	9.6%	7.2%	69.2%
	All	21.89%	3.181	48.0%	1.8%	4.3%	16.4%	7.9%	62.5%
All		3.003	57.7%	2.2%	4.8%	17.1%	9.4%	60.0%	

Table 22 provides additional information about the findings from Table 21.

Table 22

Course Final Grade data for all Students by Previous GPA and Race/Ethnicity/International Status

Prev. GPA	% Total	Course Grade	Male	Int'l	Asian	Black	Hispanic	White
<2	1.6%	1.917	68%	1%	4%	32%	10%	44%
2<2.5	8.2%	2.196	67.7%	1.4%	5.1%	26.6%	8.9%	50.3%
2.5<3	23.9%	2.628	64.7%	1.9%	4.6%	21.6%	9.8%	55.7%
3<3.5	39.3%	3.069	55.9%	2.1%	4.4%	15.7%	9.6%	62.3%
3.5-4	26.9%	3.551	50.5%	3.1%	5.5%	11.4%	8.9%	64.3%
All		3.003	57.7%	2.2%	4.8%	17.1%	9.4%	60.0%

Table 23 and Figure 1 summarizes Table 22.

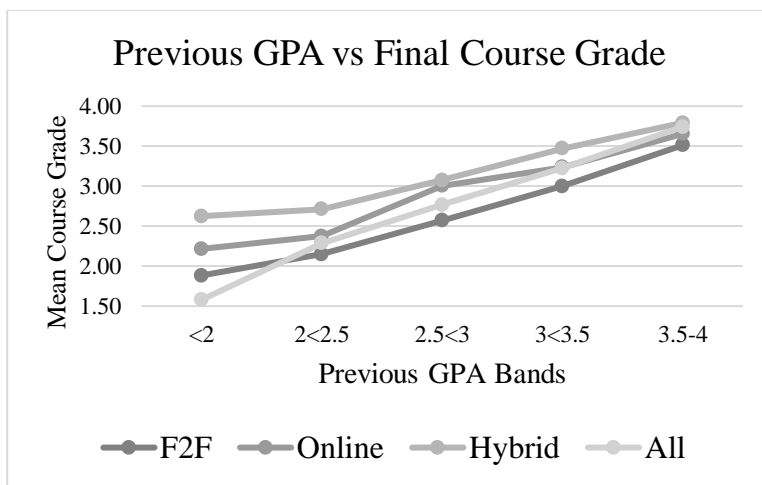
Table 23

Course Final Grade Data for all Students by Instructor Mode and Previous GPA

Mean Course PrGPA	AIP	Final Grade		
		Online	Hybrid	All
<2	1.88	2.216	2.63	1.58
2<2.5	2.15	2.373	2.71	2.29
2.5<3	2.57	3.005	3.08	2.77
3<3.5	3.00	3.238	3.47	3.23
3.5-4	3.51	3.654	3.79	3.74
All	2.94	3.003	3.56	3.15

Figure 3.

Course Final Grade Data vs Previous GPA for all Students by Instructor Mode



For all previous GPA, the hybrid is best for mean final grade is best then online, then AIP.

Results Using Only Multi-Mode Teachers

All data were deleted with instructors that only taught in the AIP mode, leaving 53,556 student-sections. Table 24 shows the results from the analysis without these instructors.

Table 24

Grade Gain Data for Student Groups by Mode Using only Multi-Mode Instructors

Instructor Mode	% Total	Course Grade	PrGPA	Male	Int'l	Asian	Black	Hispanic	White
AIP	61.4%	2.95	3.13	61.8%	2.4%	5.0%	17.8%	9.6%	58.9%
Hybrid	4.9%	3.44	3.24	62.1%	3.8%	4.9%	16.0%	9.1%	59.5%
Online	33.8%	3.16	3.19	47.9%	1.8%	4.3%	16.5%	7.9%	62.3%
All		3.04	3.15	57.1%	2.2%	4.8%	17.3%	9.0%	60.1%

In the table, the same results emerge as in previous analyses. That is, that students in hybrid courses received higher grades than in online courses. Further, both online and hybrid courses result in students receiving higher grades than in AIP courses.

Results Using Only Those Instructors Who Taught Hybrid Mode

The researcher then looked at data sets with instructors who taught hybrid, with 9834 data sets with 16 instructors (about 7% of all instructors). With this data in Table 25, hybrid is a far larger proportion of courses.

Table 25

Course Final Grade for Student Groups by Mode Using only Instructors Who Teach Hybrid

Instruct Mode	% Total	Course Grade	Prev. GPA	Male	Int'l	Asian	Black	Hispanic	White
AIP	42.2%	3.26	3.22	63.9%	3.6%	5.4%	15.0%	10.3%	59.4%
Hybrid	26.4%	3.44	3.24	62.1%	3.8%	4.9%	16.0%	9.1%	59.5%
Online	31.3%	3.48	3.26	49.1%	2.2%	5.0%	14.7%	8.1%	63.2%
All		3.38	3.23	58.8%	3.2%	5.2%	15.1%	9.3%	60.6%

Table 26 further disaggregates information from Tables 24 and 25.

Table 26

Course Final Grade Data for All Students by Instructor Type and Mode*

<i>Instructor Type</i>	<i>Do Hybrid</i>	<i>Multimode</i>	<i>All</i>
AIP	3.26	2.95	2.94
Hybrid	3.44	3.44	3.44
Online	3.48	3.16	3.18
All	3.38	3.04	3.00

*Note: instructor type is whether instructors teach a hybrid course or not.

Generally, instructors who taught at least one hybrid courses allocated higher grades in all modes than those that did not. With hybrid teaching instructors, there was little difference between online and hybrid results. Even so, both groups allocated higher grades than those who taught in AIP courses only.

Summary of Results for Course Final Grades

Previous GPA - The biggest predictor of a student's final grade in a course was their previous university GPA at the start of the course.

Sex - Generally, female students tend received higher final grades than male students in all formats and courses.

Race/Ethnicity/International Student Status - International students (who could claim multiple races and ethnicities) received the highest final course grades. Asian students in at KSU without international student status received the next highest grades. Students reporting their race as Black received lower grades than other groups. Students in hybrid courses received the highest final course grades across races, ethnicities, and status as an international or domestic student. The advantage in terms of higher grade received was highest for Black students and least for Hispanic students.

Mode - Overall, grades were higher in hybrid courses than online courses. Both hybrid and online grades were higher than AIP grades. However, hybrid courses tended to be more available in upper division courses.

Discipline - Only half the business disciplines taught courses in the hybrid mode, which may have affected results. However, in all disciplines with hybrid courses, the hybrid mean course grade was higher than that for online or AIP.

Based on these findings, more courses should be available in the online and hybrid modes, but especially the hybrid mode. There also might be benefits to using the hybrid mode that go beyond the scope of this student. If higher education institutions want to increase hybrid teaching, it seems reasonable to provide additional support to instructors to learn to teach in hybrid modes. Additional research might examine the types of supports.

While this study showed hybrid mode teaching resulted in higher grades than in AIP courses, it did not show why. One theory could be is that hybrid courses enable more interactive teaching than AIP. Another theory is that students took advantage of other affordances of online and hybrid courses that include a more fluid sense of time and deadlines. There is also the

possibility that the instructors who give higher grades tend to be those who teach hybrid courses. In any case, additional research is also needed to determine *why* the grades are higher in these courses. Is because there is better teaching and learning? Is it because teachers set different expectations for learning in different modes? Is it because there are fewer threats to individuals' claimed identities in courses where one does not have to be in the AIP space? Or is there some other reason?

It would be interesting to do similar studies with other universities and colleges to see if KSU's patterns are similar or different. If done with several other teaching institutions and one found similar results, then one could make generalizable conclusions about the effect of teaching mode on course grades.

Limitations

This study has several limitations.

1. The use of previous GPA to represent the academic ability of an incoming student is a convenient assumption. However, that is how most students rate their learning.
2. The use of course final grade to represent learning from a course is a common approximation of learning, but admittedly imperfect.
3. This analysis did not consider other factors like how many online or hybrid courses the student had done before the course, how many online or hybrid courses the student took at the same time, or whether the student was only taking online courses or mixing F2F with online and hybrid courses.
4. In the main study, hybrid student course records were only a small proportion of the total data.
5. The study did not examine differences between instructors. However, many instructors grade harder than others for the same course. Hybrid teaching instructors may grade higher than those teaching other modes.
6. The data for this case study comes from one university. Other universities and colleges may show completely different patterns.
7. Variables for Race/Ethnicity and International Student Status were all grouped together for this analysis, which might obscure some of the nuance between students who claim these characteristics.
8. Since KSU only collects information about sex using a binary of Male/Female. Data and analysis for those who might claim a non-binary sexual/gender identity was unavailable.

Conclusions

The base data set has only a very small proportion of all student-course records from hybrid sections. This may mean that the results are heavily biased towards online and AIP modes. However, due to the large number of student-course records, this analysis can provide useful information that might cause other universities to consider their own patterns. The analysis also showed there was little difference in type of student who did each mode, except those students with more experience in the academy tended to do more online courses. This research basically replicates most of the previous studies with larger student populations, but with more information of how student types affect the results.

Declarations

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author received approval from the ethics review board of Kennesaw State University, USA for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Amro, H.J., Mundy, M-A., & Kupczynski, L. (2015). The effects of age and gender on student achievement in All-in-Person and online college algebra classes. *Research in Higher Education, 27*, 1-22.
- Amparo, A.R., & Smith, G. (2018). Gender and persistent grade performance differences between online and face-to-face undergraduate classes. Proceedings from the June 2018 *EdMedia+Innovate Learning* conference in Amsterdam, Netherlands, 1935-1939.
- Baum, S., & McPherson, M.S. (2019). The human factor: the promise & limits of online education. *Daedalus, the Journal of the American Academy of Arts & Sciences, 148*(4), 235-254.
- Biel, R., & Brams, C.J. (2016). Traditional versus online biology courses: connecting course design and student learning in an Online setting. *Journal of Microbiology & Biology Education, 17*(3), 417-422.
- Blau, G., & Drennan, R. (2017). Exploring differences in business undergraduate perceptions by preferred classroom delivery mode. *Online Learning, 21*(3), 222-234.
- Blau, G., Gaffney M.A., Scirmer, M., Ozkan, B., & Kim, Y.J. (2019). Exploring the relationship of background, technology, and motivation variables to business transfer intent for two mixed course format business undergraduate samples. *Online Learning, 23*(1), 80-94.
- Brau, M., Christian, S., Hill, B., McNair., Sandoz, S., & Taylor, C. (2010). Success and retention in online and hybrid courses, Lane Community College, online teaching and learning project, phase 1. *Lane Community College paper*, spring 2010, 1-12.
- Catorall, M.L., Xin, H-B., Blankson, F., Kempland, M., & Schaefer, C. (2018). Assessing student performance in hybrid versus web-facilitated personal health courses. *The Turkish Online Journal of Educational Technology, 17*(1), 11-16.
- Cavanaugh, J., & Jacquemin, S. J. (2013). A large sample comparison of grade-based student learning outcomes in online versus face-to-face courses. *Online Learning, 19*(2), <https://olj.onlinelearningconsortium.org/index.php/olj/article/view/454>.

Dell, C.A., Low, C., & Wilker, J.F. (2010). Comparing student achievement in online and face to face class formats. *MERLOT Journal of Online Learning and Teaching*, 6(1), 30-42.

Goerke, L.F. (2018). Student satisfaction in traditional, online, and hybrid continuing education course. Eaker paper 1, *Air University Press*, Maxwell AFB, Alabama. ISBN: 978-1-58566-281-4 / AU Press Code: P-126, 1-55.

https://www.airuniversity.af.edu/Portals/10/AUPress/Papers/ep_0001_goerke_student_satisfaction_education.pdf

Kelly, V. A. (2009). A quantitative study of course grades and retention; comparing online and All-in-Person classes. *Dissertation submitted to Baker University*, December 2009.

https://www.bakeru.edu/images/pdf/SOE/EdD_Theses/Kelly_Vickie.pdf

Kemp, N., & Grieve, R. (2014). Face-to-face or face-to-screen? Undergraduates' opinions and test performance in classroom vs online learning. *Frontiers in Psychology*, November 2014, (article 1278), 1-11.

Kim, D-Y., & Kruegaer, T.M. (2017). Comparison of student success in hybrid and traditional introductory finance classes. *Journal of Accounting & Finance*, 17(5), 124-134.

Landers, R. N. (2009). Traditional, web-based, and hybrid instruction: a comparison of training methods. Dissertation. *University of Minnesota*, May 2009, 1-132,

https://conservancy.umn.edu/bitstream/handle/11299/52260/Landers_umn_0130E_10315.pdf?sequence=1

Larson, D. K. & Sung, C-H. (2009). Comparing student performance: online versus blended versus face-to-face. *Journal of Asynchronous Learning Networks*, 13(1), 31-42.

Lovern, J.J. (2010) is there a difference in student achievement based on the delivery method in an undergraduate assessment course: A comparison of face-to-face, hybrid, and online sections. Proceedings from the June 2010 *EdMedia+Innovate Learning* conference in Toronto, Canada, 2462-2467.

Mansour, B.E, & Mupinga, D.M. (2007). Students' positive and negative experiences in hybrid and online classes. *College Student Journal*, 41(1), 242-248.

McFarlin, B.K. (2008) Hybrid lecture-online format increases student grades in an undergraduate exercise physiology course at a large university, *Advanced Physiological Education*. 32, 86-91.

Muller, K., Gradel, K., Deane, S., Forte, M., McCabe, R., Pickett, A.M., Piorkowski, R., Scalzo, K., & Sullivan, R. (2019). Assessing student learning in the online modality. *NILOA, Urbana, IL*, paper 40, 1-31.

Nguyen, T. (2015). The effectiveness of online learning: beyond no significant differences and future horizons. *MERLOT Journal of Online Learning and Teaching*, 11(3), 309-319.

- Ni, A. Y. (2013). Comparing the effectiveness of classroom and online learning: teaching research methods. *Journal of Public Affairs Education*, 19(2), 199-215.
- Price, R.A., Arthur, T.Y., & Pauli, K.P. (2016). A comparison of factors affecting student performance and satisfaction in online, hybrid, and traditional courses. *Business Education Innovation Journal*, 8(2), 32-40.
- Reasons, S. G., Valadares, K., & Slavkin, M. (2005). Questioning the hybrid model: student outcomes in different course formats. *Online Learning*, 9(1), 83-94.
- Romero-Hall, E., & Vicentini, C. R. (2017). Examining distance learners in hybrid synchronous instruction: success and challenges. *Online Learning*, 21(4), 141-157.
- Sapp, D.A., & Simon, J.L. (2005). Comparing grades in online and face-to-face writing courses: interpersonal accountability and institutional commitment. *Computers and Composition*, 22(4), 471-489.
- Senn, G.J. (2008). Comparison of face-to-face and hybrid delivery of a course that requires technology skills development, *Journal of Information Technology Education*, 7, 267-283.
- Son, J.Y., Narguizian, P., Beitz, D., & Desharnais, R. A. (2016). Comparing physical, virtual, and hybrid flipped labs for general education biology. *Online Learning*, 20(3), 228-243.
- Stern, B.S. (2004). A comparison of online and face-to-face instruction in an undergraduate foundations of American education course. *Contemporary Issues in Technology and Teacher Education*, 4(2), 196-213.
- Summers, J., J., Waigandt, A., & Whittaker T. A. (2005). A comparison of student achievement and satisfaction in an online versus a traditional face-to-face statistics class. *Innovative Higher Education*, 29(3), 233-250.
- Sun, A., & Chen, X-F. (2016). Online education and its effective practice: a research review, *Journal of Information Technology Education: Research*, 15, 157-190.
- Xu, D. & Jagers, 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.

“We Overwhelm Them with Hope”: How Online Mentors Can Support Online Learners

Camey L. Andersen

Richard E. West

Brigham Young University, USA

Abstract

This survey research study analyzed responses from 143 mentors from around the world participating in a global higher education initiative. Results confirmed the effectiveness of four mentoring domains identified in the literature, reporting the most success from providing emotional and psychological support for students. This article provides mentoring strategies including student goal setting, identifies characteristics of an online role model, and shows the importance of online mentors' confidence in students gaining technology skills. The study has additionally contributed to the literature supporting (a) benefits of online mentoring for nontraditional students, (b) influence of technology on mentoring challenges, and (c) role assumption in online mentoring. Additionally, the study provided a literature review of the background of online mentoring and mentoring practices, the benefits and challenges of online mentoring, and lessons learned from research. This work presents a comprehensive understanding of online mentoring, providing support for mentors seeking to improve their performance as well as recommendations for creating mentoring programs to improve organizations.

Keywords: best practices, higher education, mentors, online education, social support, technology

Andersen, C. L., & West, R.E. (2021). “We overwhelm them with hope”: How online mentors can support online learners. *Online Learning*, 25(4), 388-415. DOI: 10.24059/olj.v25i4.2440

With the increasing prevalence of online communication, universities continue to expand their online presence with online courses and programs. Unfortunately, challenges of online higher education have resulted in higher dropout rates (Boston & Ice, 2011; Gravel, 2012; Xu & Jaggars, 2013). Of course, students must be responsible for their own learning; however, their way can be eased by online mentoring that provides academic support, personal connection, and future direction as these students navigate their online educational experience. This mentoring connection can be critical for the success and retention of online higher education students. Receiving academic mentoring online is a natural transition for many millennials, who believe, as Houck (2011) stated, that “technology is the core to their way of life and thinking” (p. 28), along with incoming Generation Z students, who expect the latest technology to be an integral part of their educational experience. But despite their ease with technology, students can be challenged by feeling alone in their online learning in the absence of in-person interaction with teachers and classmates (Bolliger & Inan, 2012).

Research affirms that online mentors can contribute in meaningful ways to students’ rewarding online learning experience. A definition of traditional mentoring was provided by Shandley (1989):

First, it is an intentional process of interaction between at least two individuals

Second, mentoring is a nurturing process that fosters the growth and development of the protégé Third, mentoring is an insightful process in which the wisdom of the mentor is acquired and applied by the protege Fourth, mentoring is a supportive, often protective process. The mentor can serve as an important guide or reality-checker in introducing the protege to the environment he or she is preparing for. Finally . . . an essential component of serving as a mentor is role modeling. (p. 60)

As online learning increases in higher education, online mentoring is expanding the roles and responsibilities of the traditional mentor, changing existing mentoring models, and adding new models (Hamilton & Scandura, 2003; Leneer, 2007; Neely et al., 2017). The COVID-19 global epidemic has further revealed the need for and gaps in online mentoring as higher education has had to dramatically and immediately transition online (U.S. Department of Education ED COVID-19 Handbook, 2021). In an early study of the effects of the pandemic on higher education, faculty across the U.S. indicated they were most concerned about how to strengthen online students and how to encourage their success in online environments (Johnson et al., 2020). A prevalent finding from the COVID-19 shift to emergency remote teaching is that many students have been left behind (Natanson, 2020).

Mentoring has been recommended by researchers to assist students with the challenges of online learning and online education (Boston & Ice, 2011). Online students—those affected and not affected by pandemic conditions—benefit from increased use of online mentoring to meet their emotional and academic needs. But although academic mentoring in general has a robust research history, very little research has been undertaken to understand how mentoring is accomplished online, especially by individuals other than the course instructors.

In this study, we used survey-based research with qualitative and quantitative questions to better understand the important role and effective practice of online mentors in an international program providing higher education designed for transitional and non-traditional students seeking a bridge into colleges. Mentors in this program recognize that many of their students are overwhelmed with the varied demands and challenges of their program. One successful and enthusiastic online mentor attributed the effectiveness of the program to mentor students as “We overwhelm them with hope.”

Review of Literature

Bierema and Merriam (2002) defined online mentoring as “a computer mediated, mutually beneficial relationship between a mentor and a protege which provides learning, advising, encouraging, promoting, and modeling that is often boundaryless, egalitarian, and qualitatively different than traditional face-to-face mentoring” (p. 219). Those differences avoid geographic constraints of traditional mentoring and benefit from equity provided by the communication platform for mentors and mentees, enabling mentees to feel less fear about mentoring dynamics and to speak more openly than they might during in-person interactions. We use the term *in-person* rather than *face-to-face* for greater accuracy since online synchronous video discussions technically offer many of the advantages of non-verbal communication available with in-person contexts.

Online mentors face challenges in navigating their responsibilities as well as opportunities to positively impact students through online interaction. This review of literature briefly presents research findings on the benefits of online mentoring, then considers the challenges of doing online mentoring well, and finishes with lessons learned from the research already completed.

Benefits of Online Mentoring

Online mentoring offers important benefits to students that may not be provided by traditional mentoring, but the breadth and extent of these benefits are still being uncovered in research. Benefits include expanding mentoring possibilities and increasing available mentors for students; minimizing demographic and cultural challenges of mentoring; offering asynchronous as well as synchronous mentoring and providing more available times for mentoring and improved access to mentors; and creating an environment where students may be more willing to share information, thus creating improved trust and more effective mentor/mentee relationships (Boston & Ice, 2011; Bowers & Kumar, 2015; Sanyal & Rigby, 2017). Because online mentoring programs may be more or less structured in organization, both implementation and benefits depend on the formality and management of the mentoring program.

Online mentoring gives university students increased access to mentoring opportunities, including a larger and more diverse pool of mentors than would be accessible through in-person mentoring (Dawson, 2014). As there are no geographic limitations, mentors with a variety of backgrounds and skills can be recruited. Online mentoring may also minimize some of the demographic challenges faced in traditional mentoring: gender, racial, and cultural differences may be mitigated in electronic communication (Bierema & Merriam, 2002; Xu & Jaggars, 2013). For example, women and minority populations may find more help available in fields where they have previously been minorities in the workforce. Also institutions can offer specialized groups of students, such as veterans, a depth of easily accessible support online that might not be as replicable in an in-person format (Cass & Hammond, 2014).

Communication flexibility is increased, as asynchronous communication enables mentors and mentees to communicate through email, text, and online messaging (e.g., Facebook or WhatsApp) at any time (Thompson et al., 2010). They can also communicate through synchronous online video such as Zoom or Skype at times that would not be convenient to meet in person, and they have the flexibility to meet in any location where they have access to a computer or mobile device as well as internet service.

Personal connection between mentors and mentees is fundamental to the mentoring relationship. Online mentoring supports and strengthens this interaction as students connect with mentors in an online space. Bear and Jones (2017) found that students’ trust in their mentor was

related to how positive they felt about their mentoring relationship. These authors found that trust was built through mentors participating in at least five interactions with students, discussing topics that strengthened their mentoring connection, including problem management, business culture, and career possibilities. Because students are familiar with communicating about themselves with peers and others through online communication, they may find it easier to develop a personal relationship with mentors online than in person, and they may be more willing to express themselves honestly and openly to the online mentor (Homitz & Berge, 2008).

These benefits of online mentoring add to other student benefits of taking classes online such as flexibility, convenience, and availability of courses.

Challenges of Online Mentoring

Research has identified online mentoring challenges, but has neglected solutions for these potential difficulties. Challenges mentioned include the (a) absence of in-person interaction, (b) limitations in mentors' and/or mentees' technology skills and online communication ability, and (c) time required compared to in-person interaction.

One of the most frustrating challenges for online mentoring is having no in-person interaction between mentors and students (Bear & Jones, 2017; Purcell, 2004; Rees Lewis et al., 2015; Sanyal & Rigby, 2017). Interacting only online can increase difficulty in developing an effective relationship between mentors and mentees, partly due to inability to interpret verbal signs or other physical cues naturally present in an in-person encounter (Hamilton & Scandura, 2003). As an effective in-person mentor may not be as successful in an online setting, practice and training may be needed, and adjustments may be required to increase online mentoring to the same quality as that of an in-person interaction (Shrestha et al., 2009).

Some mentors do not have adequate skills with the technologies needed to provide online mentoring. Technology can be an obstacle to online mentoring, and mentor technology knowledge cannot be assumed (Ensher et al., 2003; Shrestha et al., 2009; Williams et al., 2012). Some formal mentoring programs may use specific student software programs or additional technology requiring mentor training for effective mentor/mentee interaction. Mastering these skills can require time. If mentors do not have the necessary skills or feel comfortable using the technology system in place, their lack of confidence can be detrimental to the mentoring interaction (Williams et al., 2012).

Research has also indicated that if the academic program does not specify which online communication form to use and how to use it for the relationship to be most effective, mentors and mentees must agree on these matters (Houck, 2011; Tyran & Garcia, 2015). Emails, Zoom calls, and other forms of communication vary in quality depending on individual engagement and ability to adapt to the communication style (Sanyal & Rigby, 2017). Ambrose and Williamson Ambrose (2013) explained:

Even in instances in which technology is more commonly deployed in advising (through e-mail . . . and websites) the problem of transactional, surface-level interactions remains. In other words, technology expedites information access, but it fails to transform advising practice. (p. 76)

When technology does not extend beyond practicality in mentoring, the associated understanding and learning in mentoring relationships suffer.

Mentoring relationships may require more time to maintain online than in person. Students may engage in more online communication with mentors when online is the only interaction than they would when meeting in person on a regularly scheduled basis (Rees Lewis et al., 2015). Also technology challenges such as poor internet connections may cause a video

conference to last longer than scheduled or to require rescheduling when an improved connection can be secured. Clarity is enhanced if mentors are more concerned about possible misinterpretation of emails or messages they send than they would be about verbal conversation, and thus spend longer composing the online exchange.

Research needs to provide more ideas for mentors, students, and mentoring program administrators to mitigate these problems that can obstruct online mentoring relationship success. Some of these challenges may also be present with in-person and blended mentoring programs; this perspective also should be considered.

Themes from Research

The following section adds to insights from the literature for improving the online mentoring process. First, to mitigate the absence of in-person interaction, in-person video conferencing provides familiarity between mentor and student. In an e-mentoring study, Sanyal and Rigby (2017) found that video conferencing (e.g., Skype or Zoom) was almost as beneficial as meeting in person and that initial in-person video conferencing influenced success by providing a necessary human connection to mentoring. However, the study did not indicate the amount of video conferencing needed.

Multiple methods of online communication can be used to improve the mentor relationship (Sanyal & Rigby, 2017). By combining video conferencing with email and, for example, a social media interaction (like Facebook or WhatsApp), the mentor and student could create a multi-dimensional relationship. Murphy (2011) found that combining email with in-person mentoring interaction increased career discussions for mentees. In a study of undergraduates in online degree programs (Gravel, 2012), students described what they considered the most important quality of the mentoring relationship as “a prompt, but also personalized type interaction” (p. 63). Thus online mentors need to provide an individualized experience for their students to create the effectiveness these students described. The research does not give specific suggestions for maximizing that personalized experience. Additional recommendations are needed regarding time and student development in the mentoring relationship, including short- and long-term goal-setting, which is cited by many as one of the most important functions of mentoring (Ambrose & Williamson Ambrose, 2013; Halupa & Henry, 2015; Houck, 2011).

Research provides few specifics on technology training for mentors. If mentors do not feel confident with their technology skills, they may be more hesitant to participate in other mentoring practices (Williams et al., 2012); thus mentors who begin a mentoring program should receive specific training in the program’s chosen technology. After mentoring relationships are established, ongoing training should occur to ensure the mentors’ questions are answered and they feel confident about their technology skills. Mentors can also benefit from learning technology skills through the mentoring process (Homitz & Berge, 2008).

Additionally, mentors need more research-based recommendations on managing mentoring time, including additional guidelines on structure as well as support in following up on interactions (Thompson et al., 2010). To maximize proactivity and minimize time waste, if possible mentors should schedule a minimum number of interactions per time period (e.g., semester) and designate types of interactions they will undertake (e.g., video conference, email, messaging) (Bear & Jones, 2017; Tyran & Garcia, 2015). A mentoring schedule could also include topics to discuss to improve mentor proactivity and help students set current goals as well as look towards future goals and career plans, which is one of the most useful functions of

mentoring (Ambrose & Williamson Ambrose, 2013; Halupa & Henry, 2015; Houck, 2011). In addition to maximizing time, mentors need to assist in managing student development.

Domains of Mentoring

Mentoring literature lacks the foundational theories that inform other disciplines (Jacobi, 1991). Instead, mentoring studies often adapt mentoring traits or models as a framework (Hamilton & Scandura, 2003; Sanyal & Rigby, 2017). This study considers three mentoring domains suggested by Nora & Crisp (2007): (a) psychological or emotional support, (b) goal and career path guidance, and (c) role model specification (p. 342). Additional studies have used these domains to show the impact of mentoring (Henry et al., 2011; Hu & Ma, 2010). We have added a fourth domain for this study, technological challenges, following results of a 2019 pilot study with a group of BYU-Pathway mentors, the population who would be the participants of this study.

The first domain, psychological or emotional support, describes the connection between mentors and students as mentors offer “moral support, [identify] problems, and [provide] encouragement” (Nora & Crisp, 2007, p. 342). In the second domain, support for setting goals and choosing a career path, mentors’ role includes “[assessing] the student’s strengths/weaknesses and [assisting] with setting academic/career goals and decision making” (p. 343). The domain specification of a role model focuses on “the mentor’s present and past actions and achievements/failures” and how this mentor is able to influence students (p. 343). The domain we added, technological challenges, identifies the technological challenges faced by mentors in online environments and describes how these can impact mentoring success.

Methods

Study Purpose and Research Questions

Much remains to be learned about how online mentors can be most effective in supporting students and contributing to the goals of their higher education institutions. With the increasing number of online classes available, online mentoring will gain prominence in higher education environments (Allen & Seaman, 2013). Online mentors should strive to be as effective as in-person mentors, with extended opportunities due to additional technology tools available to them. This study investigates online mentors and mentoring practices for the purpose of increasing effectiveness in supporting students. Four questions guided this research:

1. How can online mentors provide emotional and psychological support in an online environment?
2. How can online mentors help students set goals and plan for their future studies and work in an online environment?
3. How can online mentors establish themselves as role models in an online environment?
4. How can online mentors negotiate technological challenges associated with online mentoring?

Research Context

To answer these research questions, the authors studied BYU-Pathway Worldwide (Pathway). Their educational program, PathwayConnect (BYU-Pathway Worldwide, 2019), is a low-cost higher education initiative that assists individuals in beginning or returning to college. PathwayConnect is available in more than 500 locations (as of 2020) in 152 countries and all 50 states within the United States (BYU-Pathway Worldwide, 2021); it currently enrolls more than 33,000 students worldwide. Once students have completed three semesters (one year) of

PathwayConnect, they are eligible to receive a certificate and may progress to complete an online degree at a college or university. Essential to the retention and success of Pathway students are the volunteer service mentors who support, encourage, and empower students as they facilitate the weekly Pathway meetings.

Pathway's innovative approach of using volunteer teams of service mentors for students helps foster a positive learning environment where students feel connection, support, accountability, and safety. Mentors may volunteer through the Pathway website, or they may be asked to serve as mentors by local representatives affiliated with the Pathway program. These volunteers learn about mentoring largely by self-training. They participate in self-directed onboarding instruction online that consists of a handbook and online reading and videos. They also participate in an in-person or virtual training session with a Pathway contact who answers additional questions, and in further training sessions during the academic year, depending on their location.

Pathway relies on an established volunteer program in its sponsoring religious organization to identify full-time and part-time volunteers to serve as Pathway service mentors. This volunteer program has a value system understood by mentors as they begin Pathway mentoring service: such as shared faith with many (but not all) students and expectations of service and commitment to "shepherding" or watching over students. This religious context to the Pathway mentoring program has at its foundation a focus on the individual needs of students.

What distinguishes the Pathway program from other online learning programs is the weekly academic gathering event (student meetings). Every Thursday (or other day once a week), in Pathway locations worldwide the volunteer service mentors facilitate the Pathway weekly gatherings, in which students meet together, in person or online depending on their group, to teach each other and discuss their week's learning. PathwayConnect includes a *standard version* for students who speak English fluently and a *language version* for students who have intermediate English skills.

The Pathway context is a large-scale online learning initiative affecting more than 33,000 students in 2020. At the time this study was conducted in 2019, Pathway enrolled more than 26,000 students with the help of 2,500 mentors, of which less than 15% (300_350) were online mentors. The target population for this education has a particular need for mentoring since the Pathway program is designed to prepare individuals for college who are not ready or who would not otherwise be participating in a higher education program. New students are recruited from current and previous Pathway student referrals, online and local advertising, and mentor recruitment of students in local areas.

Research Design

We implemented survey-based research using both quantitative and qualitative items, as we sought to understand how online mentors were conducting their practice and how they were impacting students. Ormston et al. (2014) explained that qualitative studies are often most appropriate for studying "what, why, and how questions rather than how many" (p. 3) if the focus is on exploring phenomena from a naturalistic perspective. Because our study sought to answer "how" questions concerning naturalistic phenomena and relationships in addition to "how many," a combined qualitative and quantitative approach was appropriate.

A qualitative survey approach was appropriate particularly for collecting open-ended qualitative answers to address research questions about how online mentoring was experienced and practiced. According to Stake (2010), qualitative research studies are "interpretive, experience based, situational, and personalistic" (p. 31). In addition, Jansen (2010) explained,

“the qualitative survey is the study of diversity (not distribution) in a Population” (para. 7). Qualitative surveys are beneficial for studying a population’s ideas and concerns, particularly when literature does not provide adequate survey examples (Fink, 2003). The depth and breadth of survey research can also provide insight and themes regarding the benefits and challenges of online mentoring and ways online mentors can be most successful in supporting students.

However, because the population studied was large and the breadth of information to be collected was substantial, we also collected statistics that were analyzed and reported descriptively. In the absence of inferential analysis and with the focus on answering the “how” behind the numbers, this study remained primarily qualitative with some descriptive statistics providing additional context.

Study Participants

The participants were volunteer service mentors in the Pathway program, serving as mentors for an average period of 2 years or longer; participants in this study had served as mentors since at least April 2019. Pathway mentors may be seniors, middle-aged individuals, or young people, including those who have recently completed the Pathway program. They are not necessarily professional educators; many are volunteers with applicable life experience or experience as Pathway students. Most mentors serve with a spouse, but some serve with another mentor in a mentoring team.

This study included 143 online mentor participants who were mentoring student groups in one of 12 selected Pathway domestic or international areas. Mentors lived in one of the 12 participating global areas, but not necessarily the same area for which they provided online mentoring. The majority of study participants were new online mentors, with 65% having begun mentor service in 2019. More than 60% of them had previously served as in-person mentors in the PathwayConnect program.

Data Collection

Data were collected via a descriptive Qualtrics survey conducted in August–September 2019. First, we conducted a pilot study survey in January 2019 with approximately 500 Pathway mentors to better understand organization training practices. For the current study all online Pathway mentors were emailed open-ended/closed-ended anonymous surveys to complete and return (see Appendix). By completing the surveys, participants also accepted an implied consent agreement from our institutional review board for participation in the study. Because PathwayConnect is a new and developing program, the participants were familiar with regular evaluation strategies, including surveys, to provide data to the program for continual improvement. The survey was available for 2 weeks, and a reminder email was sent midway through this time period. The purpose of the survey was to understand online mentoring practices in the Pathway Worldwide online educational program and to discern how mentors help students achieve their educational goals.

Data Analysis

At the completion of the survey period, the data were collected and analyzed using a holistic and interpretive stance with an emphasis on dominant themes (Braun et al., 2019; Spradley, 1979; Stake, 2010; Yin, 2017). Based on the Stake (2010) coding method, data were sorted and categorized by major topics and themes related to the research questions. As Stake explained, “The code categories are progressively focused, changing as the research question takes on new meanings and as the fieldwork turns up new stories and relationships” (p. 151). In additional analyses of the data, themes emerged from the categories, and particular topics and subtopics were identified. Principal themes were further identified from this analysis. The Nora

and Crisp (2007) mentoring domains—(a) psychological or emotional support, (b) goal setting and career path support, and (c) role model specification (p. 342)—were used as an interpretive framework for sorting and coding topics by designated major themes; another domain, technological challenges, was added to the framework to provide further insights into mentoring, after being identified as a significant theme in the 2019 pilot study. The discussion and findings resulted from further analysis of the combined synthesis of principal themes.

Trustworthiness

This study relied on Guba and Lincoln's (1994) recommendations for trustworthiness for increased credibility of data analysis. First, we surveyed a diverse sample of approximately 143 mentors from locations around the world, providing diversity for participant response data that would be expected in a survey of mentors of worldwide geographic locations. Survey checking, peer debriefing, and negative case analysis were used to minimize bias and improve validity. For survey checking, survey responses were reviewed and verified with Pathway executives for meaning and clarity, using verbal confirmation. This review ensured that information presented was correct in consistency with the broader context of the Pathway organization and goals, without biasing the research by too much management involvement. For peer debriefing, findings were reviewed and discussed with mentors' colleagues and other peer scholars. One of our academic colleagues also reviewed and coded some of the survey data for comparison with our results. Based on the peer debriefing of coding outcomes, adjustments were made to the study analysis to bring unity to the overall assessment of responses.

For negative case analysis, survey responses were compared to existing Pathway data, including a January 2019 Pathway pilot evaluation study we conducted to discern potential differences in results. After completing the analysis, we coded approximately 20% (325) of the text responses from the pilot data (never published or approved for publication by an IRB). However, these pilot data provided a solid check on emerging themes in the data included in this study. We analyzed these pilot data specifically seeking to find areas of disagreement with the study framework. We recorded all these disagreements and contrary evidence in a research journal. Next, we evaluated findings and categories in consideration of any contrary evidence. Then we provided the contrary evidence and overall findings to a peer for debriefing to better understand the overall fit of the conclusion to the data.

Results

This study examined how online mentors can be most effective in supporting students in higher education systems. Results showed the impact of four mentoring domains: mentors' abilities (a) to provide psychological and emotional support for students, (b) to help students set goals and see future options, (c) to function as role models (Nora & Crisp, 2007), and (d) to navigate technology challenges. These themes are described in the subsequent results.

Support for Individual Students Outside the Virtual Classroom

The first research question asked, "How can online mentors provide emotional and psychological support in an online environment?" Mentors reported this skill as their most effective of the four surveyed, with 44% reporting themselves as being *very effective* at providing this support. Depending on their response to the survey question, participants had an opportunity to share an experience when they had been able or not able to provide support a student needed and why. Mentors provided this support through email, phone calls, online in-person conversations through Zoom, online conversations through messaging such as

WhatsApp, and in-person contact when possible. Mentors provided essential emotional and psychological support to Pathway students as they faced personal concerns, family challenges, and academic difficulties, and their support helped students continue moving forward in their educational program through these difficulties, whereas without this support they might not have completed the program (see Table 1).

Table 1
Rating (1–5) of Ability to Provide Emotional Support for Students in the Virtual PathwayConnect Program

	Percentage
Extremely effective (5)	19.38
Very effective (4)	44.19
Moderately effective (3)	31.78
Slightly effective (2)	3.10
Not effective at all (1)	1.55

A mentor explained helping a student resolve his individual concerns related to attending the weekly student online class (gathering):

I had a student that traveled for work and had to climb cell towers on adjacent islands in the Caribbean. He was worried that he could not make the gathering on Wednesdays. [My mentor partner and] I had a Zoom conference so he could explain the issues that he faced. I provided several solutions for him. He went to his boss and discussed these solutions, and they customized one for him. He was diligent coming to class [online] and would sometimes be riding his motorcycle home when we started, but he would still login and the [class] loved it when we were able to ride along with him as he listened.

A number of mentors explained how they had helped students in dealing with serious personal emotional problems without interrupting their Pathway program. A mentor shared the experience of helping a student through her family difficulties:

One of my students, who has panic attacks and is very introverted, also got a divorce during the semester and lost custody of her kids. The emotional strain was heavy, and she lost her job because of it. She kept coming to Pathway but spent much of her time with the video off. We were not sure if she would be back. [I] spent a lot of time on the phone with her and [emailed] with her [religious leader] . . . She will be back the second semester. She still has a lot of baggage, but she has made it this far.

Many mentors reported encouraging students to continue their studies as they faced the serious illness or death of family members during the semester. Mentor support enabled students to maintain educational progress through a major life tragedy, as illustrated by the following experience:

One of our students had her father die during the semester, and we contacted her multiple times, talked with her about his death, talked to her about the days she needed to miss, and tried to help her in any way we could . . . We . . . arranged to meet with [students] in Zoom whenever they need us for support.

Mentor awareness and support could be particularly important for students who were struggling academically. Mentors were able to monitor students' academic progress and intervene with additional support when difficulty became apparent. A mentor shared this experience:

I have a student who barely graduated from high school and was really worried about going to college. She also had a baby right before the first semester and has no support at home from husband or extended family. Many times during the first semester she wanted to give up. She fell behind frequently and got frustrated. I was able to provide emotional support and encouragement, and she completed the semester!

A mentor explained how he was supporting a failing student:

I have a student who has an F currently. I called him and dealt with his issues and what I can do to help him bring his grade up. He was reassured and registered for [second] semester where he will hopefully improve his scores.

In this study, mentors' experiences showed how they were successful in supporting students emotionally and psychologically in an online environment. Student challenges were always present in the mentoring experience, but the online environment did not hinder mentors from connecting with students who needed support.

Strategies for Student Goal Setting

The second research question asked, "How can online mentors help students set goals and plan for their future studies and work in an online environment?" Mentors' reports of their skills almost equally split between *moderately effective* (43.31%) and *very effective* (39.37%; see Table 2).

Table 2
Ability (1–5) to Help Students Set Goals and See Future Options

	Percentage
Extremely effective (5)	7.87
Very effective (4)	39.37
Moderately effective (3)	43.31
Slightly effective (2)	7.87
Not effective at all (1)	1.57

Depending on their response to the survey question, participants had the opportunity to describe an experience when they were able to help a student set goals and see after-Pathway options or explain why or when it had been difficult to help students do this.

Two types of goal-setting were identified by mentors as most effective:

(a) initial goal-setting, prior to or as the semester was beginning, and (b) situational goal-setting, as the mentor perceived a student had developed a need. A mentor explained the benefit as well the rationale for students in setting goals at the beginning of the semester:

[In] my first personal conversation with each one, I asked what their goal was in taking Pathway; that way I have that knowledge to refer back to as we go through the semester. I can use the information to give added strength to what I am saying or when a new certificate is available can let them know about it.

Another mentor shared what the team had learned about helping students with the goal-setting process:

This is the second time we [have] started a Pathway cohort and we [have] learned some things we [are] going to do differently this time around. We [are] going to do more to keep students focused on the future and the goals they need to set to get there. Students who experience difficulties lose focus on their goals first. They get overwhelmed and they get behind and they don't finish. If we can incorporate some aspect of goal setting and achievement into each week's gathering . . . students will experience greater success and complete their Pathway education.

Mentors were able to observe student needs that came up during the semester, particularly with low-performing students or as previously successful students suddenly encountered difficulties; mentors identified strategies to help these students to continue in their educational progress. One mentor shared this experience of assisting a student:

One of my students was a waitress and was provided Wednesdays off so she could attend our gatherings. All went well for the first semester. Then she missed three [meetings] in a row. I contacted her via WhatsApp, and we talked about what the issues were and how she found herself stuck. Apparently, one of her co-workers [had a] baby. The boss decided not to replace her, but to ask my student to work overtime and extra days. She didn't know what to do. We . . . revisited her priorities and goals. She then was inspired, after talking with her husband and boss, to quit her job and pursue her education dream. [She has done] that, and other single-day jobs have popped up along the way to help her achieve those goals.

Mentors have helped students with small goals such as finishing a math unit or with language goals like improving in English, in addition to encouraging them to set larger goals to finish the education course. Mentors were also able to help students understand and set goals for their after-Pathway plans and realize how those options would help them eventually meet their career or life goals.

Characteristics of Online Role Modeling

The third research question asked, “How can online mentors establish themselves as role models in an online environment?” Almost 42% of mentors felt it was *somewhat easy* to be a role model in an online environment. As they responded, participants were asked to share an experience of acting as a role model in the virtual PathwayConnect or discuss when they had had difficulty being a role model in this program. Even in a virtual environment where they did not interact in person, mentors felt that they were able to positively influence students as a role model by demonstrating beneficial educational and life practices. They did not feel that the online environment significantly detracted from their ability to do this (see Table 3).

Table 3
Rating (1–5) of Ability to Be a Role Model for Students in the Virtual PathwayConnect Program

	Percentage
Extremely easy (5)	29.13
Very easy (4)	41.73
Neither easy nor difficult (3)	23.62
Somewhat easy (2)	4.72
Extremely difficult (1)	0.79

Mentors reported being able to show students examples of service, professionalism, and positive attitude. One mentor shared an example of modeling behavior for students during class interaction:

By frankly admitting weaknesses in a general manner and [telling] how we managed those shortcomings . . . we worked through times [in] our class when [things] did [not] go quite as they were supposed to. The class members were able to see how imperfect [mentors] can still . . . strive to reach the goal of a successful . . . class.

For most mentors, being a role model was enhanced by advance preparation for the class. One mentor explained, “I review the gathering lesson before it is given and think about what life experiences I have had that might help my students. I then share as appropriate during the lesson.”

Sharing their own personal experiences was also important to mentors in supporting students. One mentor provided an experience she had shared:

During one of the lessons, I talked about a personal experience as a mother during a busy time in my life. It affected several students who had children and felt they weren’t doing a good job. I helped them understand simple ways to make time for their families and meet their needs. A few students really needed to hear that . . .

They are easily affected by any encouragement we give them.

Mentors were also able to share their own experiences of struggling to earn academic degrees, including how they had succeeded in their own education, careers, and personal life. They were able to provide academic, professional, and life encouragement supporting students through the semester. One mentor described a typical student/mentor interaction and its perceived impact:

I don’t know for sure if those discussions were instrumental in being seen as a ‘role model,’ but they seem to influence many of [the students] in a positive way, even to the point of keeping three of them in the program when they were contemplating quitting for various personal reasons.

Confidence in Technology Skills

The fourth research question asked, “How can online mentors negotiate technological challenges associated with online mentoring?” Almost 38% of mentors considered their ability to use technology in an online educational program somewhat easy (see Table 4).

Table 4
Rating (1–5) of Ability to Use Technology Effectively in the Virtual PathwayConnect Program

Options	Percentage
Extremely easy (5)	21.26
Somewhat easy (4)	37.80
Neither easy nor difficult (3)	18.90
Somewhat difficult (2)	19.69
Extremely difficult (1)	2.36

In terms of their response, mentors were asked to share an experience demonstrating how they were able to use technology to help virtual students achieve their educational goals or describing additional training that would help them resolve technology challenges. These mentors were most successful when they felt confident in their understanding of the program technology platform, Zoom, and could use it effectively to engage students. Mentors needed to learn and remain current with technology skills to successfully navigate the online system. One mentor explained how she continued to learn about the technology so she could more effectively help the students:

We have been able to find ways to improve our ability to collaborate using Zoom. For example, we learned how to split the screen to see math problems on one side [and] copy/paste them to the other side . . . as though we were in a face-to-face classroom . . . The breakout room allows us total privacy with the students when doing our observation and feedback sessions . . . [The virtual program] is as good and in some ways even better than a face-to-face group.

Mentors explained the importance of training students in Zoom before the semester started so they would be ready to use the technology from the beginning of the course.

In reviewing all four question categories and mentoring domains, ability to use technology was the area in which mentors seemed most unsure. This was the question which resulted in the largest percentage of *somewhat difficult* responses (almost 20%) and the lowest percentage of *neither easy nor difficult* responses (almost 19%; see Table 4). These differences in comparison to the other mentoring areas appear to reflect mentors' challenges with technology in the online educational program as they tried to assist students. Difficulties seemed to be a result of inexperience with the technology, lack of training (perceived or actual), difficulties with the system, and problems with the connection. A mentor explained the challenges:

I rated my use of technology as *somewhat easy* (now; see Table 4), but it was simply awful at first. I struggled to use Zoom, a lot. I felt really dumb in front of the students, making all kinds of mistakes. Maybe that is why I endeared myself to them, because they could see if it was hard for me and I refused to give up but kept trying in something I did not understand, I suppose they thought they could do hard things too. Now, of course, it is *very easy* after two semesters, but in a virtual classroom, it was very challenging to learn technology on [my] own.

Other study mentors also reported their technology skills had improved with time and practice, and when they had challenges, students in the class helped them find solutions to technology problems. As one mentor shared, "I know I could be a lot better at technology. The students help each other and teach others how to use excel and other technology . . . They learn even more by teaching each other." Thus even when mentors struggled with technology, they used their challenges to benefit students' learning experiences.

Discussion

Comparison and Interpretation of Findings

The central purpose of this study was to examine the experiences and practices of online mentors and to understand how they could most effectively support students. The study examined four mentoring domains in connection with online mentoring. The findings showed support for each of the domains, but demonstrated that participants believed their most effective mentoring skill was providing emotional and psychological support to

students. They reported that their least effective skill was navigating technological challenges. Mentoring is essential for students in online higher education who may face more challenges than traditional university students (Bolliger & Inan, 2012). The results of this study are consistent with mentoring literature on the benefits of online mentoring for higher education students (Boston & Ice, 2011; Bowers & Kumar, 2015; Dawson, 2014; Sanyal & Rigby, 2017). Results identified four additional themes: (a) creating student connection, (b) personalizing goals for the online student, (c) differentiating online role modeling, and (d) overcoming technology challenges.

Creating Student Connection

One of the greatest challenges in online mentoring is replicating the mentor/mentee relationship that exists in an in-person learning environment (Bear & Jones, 2017; Purcell, 2004; Rees Lewis et al., 2015; Sanyal & Rigby, 2017). Answering the first research question, the results showed that mentors identified themselves as *very effective* at providing emotional and psychological support to students and perceived this as their most effective skill (see Table 1). These mentors provided such support through many Zoom communication interactions, which were among the tools described in this article as effective for creating personal connections online. Many mentors felt that using Zoom was as effective for positive mentor/student interaction as meeting in person. A mentor explained benefits:

The ability to meet with our virtual student on Zoom . . . was superior [to a phone conversation] because we were able to see each other as we met, which added an important component to our ability to communicate with each other. She . . . could have been in the same room with me as far as the communication was concerned Because of Zoom, our ability to connect with our students and communicate with them is actually enhanced.

Thus Zoom interaction removed the distance between mentors and students that sometimes exists in online mentoring.

Zoom provided mentors with a tool to connect with a student who needed program support. One mentor shared:

There was a [student] who was about 70 years old. She didn't know how to use the web apps. Using the Zoom tool, I guided her to solve her questions. I did it twice. Then she did the rest of the semester by herself.

With Zoom, mentors engaged with students online to help them gain confidence. Mentors reported how struggling students were able to share their difficulties with them via Zoom after class meetings or on other Zoom calls (Homitz & Berge, 2008). As one mentor described the interaction, “The student was willing to open up virtually after everyone left the group. That would not have happened in a face-to-face environment.” Accessibility was another Zoom benefit, as mentors were able to arrange to meet with students on Zoom whenever they needed support (Thompson et al., 2010). While some students did require more mentor time, this study validated other mentoring research showing that quality, rather than quantity, interaction matters most in mentoring relationships (Hernandez et al., 2017; Poor & Brown, 2013).

Personalizing Goal Setting for the Online Student

Mentors have a difficult challenge in personalizing goals for online students because they do not have in-person interaction or observation to assist them in providing that support. This challenge of the online interaction likely contributed to the finding of the second research question that 43% of mentors rated themselves *moderately effective* at setting goals

and planning for after-Pathway options. Although the confidence expressed in this result was not as high as that expressed in the first research question, this finding supported the mentoring domain of Nora and Crisp (2007) establishing support for setting goals and choosing a career path in online mentoring. While a mentoring program may have recommended goals for its students (e.g., Pathway presenting a certificate of completion after three semesters and encouragement for advancing to university studies), this result showed the importance of mentors encouraging goals of the institution while also supporting goals of the individual, as did mentors participating in the study. Research suggests that setting goals and planning for a student's future are some of the most important mentoring responsibilities (Ambrose & Williamson Ambrose, 2013; Halupa & Henry, 2015; Houck, 2011). One mentor explained the individualized nature of the goal setting process:

I meet with them personally in Zoom outside of the gathering to discuss what goals they have, their plan, [and] if there is anything I can do to help One thing [I learned my first year was] people [come] to Pathway for many reasons.

Mentors reported that encouraging students regarding goals and follow up was important if students were to accomplish the goals. While mentors reported that many of their Pathway students had advanced to full-time university studies through goal planning, which is one of the objectives of the Pathway program, mentors were equally enthusiastic about sharing students' interim goals, which included strengthening their confidence, learning to use the computer, improving their English skills, finding better employment, and earning Pathway certificates.

Mentors also relied on class support to help students set and keep goals. They reported individual students' goals were strengthened by discussions about goals and future options in the online gathering class and in social media groups (e.g., WhatsApp) where they affirmed goals and future options for their students in a group setting. One mentor shared this mentoring philosophy: "We overwhelm them with hope and the idea that everything is possible. Excellence is the road we're on—not the destination."

Differentiating Online Role Modeling

Concerning the third research question, how mentors could become role models for their students, almost 42% of them said this responsibility was *somewhat easy*, while 29% said it was *extremely easy*, the highest number of these confident responses in the survey confirming Nora and Crisp's (2007) mentoring domain of online role modeling. Significant research has established the importance of role modeling in mentoring (Bear & Jones, 2017; Bowser et al., 2014; Healy et al., 2012; Poor & Brown, 2013), but little research differentiates online role modeling. Results of this study show the function of role modeling similar in online and traditional mentoring: to provide guidance to students, to encourage students to be successful in academic pursuits, and to help students see a vision for their academic and professional future (Barbuto et al., 2011; Poor & Brown, 2013).

But this study showed additional technical and planning skills needed for effectively providing these mentoring roles for students in the virtual environment: (a) learning Zoom technology, (b) logging on early to have informal Zoom conversations with students before the weekly student class, (c) participating in the breakout Zoom sessions to share personal experiences, and (d) meeting with students outside of class through Zoom as needed. Some used additional contact methods such as WhatsApp groups or more traditional email or telephone calls, which research shows further strengthens mentoring relationships (Thompson et al., 2010). One mentor described the flexibility of the online role model experience:

On occasion we have to be out of town. With the on-site groups that requires a substitute. . . . The virtual option, in contrast, allows us to attend the gathering from anywhere. We have convened the meeting while in India, Virginia, and Alaska. . . .

We have promoted that “can do” attitude and we’ve seen [the students] follow suit.

As online role models, Pathway mentors had the benefit of being able to be consistently engaged with their students throughout the semester, regardless of location or circumstances. Improved access to and ease of student interaction for role models (Braun & Zolfagharian, 2016; Sanyal & Rigby, 2017) is another important advantage for online mentors.

Overcoming Technology Challenges

Mentors in this study cited technology challenges as their greatest area of difficulty, with almost 20% rating their ability to use technology to help students as *somewhat difficult*. Providing responses to the fourth research question, mentors shared mixed messages about the benefits and challenges of online mentoring when navigating technological tools. The results supported our fourth form of technology challenges in online mentoring that mentors need to overcome to successfully assist students. Along with experiencing many affordances for online mentoring, individuals also struggled with technology in fulfilling their mentoring roles.

The limited research available on online mentors’ technology training claims that mentors who do not feel skilled in technology practices may not encourage participants (Ambrose & Williamson Ambrose, 2013; Williams et al., 2012). Pathway mentors who were not confident in their skills requested additional training to teach them the technology skills they were lacking. In contrast to research showing that mentors with inadequate technology skills did not encourage participants, mentors in this study who needed help with technology asked students to assist them in solving technology problems. By asking for help and engaging students, they improved class unity in as well as their relationship with students. Research by Boston and Ice (2011) demonstrated that this confidence in students builds trust in the mentoring relationship.

This study also validated research showing that mentors benefit from technology skills learned through the mentoring process (Homitz & Berge, 2008). While some mentors had previous experience with online tools, many learned to use Zoom and other tools as mentors and were able to teach students what they had learned to help these students successfully participate in online learning. The data showed that the online experience, including the challenges, provided mentors with significant mentoring opportunities to help students in ways that they would not have experienced similarly in in-person mentoring environments.

Contributions of Findings to Literature

Online Mentoring Benefits for the Nontraditional Students

Consistent with mentors in this study perceiving their greatest strength as providing emotional and psychological support for students, for the students who might have difficulty in a traditional in-person university classroom, advantages of mentoring support in an online learning environment could be significant. One mentor shared how support for an online student with emotional challenges made a difference in his educational and personal life:

We had one student who suffers from extreme anxiety and had not left his house for over two years. He felt stuck and trapped, and he was—literally and emotionally. The Pathway program, even in virtual form, allowed him to come and be accepted by our group of students. They reached out to him, accepted him and his limitations, as did

we as [mentors], [caring about] him, conversing and building a strong relationship of support over WhatsApp and the gathering. He has since obtained counseling, and being successful in the program has spurred him on in his personal life as well. He is doing very well, has left his house on some adventures, and is a contributing part of our group, although he still cannot show his face and uses only the audio part to communicate with us.

Another mentor shared how personal awareness for a nontraditional student's individual needs helped her maintain her educational progress:

One of our students was a refugee from Iran. She saved her own life by escaping to Turkey. However, the scars from that experience made her very cautious and suspicious of people, especially those she did not yet know. This was evident from the start as she held back in the gatherings and was not as engaged as she needed to be to do well with the academic assignments. About three weeks into the semester, she was late joining a gathering. As the gathering was starting, [I asked her to share her experience with the group]. As we talked about her experience, it was amazing how many of our students had had similar experiences with an oppressive regime in their respective countries and how it had affected them. When she did come online that night, the group collectively encouraged her in her efforts both in and outside the gathering. She became a wonderful member of the group, eventually coming out of her shell and taking a most impressive lead role in much of what the group did from that time on.

In the online environment, often recognized for anonymity, mentors may actually become more cognizant of individual students' needs. These needs may be more visible in individual profiles in the online environment and in online interaction, providing mentors with opportunities to aid and engage students beyond those available in a traditional classroom.

Technology Challenges That Influence Mentoring Challenges

In this study, using technology was the most difficult challenge identified in the survey, causing problems in different mentoring areas. For example, mentors who reported effectiveness in online role modeling needed good technical skills to establish role modeling relationships with online students: (a) being proficient in Zoom, (b) successfully holding Zoom meetings with students before, after, and outside of class, and (c) knowing how to participate in class breakout Zoom sessions. Even if participants still rated themselves high in other mentoring areas, insufficient technical skills could minimize their overall effectiveness (Neely et al., 2017). Results of mentors reporting significant technology challenges in this study showed that mentoring programs, particularly online mentoring programs, cannot disregard the importance of well-planned and consistent technology training to their overall program efficacy.

Online Mentoring Role Adoption

An important finding of this study was how quickly online mentors can learn mentoring responsibilities; 65% of participating mentors had been online mentors for eight months or less. Although more than 60% of study mentors had had previous experience as in-person mentors, a significant part of online mentoring, as shown by answers to research questions in this study, requires understanding how to interact with students online and navigating the technological challenges of an online class. While study results indicated that mentors would benefit from more technology training (Homitz & Berge, 2008; Williams et al., 2012), 59% reported that their ability to use technology in an online environment was

somewhat easy or *extremely easy*. One mentor said, “When I know how to use the tech tools effectively, the students trust they have a resource at their disposal to help them be successful in their assignments.” As online higher education programs continue to increase worldwide, education leaders can benefit from this study in gaining confidence that online mentors can quickly engage and learn necessary mentoring and technology skills to support students.

Limitations of the Study

While survey responses are representative of the sample group, online mentoring experiences differed among mentors. A total of more than 2,500 mentors participated in in-person or virtual Pathway, resulting in a diversity of mentoring experiences. Mentoring may be experienced differently depending on the geographic area, participation format (in-person or virtual), and mentor background, including past mentoring experience, training received, and students mentored.

In the study, online mentoring experiences were different depending on age, location, gender, nationality, ethnicity, educational and professional background, mentor partner, and other factors. While many Pathway student needs were typical of a higher education mentor’s responsibilities and could be standardized in online mentoring, some needs were unique to areas where the students lived, and individual students’ needs were different in every online class. Another consideration is that these survey questions asked about self-perceptions from mentors. Different outcomes may have been reported from questions related to objective measures.

The Pathway higher education program has religious principles as part of its core values and training, which may not apply to other higher education programs. The mentoring commitment resulting from mentors’ volunteer participation in the Pathway program as part of their religious service also may not be transferable. Similarly, a connection between mentors and students due to shared religious values strengthens the mentoring relationship. In the Pathway program, mentors and instructors may be in contact on behalf of students, but mentors are more likely to encourage students to personally contact instructors directly with issues that arise. Other programs may have more formal or more frequent contact between mentors and instructors. Limitations also include that the survey was conducted by email and was available over a limited two-week period.

Conclusion and Recommendations

This survey research study analyzed quantitative and qualitative responses from 143 mentors from around the world participating in a global higher education initiative.

Contributions

The study results supported three domains suggested by Nora and Crisp (2007): (a) providing psychological or emotional support, (b) setting goals and choosing a career path, and (c) acting as role model (p. 342). We included an additional domain, dealing with technology challenges in online mentoring.

This study also provided support for other studies that have used the Nora and Crisp (2007) model demonstrating that mentoring can improve student success (Henry et al., 2011; Hu & Ma, 2010). Of the four mentoring domains studied, online mentors perceived themselves as most successful at providing emotional and psychological support for students. Study results (a) provided strategies for effective mentoring in student goal setting, (b) established characteristics of an online role model, and (c) showed the importance of online mentor confidence in gaining

technology skills. The study also contributed to the literature concerning online mentoring benefits for nontraditional students and online mentoring role adoption.

Recommendations

Discussion of online mentoring in previous literature has not provided adequate guidance for those developing online mentoring programs. As online learning opportunities in higher education increase worldwide, with urgency in wake of the COVID-19 crisis, higher education must prepare effective, not just adequate, online learning and mentoring for students. As students have opportunities to take some or all of their university classes online, they will expect a continuing increase in quality of courses, ease of access, and standards of technology (Seaman et al., 2018). Online mentoring will become increasingly important to higher education institutions for retaining online students.

Implications for Practitioners

This study provides specific recommendations for online mentoring programs, identifying potential mentors and developing mentoring policy and training along with suggestions for online mentors for improving their skills. First-person mentor examples demonstrate effective interaction with students while providing mentoring assistance.

Mentors need to identify ways to support students outside the virtual classroom, particularly those with personal, family, and academic concerns. This includes proactively helping students set goals at crucial moments in the education process and also finding opportunities to assist in setting interim goals. Opportunities for role modeling provided by technology include easier access to students for sharing personal experiences. Mentors can request technology training to improve technology skills. As research shows that students are more engaged with mentors who are involved with them through more than one communication tool (Rees Lewis et al., 2015), mentors can identify and use multiple communication methods that connect best with their students to improve their mentoring relationships.

Implications for Future Research

This study provides insights for improving online mentoring for higher education students; however, more research is needed since this study involved only 143 mentors in a single online higher education program. A larger quantitative survey of more mentors in multiple higher education programs could provide a greater quantity and diversity of data regarding mentor practices. Also this study did not collect any student data. Future studies could collect student data to compare with mentor responses on mentoring effectiveness. Regarding prior experience, 65% of the mentors in this study had begun their service at the beginning of 2019 or afterwards. Future studies could compare how long-term mentoring affects mentor skills. Because this study was survey research, responses provided brief insights into mentoring practices; additional qualitative research on online mentoring would provide more in-depth insights into how mentors help students. As online higher education programs continue to increase (Bettinger et al., 2017; Seaman et al., 2018), the need for more research-based mentoring in these programs increases (Purcell, 2004). Studies of effects and needs caused by COVID-19 on higher education should include the impact of mentoring in helping students navigate their online education during the pandemic.

In addition, this study investigated mentors as part of a unique religious program that connected willing volunteers to learners seeking to transition into higher education. While the specifics of this mentoring program developed by a religious institution may have limited transferability to other situations, we consider the insights gained from this study to be

relevant since volunteer mentors not otherwise connected to the course or academic institution can provide powerful emotional and academic support to students. Such volunteer mentors create a powerful community of engagement that supports and sustains students outside of the classroom community (see Borup et al., 2020). This idea could be developed in other settings by seeking and training volunteer mentors from various religious, community, and social service institutions. Thus future studies may explore developing similar volunteer mentoring programs and comparing their results to those described in this paper.

As advances in online education are changing the definition of effective mentoring, reexamination seems to be necessary. In addition to removing geographic boundaries and synchronous constraints on communication, online mentoring adds multiple interactions to the standard for successful mentoring. Online mentors and students can expect to interact through Zoom, email, and social media platforms as multifaceted media choices offer enhanced mentoring relationships. More studies are needed on the impact of these multiple mentoring interactions and their effects on the definition of mentoring. A more comprehensive understanding of online mentoring provides support for mentors who are seeking direction for improving their performance along with recommendations for institutions that are creating or improving their mentoring programs.

Mentoring research and the results of this study show an emerging trend for higher education student support through effective mentoring, which includes several sources ranging from instructors who provide content support, to advisors who provide academic support, to mentors who provide emotional support (Gravel, 2012), enabling higher education institutions to meet the range of student needs both in traditional classrooms and online. Providing students with effective mentoring is important to ensure students have the emotional support they need for improved retention and persistence. More research is needed concerning online mentor training, including improved technology instruction; what training would be most helpful to online mentors warrants further investigation. Online mentoring can provide valuable support for higher education students by providing them with tools and opportunities they need to succeed.

Declarations

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author(s) received approval from The Institutional Review Board on Human Subjects at Brigham Young University, USA for this study.

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Sloan Consortium. (ED541571). ERIC.
<https://files.eric.ed.gov/fulltext/ED541571.pdf>
https://doi.org/10.1007/978-3-319-141886_2
- Ambrose, G. A., & Williamson Ambrose, L. (2013). The blended advising model: Transforming advising with ePortfolios. *International Journal of ePortfolio*, 3(1), 75–89.
- Barbuto, J. E., Story, J. S., Fritz, S. M., & Schinstock, J. L. (2011). Full range advising: Transforming the advisor–advisee experience. *Journal of College Student Development*, 52(6), 656–670. <https://doi.org/10.1353/csd.2011.0079>
- Bear, S., & Jones, G. (2017). Students as protégés: Factors that lead to success. *Journal of Management Education*, 41(1), 146–168. <https://doi.org/10.1177/1052562916658688>
- Bettinger, E. P., Fox, L., Loeb, S., & Taylor, E. S. (2017). Virtual classrooms: How online college courses affect student success. *American Economic Review*, 107(9), 2855–285575. <https://doi.org/10.1257/aer.20151193>
- Bierema, L. L., & Merriam, S. B. (2002). E-mentoring: Using computer mediated communication to enhance the mentoring process. *Innovative Higher Education*, 26(3), 211–227.
- Bolliger, D. U., & Inan, F. A. (2012). Development and validation of the online student connectedness survey (OSCS). *The International Review of Research in Open and Distributed Learning*, 13(3), 41–65. <https://doi.org/10.19173/irrodl.v13i3.1171>
- Borup, J., Graham, C. R., West, R. E., Archambault, L., & Spring, K. J. (2020). Academic communities of engagement: An expansive lens for examining support structures in blended and online learning. *Educational Technology Research and Development*, 68(2), 807–832. <https://doi.org/10.1007/s11423-020-09744-x>
- Boston, W. E., & Ice, P. (2011). Assessing facilitator performance as an influence on student satisfaction. *Online Journal of Distance Learning Administration*, 14(2), 1–5.
- Bowers, J., & Kumar, P. (2015). Students' perceptions of teaching and social presence: A comparative analysis of face-to-face and online learning environments. *IJWLTT*, 10(1), 27–44. <https://doi.org/10.4018/ijwltt.2015010103>
- Bowser, A., Hux, A., McBride, J., Nichols, C., & Nichols, J. (2014). The roles of site-based mentors in educational leadership programs. *College Student Journal*, 48(3), 468–472.
- Braun, J., & Zolfagharian, M. (2016). Student participation in academic advising: Propensity, behavior, attribution and satisfaction. *Research in Higher Education*, 57(8), 968–989. <https://doi.org/10.1007/s11162-016-9414-2>

Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In C. Willig & W. S. Rogers (Eds.), *The SAGE handbook of qualitative research in psychology* (pp. 843–860). Sage.

BYU-Pathway Worldwide. (2019, April 1). <https://www.byupathway.org>

BYU-Pathway Worldwide, (2021, October 1). *Facts and Stats*, <https://www.byupathway.org/facts-stats>

Cass, D., & Hammond, S. (2014). Bridging the gap: Technology and veteran academic success. *Online Learning*, 19(1). <http://dx.doi.org/10.24059/olj.v19i1.517>

Dawson, P. (2014). Beyond a definition: Toward a framework for designing and specifying mentoring models. *Educational Researcher*, 43(3), 137–45. <https://doi.org/10.3102/0013189X14528751>

Ensher, E. A., Heun, C., & Blanchard, A. (2003). Online mentoring and computer-mediated communication: New directions in research. *Journal of Vocational Behavior*, 63(2), 264–288. [https://doi.org/10.1016/S0001-8791\(03\)00044-7](https://doi.org/10.1016/S0001-8791(03)00044-7)

Fink, A. (2003). *The survey handbook*. Sage.

Gravel, C. A. (2012). Student-advisor interaction in undergraduate online degree programs: A factor in student retention. *NACADA Journal*, 32(2), 56–67.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage.

Halupa, C., & Henry, M. (2015). Using VineUp to match students with alumni industry mentors in engineering: A pilot study. *International Journal of Higher Education*, 4(4), 105–112. <https://doi.org/10.5430/ijhe.v4n4p105>

Hamilton, B. A., & Scandura, T. A. (2003). E-mentoring: Implications for organizational learning and development in a wired world. *Organizational Dynamics*, 31(4), 388–402. [https://doi.org/10.1016/S0090-2616\(02\)00128-6](https://doi.org/10.1016/S0090-2616(02)00128-6)

Healy, M. A., Lancaster, J. M., Liddell, D. L., & Stewart, D. L. (2012). The role of the campus professional as a moral mentor. *New Directions for Student Services*, 2012(139), 83–92. <https://doi.org/10.1002/ss>

Henry, J., Bruland, H. H., & Sano-Franchini, J. (2011). Course-embedded mentoring for first-year students: Melding academic subject support with role modeling, psycho-social support, and goal setting. *International Journal for the Scholarship of Teaching and Learning*, 5(2). <https://doi.org/10.20429/ijstl.2011.050216>

Hernandez, P. R., Estrada, M., Woodcock, A., & Schultz, P. W. (2017). Protégé perceptions of high mentorship quality depend on shared values more than on demographic match. *Journal of Experimental Education*, 85(3), 450–468. <https://doi.org/10.1080/00220973.2016.1246405>

Homitz, D. J., & Berge, Z. L. (2008). Using e-mentoring to sustain distance training and education. *The Learning Organization*, 15(4), 326–335. <https://doi.org/10.1108/09696470810879574>

Houck, C. (2011). Multigenerational and virtual: How do we build a mentoring program for today's workforce? *Performance Improvement*, 50(2), 25–30. <https://doi.org/10.1002/pfi.20197>

Jacobi, M. (1991). Mentoring and undergraduate academic success: A literature review. *Review of Educational Research*, 61(4), 505–532. <https://doi.org/10.3102/00346543061004505>

Jansen, H. (2010). The logic of qualitative survey research and its position in the field of social research methods. *Forum: Qualitative Social Research*, 11(2). <https://doi.org/10.17169/fqs-11.2.1450>

Johnson, N., Veletsianos, G., & Seaman, J. (2020). U.S. faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning*, 24(2). <http://dx.doi.org/10.24059/olj.v24i2.2285>

Krause, J., Dias, L. P., Schedler, C., Krause, J., Dias, L. P., & Schedler, C. (2015). Competency-based education: A framework for measuring quality courses. *Online Journal of Distance Learning Administration*, 18(1), 1–9. <https://doi.org/10.1080/02701367.2016.1213610>

Lenear, P. E. (2007). E-mentoring interaction models. [Paper presentation]. International Research Conference in the Americas of the Academy of Human Resource Development, Indianapolis, IN. <https://eric.ed.gov/?id=ED504399>

Murphy, W. M. (2011). From e-mentoring to blended mentoring: Increasing students' developmental initiation and mentors' satisfaction. *Academy of Management Learning and Education*, 10(4), 606–622. <https://doi.org/10.5465/amle.2010.0090>

Natanson, H. (2020, November 24). Failing grades spike in Virginia's largest school system as online learning gap emerges nationwide. *The Washington Post*. https://www.washingtonpost.com/local/education/fairfax-schools-more-failing-grades/2020/11/24/1ac2412e-2e34-11eb-96c2-aac3f162215d_story.html

Neely, A. R., Cotton, J., & Neely, A. D. (2017). E-mentoring: A model and review of the literature. *AIS Transactions on Human-Computer Interaction*, 9(3), 220–242. <https://doi.org/10.17705/1thci.00096>

Nora, A., & Crisp, G. (2007). Mentoring students: Conceptualizing and validating the multi-dimensions of a support system. *Journal of College Student Retention*, 9(3), 337–356.

Ormston, R., Spencer, L., Barnard, M., & Snape, D. (2014). The foundations of qualitative research. In J. Ritche, J. Lewis, C. McNaughton Nicholls, & R. Ormston (Eds.), *A guide for social science students and researchers*. SAGE.

Poor, C. J., & Brown, S. (2013). Increasing retention of women in engineering at WSU: A model for a women's mentoring program. *College Student Journal*, 47(3), 421–428.

Purcell, K. (2004). Making e-mentoring more effective. *American Journal of Health-System Pharmacy*, 61(3), 284–286. <https://doi.org/10.1093/ajhp/61.3.284>

Rees Lewis, D., Harburg, E., Gerber, E., & Easterday, M. (2015). Building support tools to connect novice designers with professional coaches. In *Proceedings of the 2015 ACM SIGCHI Conference on Creativity and Cognition* (pp. 43–52). ACM Press.
<https://doi.org/10.1145/2757226.2757248>

Sanyal, C., & Rigby, C. (2017). E-mentoring as a HRD intervention: An exploratory action research study within an international professional mentoring scheme. *Human Resource Development International*, 20(1), 18–36. <https://doi.org/10.1080/13678868.2016.1220156>

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. The Babson Survey Research Group.

Shandley, T. C. (1989). The use of mentors for leadership development. *NASPA Journal*, 27(1), 59–66. <https://doi.org/10.1080/00220973.1989.11072135>

Shrestha, C. H., May, S., Edirisingha, P., Burke, L., & Linsey, T. (2009). From face-to-face to e-mentoring: Does the “e” add any value for mentors? *International Journal on Teaching and Learning in Higher Education*, 20(2), 116–124.

Spradley, J. P. (1979). *The ethnographic interview*. Holt, Reinhardt & Winston.

Stake, R. E. (2010). *Qualitative research: Studying how things work*. Guilford Press.

Thompson, L., Jeffries, M., & Topping, K. (2010). E-mentoring for e-learning development. *Innovations in Education and Teaching International*, 47(3), 305–315.
<https://doi.org/10.1080/14703297.2010.498182>

Tyran, K. L., & Garcia, J. E. (2015). Reciprocal learning and management education: The example of using university alumni and other business executives as “virtual” mentors to business students. *Journal of the Academy of Business Education*, 16, 54–72.

U.S. Department of Education ED COVID-19 Handbook (2021)
<https://www2.ed.gov/documents/coronavirus/reopening-3.pdf>

Williams, S., Sunderman, J., & Kim, J. (2012). E-mentoring in an online course: Benefits and challenges to e-mentors. *International Journal of Evidence Based Coaching and Mentoring*, 10(1), 109–123.

Xu, D., & Jaggars, S. (2013). Adaptability to online learning: Differences across types of students and academic subject areas. Columbia University, Community College Research Center. <https://doi.org/10.7916/D82N59NB>

Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage.

Appendix A

Survey Instrument

1. Which is your students' geographic area? (multiple choice)
 - Africa Southeast, Africa West, Middle East, Africa North Area
 - Asia, Asia North and Philippines Area
 - Brazil Area
 - Caribbean and South America South Area
 - Europe, Europe East and Pacific Area
 - Mexico Area
 - North America: Central or Idaho Area
 - North America: Southeast or Northeast Area
 - North America: Southwest Area
 - North America: West or Northwest Area
 - North America: Utah Area
 - South America Northwest and Central America Area
2. Which is your geographic area? (multiple choice)
 - Africa Southeast, Africa West, Middle East, Africa North Area
 - Asia, Asia North and Philippines Area
 - Brazil Area
 - Caribbean & South America South Area
 - Europe, Europe East and Pacific Area
 - Mexico Area
 - North America: Central or Idaho Area
 - North America: Southeast or Northeast Area
 - North America: Southwest Area
 - North America: West or Northwest Area
 - North America: Utah Area
 - South America Northwest and Central America Area
3. When did you begin your first term as a virtual Pathway mentor? (multiple choice)
 - April 2019
 - January 2019
 - September 2018
 - April 2018
 - January 2018
 - 2017 or earlier
4. Have you served previously as a face-to-face [mentor]? yes/no
5. Please rate (1–5) your ability to provide emotional support for students in the virtual PathwayConnect program.
 - 5a (Responses 1, 2). Please share an experience when you were not able to provide student support needed and why.
 - 5b (Responses 4, 5). Please share an experience when you were able to provide student support needed and why.

6. Please rate (1–5) your ability to help students set goals and see after-Pathway options.
 - 6a (Responses 1, 2). Please share an experience when you found the virtual PathwayConnect experience made it difficult to help students set goals and see after-Pathway options and why.
 - 6b (Responses 4, 5). Please share an experience when you were able to help students set goals and see after-Pathway options in the virtual PathwayConnect experience and why.
7. Please rate (1–5) your ability to be a role model for students in the virtual PathwayConnect program?
 - 7a (Responses 1, 2). Please share an experience when you found the virtual PathwayConnect experience made it difficult to be a role model.
 - 7b (Responses 4, 5). Please share an experience when you were able to be a role model in the virtual PathwayConnect experience.
8. Please rate (1–5) your ability to use technology effectively in the virtual PathwayConnect program.
 - 8a (Responses 1, 2). What additional training would help you resolve any technology challenges? (Be specific.)
 - 8b (Responses 4, 5). How were you able to use technology to help virtual students achieve their educational goals?

Advancing Sociotechnical-Pedagogical Heuristics for the Usability Evaluation of Online Courses for Adult Learners

Isa Jahnke

Nathan Riedel

Kanupriya Singh

Joi Moore

University of Missouri-Columbia, USA

Abstract

Online courses often include interface designs that do not support a positive learner experience. Literature shows a variety of heuristics to detect issues of online courses. While heuristic-based inspection of usability is a dominant method for evaluating digital systems, these methods cannot be easily transferred to online courses. To close this gap, we identified an initial set of social, technical, and pedagogical related items (STP) heuristics based on literature. Next, we analyzed this set using empirical data from two online courses. In total, we analyzed 195 problems with the goal to substantiate a final set of 14 STP heuristics. This new set allows for efficiently evaluating online courses by supporting evaluators and instructional designers in uncovering the most crucial issues and improving the learner experience. Finally, based on this work, we discuss a definition of learner experience for the emerging field of learner experience design and research.

Keywords: online courses, evaluation, heuristics, online learning, adults, sociotechnical-pedagogical usability

Jahnke, I., Riedel, N., Singh, K. & Moore, J., (2021). Advancing sociotechnical-Pedagogical Heuristics for useability evaluation of online courses for adult learners. *Online Learning*, 25(4), 416-439. DOI: 10.24059/olj.v25i4.2439

Online courses are built with technology, such as Learning Management Systems (LMS) and course authoring tools, that include basic templates that allow some flexibility with the design of the course. The ease of use of such systems is important for supporting a positive experience for the learner, and Nielsen's usability heuristics (Nielsen, 1994) are helpful for understanding the usability of a system and its efficiency, error frequency, and error severity (Botella, Rusu, Rusu, & Quiñones, 2018; Khajouei, Gohari, & Mirzaee, 2018; Sauro, 2014; Stone, Jarrett, Woodroffe, & Minocha, 2005). These methods aim to improve the user experience, which can lead to better engagement with the content. This is important as Demmans Epp, Phirangee, Hewitt, & Perfetti (2020) show that the quality of the system design and course type (student-centered vs. teaching-centered) impact student behavior, experiences, and learning outcomes.

However, as shown by Nokelainen (2006) pedagogical usability is not sufficiently addressed when evaluating online course systems. Moore, Dickson-Deane, & Liu (2014) argue that the traditional technological usability evaluation is not sufficient, and that pedagogical usability is more relevant for learning environments. Other researchers confirm the importance of pedagogical usability (e.g., Horila, Nokelainen, Syvänen, & Överlund, 2002; Lim & Lee, 2007; Quinn, 1996; Reeves, 1994; Silius & Tervakari, 2003).

In addition, a factor that is overlooked and often not considered for the evaluation of online courses is the social dimension. Learning is a social effort, and meaningful online learning is embedded into social group activities (Jahnke, 2015). Learning is dependent on social relations with teachers and peers, as some researchers express the need for humanizing the online space (Jahnke, 2015). Social interactions and social roles are equally important to foster human-centered learning processes. Garrison, Anderson, and Archer's (2003) framework of social, cognitive, and teaching presence indicates the importance of the social dimension as it shows how discussion boards and chats support direct replies and foster learners' interaction. From this perspective, we propose to evaluate the quality of online courses through the lens of the three dimensions of social, technological, and pedagogical usability. To empirically study an advanced set of sociotechnical-pedagogical (STP) usability heuristics, we examined online courses. We first predefined a set of STP heuristics grounded in literature, then applied them to online courses. This paper presents the results.

The research question was: To what extent is it possible to develop a concise set of sociotechnical-pedagogical heuristics (STP heuristics), and what is the quality of the heuristics when applying them to online courses?

Review of Related Work

Usability of online courses is measured by the learner's interaction with the learning management system (LMS) that also includes the course organization, material presentation, sociability, and other elements of the LMS. Studies have shown the importance of evaluating the usability of online courses; however, studies have used different perspectives (Dringus & Cohen, 2005; Mayer, 2002; Reeves, 1994). There exists a gap between the social, technological, and pedagogical usability aspects of online courses. According to Guo, Kim, and Rubin (2014), some perspectives include the technical or the pedagogical approach to course usability. Nokelainen (2006) focused on the social and pedagogical aspects of online courses.

Heuristics in General

Heuristics are used to evaluate the user-friendliness and usability level of digital systems. A heuristic evaluation uses a set of items and applies them to a certain system or technology with the goal of detecting potential issues for the purpose of improving the technology and the user experience (e.g., Nielsen, 1994). A prominent heuristic tool developed by Nielsen (1994) includes a set of 10 heuristics to guide designers in detecting technological usability problems in systems.

Recently, in the field of online courses, effective design indicators have been developed. Design and evaluation instruments, such as Quality Matters, digital didactical designs, and the 12 principles of multimedia learning (Quality Matters, 2018; Jahnke, 2015; Mayer, 2002) work as a rule of thumb when creating online courses. For example, Quality Matters contains eight general items, each broken down into more detailed items, that guide education professionals in aligning learning objectives, activities, and learner support (Quality Matters, 2018). Such guidelines allow for quick, high-quality course design.

Technological, Pedagogical, and Social Usability Heuristics

Nielsen and Loranger (2006) define usability as “how quickly people can learn to use something, how efficient they are while using it, how memorable it is, how error-prone it is, and how much users like using it. If people can’t or won’t use a feature, it might as well not exist” (p. xvi). Usability focuses on the optimization of user interaction with the interface to enable the user to perform typical tasks. It also includes the evaluation of aesthetic features to support a positive user experience with the system. In this study, we refer to this kind of usability of the interface interaction as *technological usability*. For example, in online courses, learners interact with the interface features of a learning management system, such as navigating to resources, viewing grades, creating a post in the discussion board, submitting assignments, and so forth. The usability of the system can affect the learner experience and learning performance with the online course.

However, interface interaction (technological usability) alone may not explain the entire learner experience. The qualities of technology-related usability are not sufficient to guarantee that an online course leads to a positive learning experience for learners. The pedagogical and social aspects related to the design of the learning process, communication among students and teachers, purpose of learning, content arrangement, and learning strategies applied, all support the achievement of learning objectives and create meaningful learning experiences for learners (Jahnke, 2015; Lim & Lee, 2007). A concise set of social and pedagogical usability heuristics would unpack such aspects.

Social usability in this paper comprises the learner’s activities with other learners, such as computer-mediated communication with peers or interactions with the tools of the online course. Social usability focuses on human-human interactions supported by technology (Preece, 2001). Jahnke et al. (2005) showed the relevance of formal and informal role dynamics and how they affect learning or interactions, e.g., having access or not to certain tools or files in the course, or role changes during a certain time. Their study indicated that the evaluation of the LMS tools to support social dimensions of learning technologies has been neglected. Robinson, Sheffield, Phillips, and Moore (2017) found that social interactions in online courses have a positive impact on student perceptions. Similarly, studies of social usability in online courses have found that level of interactivity, social presence, and student characteristics in online courses significantly impact the online learning experience for students (Chen, Chang, Ouyang, & Zhou, 2018; Kaufmann, Sellnow, & Frisby, 2016; Martin & Bolliger, 2018; Orcutt & Dringus, 2017).

According to Silius and Tervakari (2003), *pedagogical usability* refers to whether the tools, content, interface, and tasks in an online learning environment support a variety of learners in achieving learning goals and objectives. Though pedagogical usability is less frequently studied than technical usability (Nokelainen, 2006), there exist pedagogical usability frameworks and heuristic checklists for evaluating online courses or web-based learning (Albion, 1999; Horila et al., 2002; Lim & Lee, 2007; Moore et al., 2014; Nokelainen, 2006; Quinn, 1996; Reeves, 1994; Silius & Tervakari, 2003; Squires & Preece, 1999). In their recent work, Yousef, Chatti, Schroeder, and Wosnitza (2018) demonstrate that effective learning design can improve pedagogical usability and make online courses more motivating for learners.

For this work we refer to Jahnke, Schmidt, Pham, & Singh (2020), who defined a conceptual framework of sociotechnical-pedagogical usability. Basically, we define sociotechnical-pedagogical usability with three dimensions that include the following elements:

Social: teacher or learner communication, collaboration or group learning, human interaction by means of digital tools, social presence, social roles/relationships

Technical: usability related to technological issues

Pedagogical: teaching or learning goals, student activities, assessment

To develop a new set of sociotechnical-pedagogical usability heuristics for online courses, we first applied a literature review before we tested the STP heuristics empirically (see Method section). For the literature review, thirty articles were reviewed in total. The research team contributed to the collection of articles. In general, articles were selected if they included the key words “online course usability,” “online course recommendations,” or “online course design principles.” In detail, articles about designing, evaluating, or improving online courses with a focus on social aspects of technology, use in education, or just pedagogy were selected. In addition, we looked at articles that consisted of different principles, heuristics, and guidelines ranging from system usability to pedagogical theories. Table 1 lists all 30 publications. The 30 articles from the literature review have been used to derive items for the development of STP heuristics.

Table 1
Breakdown of STP Heuristics Derived from Literature Review

Source (alphabetical order)	Year	STP	Items derived from literature	No. of items
Benson et al.	2002	P, T	Technology interactions, learning products adhere to widely recognized standards for technology/ software interactions.	17
Bloom	1956	P	Objectives are developed based on Bloom’s taxonomy.	1
Boyle	1997	T, P	Give learners controls (e.g., pause, go back, go forward, skip) to allow them to access the video at their own pace.	1
Chao, Saj, & Tessier	2006	P	Language use is consistent throughout the course.	4
Clement	1985	T	When presenting one topic/idea, follow the “rule of seven” guideline: present a maximum of seven pieces of content at a time.	1

Usability Evaluation of Online Courses for Adult Learners

Das	2012	P	Syllabus contains information regarding drop/withdraw/return policy.	1
Douglas	2017	T	Pages and sections mentioned in the instructions or throughout the course should include a link to provide shortcuts for efficient navigation.	1
Dringus & Cohen	2005	P	Content elements are presented in a logical sequence.	18
Fink	2012	P	Syllabus provides titles of assignments and relevant points.	1
Guo et al.	2014	P, T	Videos should display the instructor's talking head at opportune times.	4
Jahnke	2015	P, S	Learning activities are active and facilitate engagement via learner-content, learner-learner, and learner-instructor interactions.	21
Lenzner, Schnotz, & Müller	2013	P	If used, images should be relevant to learning content and enhance the knowledge acquisition.	1
Mayer	2002	P, S	People learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen.	8
Moore et al.	2014	P	Content can be organized using hierarchical classification.	12
Nielsen	1994	P	Users should not have to wonder whether different words, situations, or actions mean the same thing.	4
Nielsen	2004	T	Underlines are only used to indicate working links to relevant sections.	1
Nokelainen	2006	P, S	Authentic stories, anecdotes, emotion, or human conflict are used to engage learners and show real-world relevance when appropriate.	2
OLC	2018	P	Syllabus communicates expectations for students and discussion participation.	12
Obsidian Learning	2017	P, T	Keep videos short. However, video length should be governed by the nature and complexity of the content.	1
Quality Matters	2018	P, S	Information and instructions are provided regarding how the tools support the learning objectives or competencies.	35
Reeves et al.	2002	P, S	The interactivity with technology has meaningful learning purposes.	1
Reeves	1994	P	The objectives/goals of the course and each module are present so learners know what objectives/goals they can achieve.	4
Safie	2007	T	Technology is compatible with all devices.	1
Schade	2014	T	Users must be able to interact with videos as they often do in their daily lives, such as watching in full view or playing backward or forward.	1
Sims, Dobbs, & Hand	2002	P	The manner of submission for assignments/assessments is clear.	2
Stein & Graham	2014	P	Materials consistently indicate when activities or assessments take place on site versus online.	1
Stone et al.	2005	T	If something is important for the user, it should be placed in a prominent position.	5
van der Meij & van der Meij	2013	P, S	Draw attention to the interconnection of user actions and system reactions.	14
Van Merriënboer, Kirschner, & Kester	2003	P	Introduce new concepts by showing their use in context. In other words, knowledge is presented at the point when the user needs that information to perform the task.	1
Xavier University	2018	P, S	Syllabus contains information regarding the course summary or the main parts of the course.	13
Zhang, Zhou, Briggs, & Nunamaker	2006	P	Interactive video is preferred over non-interactive video.	1

Research team	Unpublished	T, P	Additional items are from previous user experience studies related to technology-enhanced learning (not found in literature): provide hierarchy of content, provide same page title, ensure page title and page content match, describe acronyms or abbreviations, and add navigation instructions.	5
<i>Total</i>				195

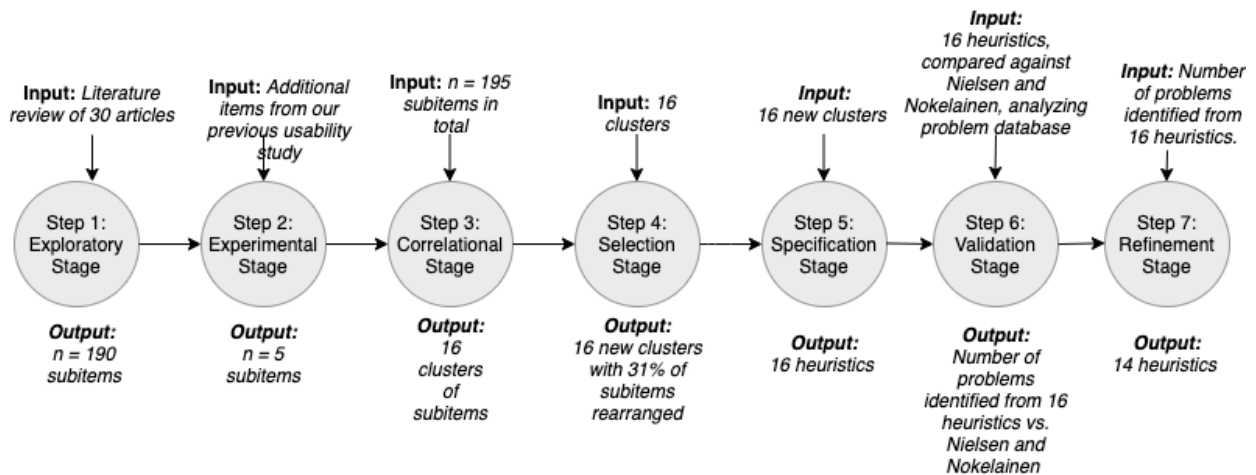
Note. $N = 195$. Items are principles or guidelines that were integrated into a new set of sociotechnical-pedagogical heuristics for online course usability evaluation (see Method section).

Method

The goal of the study was to develop and test key sociotechnical-pedagogical heuristics for evaluating and detecting issues in online courses. We applied the heuristic development methodology guided by Quiñones, Rusu, and Rusu (2018). They provide a roadmap to ensure quality, reliability, and validity when developing new heuristics. The final heuristic development framework of Quiñones et al. (2018) consists of eight steps. However, Quiñones et al. (2018) also stress that some steps may be omitted if they are unnecessary based on context or that some steps may overlap as they may need to occur simultaneously. Our method consisted of seven steps, as outlined in Figure 1. We describe the process and methods of each step in the following sections. This process led us to a final set of 14 heuristics that are described in the Results section.

Figure 1

Steps of developing and testing a new set of STP heuristics



Note. Steps are adapted from Quiñones et al. (2018)

In total, 13 research team members were involved in different phases of the project: three master students or interns in the study program of learning design & technologies, nine doctoral students of information science and learning technologies, trained in usability evaluation, and one expert; see Appendix A for details.

Steps 1 and 2: Exploratory and Experimental Stages

In Step 1, we collected 190 items from literature based on 30 articles (see Table 1). The 190 items from literature were collected by searching repeated patterns of social, technological,

and pedagogical principles in literature of online learning environments. Five members of the research team collected the literature. The members chose articles based on several criteria. Members searched for established instructional design guidelines (e.g., Quality Matters) and articles with outcomes that provided recommendations for instructional design (e.g., Nokelainen, 2006) or for the creation of instructional content (e.g., Fink, 2012). In addition, they searched for articles that focused specifically on the use of technology in education (Stein & Graham, 2014). In summary, criteria for the literature search included design guidelines or principles for designing online learning from social, pedagogical, or technological views. All articles were compiled in a shared, cloud-based document to ensure that no articles were duplicated. Step 2 in this study followed the experimental stage of Quiñones et al. (2018), which recommends adding additional items identified via specific features of the application, detected usability problems, and problems with existing heuristics. We added five items from our user experience tests from technology-enhanced learning environments that were not found in existing literature. In total, there were 195 items because of these two steps.

Steps 3–5: Correlational, Selection, and Specification Stages

In Step 3 (Correlation Stage), the 195 items were analyzed for correlation. The research team took the 195 items and matched them to similar items. In detail, after collecting a total of 195 items from the literature, printed versions of the items were posted on a whiteboard (see Figure 2). Then, team members collaboratively began placing items that addressed similar issues next to one another (e.g., aesthetic guidelines and course material guidelines). In the process of clustering relevant data, the team members began coding similar features as they appeared by naming each category. During this process, categories were consolidated or split based on whether the team members felt a category was too narrow or included too many topics. As similarities began to take shape, the team members suggested names for each category. Any item that did not fit one of the categories or required further details was placed in the center of the wall in a miscellaneous category; these items were discussed later and placed into an existing category or a new one was created. Once all the items were placed into categories, the items were then transferred into a *digital* list of 16 categories.

Figure 2

Initial categories of items displayed on a white board



In Step 4, Quiñones et al. recommend conducting a Selection Stage, in which heuristic developers keep, adapt, and/or discard the heuristics developed in the previous step. Hence, we

refined the collection of the 16 categories. In detail, the list with the 16 categories was sent off to a research group member who is an expert in technology-enhanced and online learning design and who was not involved in the clustering. This member then read the categories titles and their descriptions. In cases of non-agreement, she offered new title suggestions and definitions. Approximately 31% of the items were moved or re-organized. The result was a list of 16 partly revised categories.

Finally, in Step 5, research team members, who had two or three years of experience and solid skills in system usability evaluation, were asked to review the categories in order to recommend their own names and any suggestions for moving any items to a new category. If an item was disputed, they discussed its best placement until a unanimous agreement was reached. The team ensured that all miscellaneous items were meticulously discussed and assigned to a category. Each category was then named a *heuristic*. The result of Step 5 was a preliminary set of 16 heuristics, with names, that were iteratively developed bottom-up from coded items (Steps 1–5).

Steps 6 and 7: Validation and Refinement Stages

The next two steps focused on ensuring the quality of the 16 new STP heuristics. In Step 6 of this study, researchers applied two forms of validation methods, which are both recommended by Quiñones et al. (2018). The first validation method is called the expert review, in which the research team members took on the role of evaluators and applied the preliminary heuristics to detect problems in online courses. More specifically, to validate the 16 STP heuristics, we checked them against a problem database that included 144 problems from two online courses. (Details of the database development are in the next section.) Each of the 16 STP heuristics was assigned to the 144 problems identified in the two online courses. More than one heuristic could be applied to each problem. All 144 problems were put in a digital spreadsheet with their assigned heuristics. Three research team members conducted this procedure. Each researcher's set was then analyzed for interrater reliability using a Fleiss's Kappa test. If there was no consent, meaning all three members selected three different heuristics for the same problem, then they met to discuss their decisions. In a few cases, no consensus could be reached (see Results).

In the second validation method, the team compared the new STP heuristics with previously established heuristics sets of Nielsen (1994) and Nokelainen (2006). The Nielsen set was chosen because of its technology-centric heuristics and Nokelainen heuristics focus on pedagogical usability in technology-enhanced learning. According to Quiñones et al. (2018), the purpose of this form of validation is to determine whether the new heuristics are able to diagnose issues not identified by older heuristics.

The result includes a table (see Table 5) with problems identified using either the Nielsen-, the Nokelainen-heuristics, or the new STP set. Based on the results, we were able to refine the 16 heuristics into a final set of 14 STP heuristics. For the refinement stage, we assumed that heuristics assigned less frequently to the 144 problems could be merged. In addition, we applied plausibility and a content view, meaning if two or more heuristics addressed similar problems, they could be merged.

Problem Database

The problem database was developed based on user experience studies for two online courses. These two courses are titled *Master Gardener* and *Fire Service Instructor I*, and both are taught in Canvas. We describe the courses then the problem database.

Master Gardener was a 14-week online course offered by the extension division of a Midwestern university in the United States. The course was offered during Spring 2019 (January to May 2019) and focused on topics related to gardening. The course was designed for adult learners who wanted to advance their knowledge of horticulture and intended to become certified master gardeners. There were 60 to 70 students enrolled of various age ranges, mainly falling within categories of ages from 35 to 39, 40 to 49, and 50 years and older. These learners were largely from rural areas of a Midwestern state in the United States.

Fire Service Instructor I (FRTI-Instructor I) was a seven-week course offered by the extension division of Midwestern university in the United States. The course was designed for firefighters who wanted to pursue professional careers as firefighter instructors. The course was mainly online but had one face-to-face meeting in the first week, in which the instructor described the course process. Enrolled students met for a face-to-face session on the first day of the class from 8 am to 4 pm for class introduction, goals, and objectives of learning. The rest of the seven-week class was offered online. According to the instructor, an adult learner needed a total of 40 hours to complete the course and receive a certificate of completion. The online portion of class comprised of various learning activities, such as assignments, quizzes, and discussions.

Each course underwent a usability study to detect potential issues with the online course. The reports of these two studies were the foundation for developing the problem database. The database was created by utilizing the usability problems discovered in the two online courses. The database began as two online spreadsheets, one for each of the online courses. The Fire Service spreadsheet was developed by using an expert evaluation report that was conducted in May 2019. Each problem from this report was placed in the first spreadsheet of the database. The Master Gardener spreadsheet was created using the results of the interviews with the participants who were enrolled in the course. Problems that emerged from the interviews were placed in the second spreadsheet of the database. The two spreadsheets were then merged. In summary, the database consists of a mix of problems identified by experts and students.

Between the two courses, a total of 144 problems were identified, with 76 problems from the Fire Service Instructor course and 68 from the Master Gardener course. The identified problems ranged across issues. Some issues were related to the objectives and goals of the course while other problems related to the course content. Some problems referred to the system of the courses, such as action buttons or multimedia problems. Additional problems included page layout (e.g., font size) and lack of accessibility (e.g., the course not providing alt text for the pictures). Both spreadsheets together compose the problem database.

The list of all 144 problems can be accessed online at <https://sites.google.com/view/stp-heuristics/problem-database>. The problems are labeled with FS or MG to identify the course (FS = Fire Service Instructor; MG = Master Gardening).

Results

The 16 heuristics developed from the literature analysis are presented here followed by the refined STP heuristics that were analyzed with two online courses.

Results from Steps 1–2 and Steps 3–5

Overall, 190 literature items and 5 additional items from our previous studies (195 in total) have been used for the development of a new heuristics set. Following the process of steps 3, 4, and 5 as described in the Method section, the correlation (coding and clustering), selection, and specification led to the result of a preliminary set of 16 STP heuristics, as shown in Table 2.

The detailed list of the heuristics with all 195 coded items can be found at <https://sites.google.com/view/stp-heuristics/home>.

Table 2
The Preliminary 16 Heuristics

H #	Heuristic	S T P	Description	# of items	Typical examples
1	Social Presence	S	Refers to social aspects of the course (e.g., communication, social or teacher presence of instructor). It points to potential issues of instructor-student communication, in online discussion boards, or of student roles in teamwork.	9	1.4 The course provides learners with opportunities to access extended feedback from instructors, experts, peers, or others through e-mail or other Internet communications (Benson et al., 2002). 1.6 Instructor plays different roles (e.g., expert, mentor, coach, learning companion) (Jahnke, 2015).
2	(Group) Activities	S , P	Refers to (group) learning activities and assignments within the course. It points to potential issues of quality of learning activities (e.g., assignments), or activities that do not match learning objectives.	15	2.8 The course supports various modes of learning, including group activities (Dringus & Cohen, 2005). 2.11 The purpose of the activities is clearly stated so students understand how they tie into course objectives (Jahnke, 2015).
3	Easy to Use	T	Refers to technological usability. It points to potential issues of accessing course materials or completing activities (e.g., uploading files).	8	3.2 Users should not have to wonder whether different words, situations, or actions mean the same thing (Nielsen, 1994). 3.7 Users are able to edit their own and reply to others' messages in discussion posts (Dringus & Cohen, 2005).
4	Page Layout	T	Refers to the aesthetic design of an online course. It points to potential issues with font size, color, chunking of text (i.e., leaving white space in between sections of text), etc.	28	4.5 No extraneous or irrelevant information, visual noise, or unnecessary styles are present (Moore et al., 2014). 4.24 The design and presentation of information is consistent (e.g., layout, color, text size, text style, font) (Stone et al., 2005).
5	Ecosystem	T	Refers to the broader learning management system's capabilities. It points to potential issues with correct use of the menu function of the LMS or the organization of modules.	17	5.1 If the course includes links to external resources, the links are kept up to date (Benson et al., 2002). 5.4 Frequently used technology tools are easily accessed (Quality Matters, 2018).

6	Navigation	T	Refers to the design of navigation within the online course. It points to potential issues with searching for information, modules, or instructions in the LMS.	8	6.2 Course design enables learners to easily locate where they are within the course (Online Learning Consortium, 2018). 6.4 Related materials and resources are joined by hyperlink (Moore et al., 2014).
7	Functionality	T	Refers to functionality from the view of human-computer interactions. It points to potential issues of lack of feedback students receive from the system, or device compatibility.	10	7.3 The system is designed so that the learner recognizes when and where he/she has made a mistake (Nielsen, 1994). 7.9 Online resources open in new windows (Chao et al., 2006).
8	Accessibility	T	Refers to accessibility rules (e.g., ADA violations). It points to potential issues with accessibility rules (e.g., a lack of accessibility statements or direct links to institutional accessibility policies).	7	8.5 The course provides guidelines and/or Q&A for disabled students to seek technology and/or academic help (Quality Matters, 2018). 8.7 For accessibility, provide a means for the learner to access the text of the narration (van der Meij, 2013).
9	Diverse Material	P	Refers to material being used in the online course. It points to potential issues of having too much material be too similar (e.g., too many videos and no other types of materials), quality level of video narration, or repetitive content.	16	9.2 Tablet drawing tutorials (e.g., Khan-style table drawing tutorials) are more engaging than PowerPoint slide presentations with voice-over (Guo et al., 2014). 9.13 People learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen (Mayer, 2002).
10	Material Organization	P	Refers to how and when materials are arranged within the course. It points to potential issues of material being extraneous to the learning objectives of a module or too much information included per module.	15	10.6 Introduce new concepts by showing their use in context. In other words, knowledge is presented at the point when the user needs that information to perform the task (van Merriënboer, Kirschner & Kester, 2003). 10.7 Information and instructions are provided regarding how the tools support the learning objectives or competencies (Quality Matters, 2018).

Usability Evaluation of Online Courses for Adult Learners

11	Material Delivery	P	Refers to how material is presented to students (e.g., introducing concepts or providing questions for learners to consider). It points to potential issues of material not being properly scaffolded (i.e., introduced too early or late in the course) or being randomly added to modules.	7	11.2 One topic or idea is introduced at one time (Moore et al., 2014). 11.7 Content elements are presented in a logical sequence (Dringus & Cohen, 2005).
12	Material Quality, Interactive Material	P	Refers to the quality of material used (e.g., quality of videos, textbooks, open access). It points to potential issues with how materials allow users to interact with the content or how much cognitive load the material requires from the learner, or with how up to date material is.	13	12.1 “There is no extraneous processing in using materials, resources, and multimedia” (Moore et al, 2014). 12.5 “Interactive video is more preferred than non-interactive video” (Zhang et al., 2006).
13	Assessment	P	Refers to forms of assessment in the course. It points to potential issues with quality of assessments or timeframe for feedback on assessments.	17	13.2 Activities and assessments are adequate and reasonable for the course duration (Xavier University, 2018). 13.5 Ongoing assessments are conducted to verify the learner’s readiness for the next lesson (Jahnke, 2015).
14	Syllabus	P	Refers to the written syllabus being easy to find and having meaningful content. It points to potential issues of not finding the syllabus or it lacking relevant information.	7	14.2 Syllabus contains information regarding instructor presence and response time for assignments (Xavier University, 2018). 14.6 Course overview and/or introduction, includes pre-requisite knowledge in the discipline and/or any required competencies that are required for the successful completion of the course (Quality Matters, 2018).
15	Teaching/ Learning Goals	P	Refers to learning goals/objectives. It points to potential issues with quality of learning objectives and how they will be measured or conveyed to learners.	7	15.2. All learning objectives are stated clearly, written from the students’ perspective, and prominently located in the course (Quality Matters, 2018; Jahnke, 2015). 15.5. The objectives/goals of the course and each module are present so learners know what objectives/goals they can achieve (Reeves 1994).
16	Guidance	P	Refers to course information to guide students.	11	16.3 Information on how to get started is present and stands

It points to potential issues of not informing students on topics such as where to find information or how to access help (i.e., technical, or educational).

out in the home page (Xavier University, 2018).
16.5 All help and documentation are written clearly and succinctly (Benson et al., 2002).

Note. Numbers such as 1.4, 2.8 are examples of the coded items and the full list is available at <https://sites.google.com/view/stp-heuristics/home>

Results from Steps 6–7 (The Empirical Study)

To test the thoroughness of the preliminary 16 STP heuristics, the research team assigned a heuristic to each of the 144 problems identified from the previous usability studies of two online courses, as described in the Method section. Problems could be assigned to multiple heuristics. The three heuristics with the highest level of frequency were Material Delivery, Guidance, and Material Quality, with each being assigned to 18 or 19 problems. Diverse Material had the lowest level of frequency with only 4 problems assigned to it. The research team had difficulty reaching consensus regarding which heuristic to assign to seven of the problems (as indicated in the problem database). In such cases, the three evaluators had assigned three different heuristics while the other problems had a consensus of one or two heuristics. For a more detailed breakdown of problem frequency see Table 3.

Table 3
Problems per Heuristic

Heurist ic no.	Heuristic name	STP	Frequency (problems assigned to heuristic)	# of problems assigned to additional heuristic(s)
11	Material Delivery	P	19	12
16	Guidance	P	18	2
12	Material Quality/Interactive Mat.	P	18	2
4	Page Layout	T	17	1
15	Teaching/Learning Goals	P	11	1
6	Navigation	T	10	3
2	Activities	S, P	10	5
7	Functionality	T	9	3
14	Syllabus	P	9	0
8	Accessibility	T	9	0
10	Material Organization	P	8	3
1	Social	S	7	0
13	Assessment	P	6	0
3	Easy to Use	T	6	3
5	Ecosystem	T	5	2
9	Diverse material	P	4	2

Note. N = 144 problems assigned to heuristics. A problem can be assigned to more than one heuristic.

The quality test of the 16 heuristics shows that some of the heuristics were assigned to 17–19 problems while other preliminary heuristics were only assigned to 4–8 problems. Based on plausibility, this was an indication that some of the heuristics assigned less frequently could be merged. To merge them also makes sense from content view because they address similar problems. Based on the data, H9 (Diverse Material) and H12 (Material Quality/Interactive Material) were merged. Diverse Material and Material Quality both contain items that could inform one another. Moreover, Diverse Material was only assigned to four problems in total

while Material Quality was one of the two heuristics most frequently assigned. Additionally, H10 (Material Organization) and H11 (Material Delivery) were also merged into one heuristic. Combining these four heuristics into two would allow for the list to maintain its integrity but also become more condensed (Step 7; see Table 4). As Nielsen argues that heuristics don't have to be distinct and can partly overlap if they help to detect the problems with the digital system (Nielsen, 1994), there was no need for additional merges. Table 4 shows the final set of 14 STP heuristics.

Table 4
Refined and Final Set of 14 STP Heuristics

No.	Final set of STP heuristics	STP (merged)
1	Social Presence	S
2	(Group) Activities	S, P
3	Easy to Use	T
4	Page Layout	T
5	Ecosystem	T
6	Navigation	T
7	Functionality	T
8	Accessibility	T
9	Diverse Material/Quality	P (#9 and #12)
10	Material Delivery/Organization	P (#10 and #11)
11	Assessment	P
12	Syllabus	P
13	Teaching/Learning Goals	P
14	Guidance	P

In Step 7, we ran checks against two previously established sets of usability heuristics: Nielsen (1994) for technical usability and Nokelainen (2006) for pedagogical usability. There were no existing heuristics for the social dimension. Both sets of heuristics are established heuristics. For example, Nielsen is used in industry and is considered a standard in usability evaluation. Two teams conducted the cross-checking against the new STP heuristics, each taking one of the previously established heuristics, either Nielsen (1994) or Nokelainen (2006).

Team Nielsen was able to identify 129 of the 144 problems. The research team evaluated both the design of the technology (learning management system) as well as the instructions integrated in the technology (pedagogy). For example, making information easily accessible to students refers to both technological and pedagogical design decisions; such a design may impact the ways in which users interact with a system. Fleiss's Kappa was used to determine interrater reliability among the research team and resulted in substantial agreement (62%) when applying Nielsen to the problem database. With the Nielsen heuristics, only 128 of 144 problems would have been found or detected.

Team Nokelainen was able to identify only 90 of the 144 problems. Fleiss's Kappa was used to determine interrater reliability among the researcher team and resulted in moderate agreement (60%). These results show that the new set of 14 STP heuristics do identify more issues than Nokelainen's heuristics and demonstrate the quality of this new set of STP heuristics (see Table 5).

Team STP heuristics was able to identify all 144 problems but had difficulty with 7 problems where no consensus was reached. The final Fleiss' Kappa score on the STP heuristic assignment was substantial with 80% reliability.

In addition, Kappa was also used to determine the severity of the problems found in the two courses (see Table 5). Severity should be tracked alongside, yet independent of, problem frequency to determine which problems require attention over others so as not to frustrate users (Sauro, 2014). Three raters assessed the severity of each problem by assigning the problem a value between one and five, with one being minor in severity and five being major in severity. This test was used to determine if the severity of the problems assigned to the heuristics were similar across the three raters. The final Kappa score on problem severity was substantial (64%). The results of the Fleiss's Kappa suggest the heuristics can accurately identify sociotechnical-pedagogical usability issues with varying severity.

Table 5
Comparison of Previously Established Heuristics and STP Heuristics

Heuristics Set	Problems detected	Problems not detected	Severity of problems detected	Severity of problems not detected
Nielsen	129	15	Level 5 = 34 Level 4 = 48 Level 3 = 28 Level 2 = 11 Level 1 = 1 Undecided = 7	Level 5 = 5 Level 4 = 4 Level 3 = 5 Level 2 = 1 Level 1 = 0 Undecided = 0
Noke-lainen	90	54	Level 5 = 22 Level 4 = 37 Level 3 = 23 Level 2 = 4 Level 1 = 1 Undecided = 3	Level 5 = 15 Level 4 = 17 Level 3 = 10 Level 2 = 8 Level 1 = 0 Undecided = 4
STP	144	0	Level 5 = 39 Level 4 = 52 Level 3 = 33 Level 2 = 12 Level 1 = 1 Undecided = 7	0

Note. $N = 144$ problems. Severity level based on consensus of 2 out of 3 raters using a severity scale of 1 to 5 (1 = minor, 5 = major) with undecided indicating raters do not agree.

Discussion

The final set of 14 STP heuristics developed through this process are detailed and robust enough to address potential issues in online courses. This study's research question contained two parts. First, to what extent is it possible to develop a concise set of sociotechnical-pedagogical heuristics? The research team was able to develop heuristics that could be condensed to provide a more concise guide for evaluation of or troubleshooting for online courses (Quiñones et al., 2018). Using Quiñones et al. (2018) as a guide, this study has resulted in a set of STP heuristics that can identify a variety of problems including social usability (heuristics 1 and 2), physical design of the course (heuristics 3 through 8), material selection and delivery (heuristics 9 and 10), and pedagogical usability, including assessment and teaching/learning goals or objectives (Heuristics 11 through 14).

Second, what is the accuracy of the heuristics when applying them to online courses? Quiñones et al. provided a method for refining and testing the quality of a new set of heuristics. By using the method, the research team tested the STP heuristics against two control heuristics (i.e., Nielsen and Nokelainen) and demonstrated the ability of the STP heuristics to identify problems that would have been neglected by the control heuristics. As outlined in Quiñones et al. (2018) and Sauro (2014), the new heuristics should exceed the control heuristics in identifying issues both in number and variety of severity levels. The procedures used in this study identified 60 problems, with varying levels of severity, that would not have been identified by a combination of both Nielsen (1994) and Nokelainen (2006). Overall, the STP heuristics were able to identify several issues (see Table 5) that neither Nielsen's nor Nokelainen's heuristics detected. Some examples include instructor self-introduction and social presence (heuristic 1), appropriate placement of course syllabus (heuristic 14), video length (heuristic 9), and page/font formatting (heuristic 4). The thorough validation method used demonstrates both the gaps that exist in current heuristics and the strength of the new STP heuristics.

The STP heuristics were developed from literature and checked against online courses (*Fire Service Instructor* and *Master Gardening*) for adult learners. The heuristics properly addressed the problems discovered in the fire service instructor course. Furthermore, the heuristics were sufficiently assigned and were able to address every problem identified in both the fire service instructor and master gardener courses, with only 16 of 144 problems being assigned to more than one heuristic and none of the problems going unassigned. The new set of STP heuristics developed here can be used for the evaluation of online courses. We assume that the evaluator should be a team of two or three members. Having evaluators who are trained in usability evaluation or who have an instructional design experience may be an advantage; however, further research is needed about the skills of such evaluators.

Third, heuristics have been developed in the field of user experience (UX) for software development and marketing fields. This new set of STP heuristics is an early step in using UX methods in digital learning, which is emerging as a new field of learner experience research (Schmidt et al., 2020). This new field of learner experience (LX), is at the crossroads of UX, learning design, and educational technology. However, there is no common or shared understanding yet of what learner or learning experience is. With this first work here, we indicate that learner experience is more than UX. It certainly includes all aspects of UX, including capturing the quality of a user's experience with a digital technology and examining how easily users perform a task efficiently using a system and how user-friendly, effective, or appealing it is. However, LX also encompasses all aspects related to learning (Jahnke et al., 2020). Based on our work with STP usability heuristics in this research, we see the need to discuss the understanding of LX in the scientific community. From this work here, we suggest the following definition as a useful starting point that includes the technological, pedagogical, and social dimensions.

Learning experience (LX) encompasses all aspects of a learner's interaction with: (a) the digital technology/service/space; (b) the pedagogical components, such as course type, learning goals, learning activities, process-based assessment, and learner control; and (c) the social dimension, such as quality of communication forms, collaboration, sociality, social presence, and social interactivity.

In summary, LX encompasses all aspects of the sociotechnical-pedagogical dimension such as the learner's engagement with the social dimension, the learner's interaction with the digital technology, service, or space, and the learner's interaction with the pedagogical elements.

Limitations

The interrater reliability was lower than some may have expected for well-defined categories, so further research could be done to better define those categories (e.g., train raters). In addition, the raters who assigned the heuristics to problems and rated the severity of the problems were on the same research team. A team from a different academic culture could view some of the problems as falling outside of the 16 final heuristics. Future research is needed.

Also, because the project took place over several semesters, different research team members were involved in different steps of the project. This may or may not impact the results. Future research is needed. Furthermore, only two online courses were evaluated, and both were outside the usual academic credit framework in that they were part of adult learning and an extension division of the university. Further research is needed to test the new heuristics for more traditional courses (e.g., populations of other ages). Further research also may use the new heuristics to score a highly rated course versus a lower rated one, or to compare this set of STP heuristics versus Quality Matters with experienced course evaluators.

Conclusion

In this study, we created a comprehensive set of sociotechnical-pedagogical heuristics (STP heuristics) for evaluating and detecting potential usability issues in online courses. Existing checklists only address specific issues (e.g., system design or pedagogy), while this new set of STP heuristics (Table 4) combines aspects of social elements of online learning, sound pedagogical practices, and technical reliability. The STP heuristics are useful for identifying potential issues in the design or redesign of online courses (Baldwin, Ching & Friesen, 2018). Practitioners and evaluators can use these heuristics as a guide for detecting potential issues and improving the learner experience with online courses. Practitioners (e.g., instructors and instructional designers) can use these heuristics to better plan and organize courses as they build them. Furthermore, these heuristics can be used to identify issues within existing courses as needed. Evaluators (i.e., professionals who assess course quality) can use these heuristics to guide their analysis of technology-heavy courses. While the pedagogical and technological aspects are properly addressed in previous sets of heuristics, the social dimension needs more research. With this sociotechnical-pedagogical set of usability items, we provide a first step that others can use to build upon for further refinement.

Acknowledgements

We are grateful to Jessica Gordon at MU Extension, University of Missouri, for the support for this study. We also thank the doctoral students and research assistants in the Information Experience Lab (ielab.missouri.edu) at the MU School of Information Science and Learning Technologies (SISLT) for supporting the data collection and analysis (in alphabetical order): Courtney Baker, Hao He, Kenneth Kircher, Yen-Mei Lee, Shangman (Eunice) Li, Minh Pham, Matin Qazi, Gayathri Sadanala, Jasmine Tan, and Fan Yu.

Declarations

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author(s) received approval from the research ethics review board at the University of Missouri—Columbia, USA for this study.

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Albion, P. (1999a). Heuristic evaluation of educational multimedia: From theory to practice. In J. Winn (Ed.), *Proceedings of the 16th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education* (pp. 9–15). Australasian Society for Computers in Learning in Tertiary Education.
- Baldwin, S. J., Ching, Y. H., & Friesen, N. (2018). Online course design and development among college and university instructors: An analysis using grounded theory. *Online Learning*, 22(2), 157–171. doi:10.24059/olj.v22i2.1212
- Benson, L., Elliott, D., Grant, M., Holschuh, D., Kim, B., Kim, H., Lauber, E., Loh, S., & Reeves, T. C. (2002). Usability and instructional design heuristics for e-learning evaluation. In P. Barker & S. Rebelsky (Eds.), *Proceedings from ED-MEDIA 2002: World Conference on Educational Multimedia, Hypermedia & Telecommunications* (pp. 1615–1621). AACE.
- Bloom, B. (1956). *Taxonomy of educational objectives handbook I: The cognitive domain*. Addison Wesley Longman, Inc.
- Botella, F., Rusu, C., Rusu, V., & Quiñones, D. (2018, Sept.). How novel evaluators perceive their first heuristic evaluation. *Proceedings of XIX International Conference on Human Computer Interaction*. Association for Computing Machinery. <https://doi.org/10.1145/3233824.3233835>
- Boyle, T. (1997). *Design for multimedia learning*. Prentice Hall.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Chao, T., Saj, T., & Tessier, F. (2006). Establishing a quality review for online courses. *Educause Quarterly*, 29(3), 32–39. <https://er.educause.edu/articles/2006/1/establishing-a-quality-review-for-online-courses>
- Chen, B., Chang, Y. H., Ouyang, F., & Zhou, W. (2018). Fostering student engagement in online discussion through social learning analytics. *The Internet and Higher Education*, 37, 21–30.
- Clement, F. J. (1985). Technology & instruction: The rule of seven revisited. *Performance + Instruction*, 24(2), 6–8. <https://doi.org/10.1002/pfi.4150240203>
- Das, J. (2012). Role of syllabus in higher education: A critical study. *Global Research Methodology Journal*, 7, 1–2. <http://www.grmgrlaranya.com/Journals/7th%20issue/Role%20of%20syllabus%20in%20higher%20education%20A%20critical%20study.pdf>
- Demmans Epp, C., Phirangee, K., Hewitt, J., & Perfetti, C. A. (2020). Learning management system and course influences on student actions and learning experiences. *Education Tech Research Dev*, 68, 3263–3297. <https://doi.org/10.1007/s11423-020-09821-1>

Dringus, L. P., & Cohen, M. S. (2005, Oct. 19–22). *An adaptable usability heuristic checklist for online courses*. The Frontiers in Education 35th Annual Conference. IEEE.

Douglas, S. (2017, Dec. 6). *7 usability heuristics that all UI designers should know*. UsabilityGeek. <https://usabilitygeek.com/usability-heuristics-ui-designers-know/>

Fink, S. B. (2012). The many purposes of course syllabi: Which are essential and useful? *Syllabus Journal*, 1(1), 1–12. <https://www.pfw.edu/dotAsset/bdf64113-75c4-487a-ba68-dfcc3044ce9c.pdf>

Garrison, D. R., Anderson, T., & Archer, W. (2003). A theory of critical inquiry in online distance learning. In M. Moore & W. Anderson (Eds.), *Handbook of distance education* (pp. 113–128). Lawrence Erlbaum.

Guo, P. J., Kim, J., & Rubin, R. (2014, Mar., 4–5). *How video production affects student engagement: An empirical study of MOOC videos*. The First Association for Computing Machinery Conference on Learning @ Scale Conference. ACM.

Horila, M., Nokelainen, P., Syvänen, A., & Överlund, J. (2002). *Criteria for the pedagogical usability, version 1.0*. Häme Polytechnic and University of Tampere.

Jahnke, I., Schmidt, M., Pham, M., & Singh, K. (2020). Sociotechnical-pedagogical usability for designing and evaluating learner experience in technology-enhanced environments. In M. Schmidt, A. A. Tawfik, I. Jahnke, & Y. Earnshaw (Eds.), *Learner and user experience research: An introduction for the field of learning design & technology*. EdTech Books. https://edtechbooks.org/ux/sociotechnical_pedagogical_usability

Jahnke, I. (2015). *Digital didactical designs: Teaching and learning in CrossActionSpaces*. Routledge.

Jahnke, I., Ritterskamp, C., Herrmann, T. (2005). Sociotechnical roles for sociotechnical systems—A perspective from social and computer sciences. In *Proceedings of the AAAI Fall Symposium on Roles, an Interdisciplinary Perspective: Ontologies, Programming Languages, and Multiagent Systems*. AAAI press.

Kaufmann, R., Sellnow, D. D., & Frisby, B. N. (2016). The development and validation of the online learning climate scale (OLCS). *Communication Education*, 65(3), 307–321.

Khajouei, R., Gohari, S. H., & Mirzaee, M. (2018). Comparison of two heuristic evaluation methods for evaluating the usability of health information systems. *Journal of Biomedical Informatics*, 80, 37–42. <https://doi.org/10.1016/j.jbi.2018.02.016>

Lenzner, A., Schnotz, W., & Müller, A. (2013). The role of decorative pictures in learning. *Instructional Science*, 41(5), 811–831. <https://doi.org/10.1007/s11251-012-9256-z>

Lim, C. J., & Lee, S. (2007). Pedagogical usability checklist for ESL/EFL e-learning websites. *Journal of Convergence Information Technology*, 2(3), 67–76.

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. doi:10.24059/olj.v22i1.1092

Mayer, R. E. (2002). Multimedia learning. *Psychology of Learning and Motivation*, 41, (pp. 85–139). Academic Press.

Moore, J. L., Dickson-Deane, C., & Liu, M. Z. (2014). Designing CMS courses from a pedagogical usability perspective. In A. Benson & A. Whitworth (Eds.), *Research on course management systems in higher education* (pp. 143–169). Information Age Publishing.

Nielsen, J. (1994). *10 heuristics for user interface design*. Nielsen Norman Group. <https://www.nngroup.com/articles/ten-usability-heuristics/>

Nielsen, J. (2004). *Guidelines for visualizing links*. Nielsen Norman Group. <https://www.nngroup.com/articles/guidelines-for-visualizing-links/>

Nielsen, J., & Loranger, H. (2006) *Prioritizing web usability*. Pearson Education.

Nokelainen, P. (2006). An empirical assessment of pedagogical usability criteria for digital learning material with elementary school students. *Educational Technology & Society*, 9(2), 178–197. <https://www.semanticscholar.org/paper/An-empirical-assessment-of-pedagogical-usability-Nokelainen/ea96b628f440642d72026c14710a67ccd06f41f1#extracted>

Obsidian Learning. (2017). *Transforming learning: using video for cognitive, emotional, and social engagement*. <https://elearningindustry.com/free-ebooks/transforming-learning-using-video-for-cognitive-emotional-and-social-engagement>

Online Learning Consortium. (2018). *OLC OSCQR course design review*. <https://onlinelearningconsortium.org/consult/oscqr-course-design-review/>

Orcutt, J. M., & Dringus, L. P. (2017). Beyond being there: Practices that establish presence, engage students and influence intellectual curiosity in a structured online learning environment. *Online Learning*, 21(3), 15–35. doi: 10.24059/olj.v%vi%i.1231

Preece, J. (2001). Sociability and usability in online communities: Determining and measuring success. *Behavior and Information Technology*, 20(5), 347–356. doi: 10.1080/0144929011008468 3

Quality Matters (2018). *Rubrics & Standards*. QM. <https://www.qualitymatters.org/qa-resources/rubric-standards>

- Quinn, C. N. (1996). Pragmatic evaluation: lessons from usability. In A. Christie & B. Vaughan, (Eds.) *Proceedings of Australasian Society for Computers in Learning in Tertiary Education (ASCILITE 96)* (pp. 437–444). University of South Australia.
- Quiñones, D., Rusu, C., & Rusu, V. (2018). A methodology to develop usability/user experience heuristics. *Computer Standards & Interfaces*, *59*, 109–129.
<https://doi.org/10.1016/j.csi.2018.03.002>
- Reeves, T. C. (1994). Evaluating what really matters in computer-based education. In M. Wild (Ed.), *Computer education: New perspectives* (pp. 219–246). Edith Cowan University.
- Reeves, T. C., Benson, L., Elliott, D., Grant, M., Holschuh, D., Kim, B., Kim, H., Lauber, E., & Loh, S. (2002, June, 24–29). *Usability and instructional design heuristics for e-Learning evaluation*. ED-Media 2002 World Conference on Educational Multimedia, Hypermedia & Telecommunications.
- Robinson, H. A., Sheffield, A., Phillips, A. S., & Moore, M. (2017). Introduction to teaching online: Usability evaluation of interactivity in an online social constructivist course. *TechTrends*, *61*(6), 533–540.
- Safie, N. (2007). *An investigation on the relationship between e-learning usability attributes towards motivation to learn*. International Islamic University Malaysia.
- Sauro, J. (2014) The relationship between problem frequency and problem severity in usability evaluations. *Journal of Usability Studies*, *10*(1), 17–25.
- Schade, A. (2014). *Video usability*. Nielsen Norman Group.
<https://www.nngroup.com/articles/video-usability/>
- Schuler, D., & Namioka, A. (2017). *Participatory design: Principles and practices*. CRC Press.
- Silius, K., & Tervakari, A-M. (2003, May, 8–9). *An evaluation of the usefulness of web-based learning environments. The evaluation tool into the portal of Finnish virtual university*. In V. Peñarrocha (Ed.), International Conference on Network Universities and E-Learning, Universidad Politécnica de Valencia.
- Sims, R., Dobbs, G., & Hand, T. (2002). Enhancing quality in online learning: Scaffolding planning and design through proactive evaluation. *Distance Education*, *23*(2), 135–148.
<https://doi.org/10.1080/0158791022000009169>
- Squires, D., & Preece, J. (1999). Predicting quality in educational software: Evaluating for learning, usability and the synergy between them. *Interacting with Computers*, *11*(5), 467–483.
- Stein, J., & Graham, C. (2014). *Essentials of online learning*. Routledge.
- Stone, D., Jarrett, C., Woodroffe, M., & Minocha, S. (2005). *User interface design and evaluation*. Morgan Kaufmann.

van der Meij, H., & van der Meij, J. (2013). Eight guidelines for the design of instructional videos for software training. *Technical Communication*, 60(3), 205–228.

<https://pdfs.semanticscholar.org/47a8/a0502d3ac8a636277b2ba48cba4e2aa14edd.pdf>

van Merriënboer, J. J. G., Kirschner, P. A., & Kester, L. (2003). Taking the load off a learner's mind: Instructional design for complex learning. *Educational Psychologist*, 38(1), 5–13.

https://doi.org/10.1207/S15326985EP3801_2

Xavier University. (2018). *Online learning heuristics*. <https://www.xavier.edu/id/online-blended-classes/>

Yousef, A. M. F., Chatti, M. A., Schroeder, U., & Wosnitza, M. (2015). A usability evaluation of a blended MOOC environment: An experimental case study. *International Review of Research in Open and Distributed Learning*, 16(2), 69–93.

Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker, Jr., J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information and Management*, 43, 15–27. <https://doi.org/10.1016/j.im.2005.01.004>

Appendix A

Research Team Members' Involvement in the Study

Step	Step Description	No. Team Members	Team Members
1	Literature review	5	Doc. student 1 Doc. student 2 Doc. student 3 Doc. student 4 Intern student 5
2	Additional items	4	Doc. student 2 Doc. student 4 Doc. student 6 Intern student 7
3	Clustering	2	Doc. student 1 Doc. student 8
4	Selection, adaptation	1	Expert 1
5	Specification, review of the 16 categories	3	Doc. student 6 Doc. student 9 Doc. student 10
6a	Validation (expert review of STP heuristics by frequency)	3	Doc. student 1 Doc. student 8 Doc. student 10
6b	Validation (expert review of STP heuristics by severity of problems)	3	Doc. student 1 Doc. student 8 Doc. student 9
6c	Validation (STP vs. Nielsen and Nokelainen heuristics)	3	Team Nielsen Doc. student 1 Doc. student 6 Doc. student 10
		3	Team Nokelainen Doc. student 1 Doc. student 11 Intern student 12
7	Refinement	2	Doc. student 1 Expert 1

Note. Total research team members were 13. See Figure 1 for more details about steps. Doc. student = doctoral student. Intern students = master students or interns of the lab.

The Scale of Online Course Anxiety: Assessing College Students' Anxiety in Online Courses

Xinyang Li

William Lan

Amanda, Williams

Texas Tech University, USA

Abstract

The purpose of this study was to develop an instrument to measure student online course anxiety, a factor that detrimentally affects student learning in the online environment. Based on Keegan's theoretical framework that identified fundamental differences between online education and traditional education, the instrument of Scale of Online Course Anxiety (SOCA) was developed and tested with a sample of 170 students from a 4-year higher educational institution. The total score and the four subscale scores show high reliability. Confirmatory Factor Analysis exhibited solid goodness of fit between SOCA items and the factor structure hypothesized in previous literature. Evidence of divergent validity shows SOCA differentiates the state anxiety and trait anxiety as expected. Limitations and possible topics for future research are also discussed.

Keywords: postsecondary institution, instrument development, online course anxiety, confirmatory factor analysis

Li, X., Lan, W., & Williams, A. (2021). The scale of online course anxiety: Assessing college students' anxiety in online courses. *Online Learning*, 25(4), 440-460.

DOI: 10.24059/olj.v25i4.2505

With the advent of the internet and computer technologies, we are increasingly experiencing the impact of these technologies on our lives, and the field of postsecondary education is no exception. The online education is prosperous and contented: according to the data from Integrated Postsecondary Education Data System (IPEDS, 2019), 35.3% of college students took at least one online course in degree-granting postsecondary educational institutions for the 2018 to 2019 academic year in the United States. Meanwhile, according to the National Postsecondary Student Aid Study (NPSAS), there is an obvious trend of increasing enrollment for entire degree programs that are offered online since the academic year of 2007 to 2008 and has reached 10.8% (NCES, 2018a) for undergraduate students, and 27.3% (NCES, 2018b) for graduate students among degree-granting postsecondary educational institutions in 2016. Moreover, the recent COVID-19 pandemic has forced an abrupt shift from traditional to online learning in higher education institutions worldwide, followed by a mass body of emerged studies revolving around the impact of such transformation on learning (Adan & Anwar, 2020; Adedoyin & Soykan, 2020; Besser, Flett, & Zeigler-Hill, 2020; Unger & Meiran, 2020). Students' anxiety is one of the most concerning subjects, as many researchers have devoted efforts to this issue (Saddik et al., 2020; Wang et al., 2020).

Along with the thriving of online education, there is a growing body of literature that explores the anxiety that students experience in online courses. To name a few areas into which researchers have delved: online test anxiety and student's performance (Alibak et al., 2019; Stowell & Bennett, 2010), anxiety and its relation to online task procrastination (Dunn, 2014; Yang et al., 2019), computer anxiety and students' perception of self-efficacy (Celik & Yesilyurt, 2013; Eryilmaz & Cigdemoglu, 2019), and web-based courses in relation to anxiety, stress, and depression (Krusche et al., 2013). From the wide spectrum of anxiety-related research, many have shown the detrimental influence of anxiety on student learning in an online setting (Bolliger & Halupa, 2012; DeVaney, 2010). However, despite the effort devoted to anxiety in the online environment, there is an absence of an instrument that is theoretically based and psychometrically sound to assess students' anxiety that is mainly caused by characteristics of online courses as a new instruction manner. For instance, different ways of communication (Wombacher et al., 2017) or novel forms of online tasks (Martin & Valdivia, 2017) might induce new challenges for students. Thus, to better serve students in the online setting, as well as researchers and instructors in online education, it is important to develop an instrument measuring online course anxiety to enrich our understanding of the sources of students' online course anxiety and possible approaches to reduce it.

Literature Review

Anxiety and Assessment for Anxiety

Anxiety has long been an essential variable of research and has had a fruitful history, tracing back to the classic study by Mowrer (1939) who argued that anxiety was acquired through a process of learning, and more particularly, through conditioning. Eysenck and others (Eysenck, 1955; Eysenck & Rachman, 2013) argued from a personality development perspective that the conditioned and unconditioned stimuli interact to produce uneasy emotions in individuals, which is highly risky for emotionally unstable introverts.

Evolving from an early behaviorism perspective, the understanding of anxiety was further developed through the cognitive perspective. Beck and other researchers (Beck, 1985; Beck & Clark, 1997; Beck & Rush, 1985) depicted anxiety as a three-stage process, including (a) an

initial registration of the threat stimulus, (b) activation of a primal threat mode, and (c) evocation of elaborative and reflective thinking. Expanding beyond Beck's earlier work, other scholars (Salkovskis, 1985; Salkovskis & Warwick, 1986) emphasized that by removing the responsible cognitions, impinged individuals could reduce or even remove the threat that produces anxiety.

From the cognitive perspective on anxiety, Spielberger (1966) proposed a conceptual framework that differentiates state- and trait-anxiety, suggesting that they need to be assessed separately. According to Spielberger (1966), trait anxiety is a stable condition related to the personality, which stimulates certain responses to threatening situations. On the other hand, state anxiety is an individual's perception of harm or threatening situations and is exhibited as a transient emotion. Each type of anxiety is considered unidimensional, and an individual's global level of anxiety needs to be studied and assessed separately (Spielberger, 1966; Muris et al., 1998). Spielberger's view of anxiety has been broadly accepted by researchers in multitudinous areas such as medicine, psychology, and education. Using the instrument developed by Spielberger and his colleagues, the State-Trait Anxiety Inventory (STAI, Spielberger et al., 1983), many researchers have delved into different "states" (i.e., types) of anxiety, which has long been an essential focus within the context of education, including the anxiety related to language (Horwitz et al., 1986; Young, 1991; Al-Shboul et al., 2013), the anxiety in statistics (Baloğlu et al., 2011; DeVaney, 2010), and test anxiety (Cassady, 2004; Conneely & Hughes, 2010) to name just a few. Like any other "state," online learning holds its own characteristics and may be perceived as threatening and raise anxiety. Considering the above, the following section will focus on the anxiety of online learning.

Online Learning Anxiety

In the new era of online education, researchers have attempted to apply traditional anxiety assessment tools to assess anxiety in the online setting. For instance, with a sample of 69 students, Stowell and Bennett (2010) alternated the order of two examinations to overcome the order effect and administrated two examinations in the online and the traditional classroom conditions. Students' anxiety in the two conditions was measured with the Academic Emotions Questionnaire (AEQ; Pekrun et al., 2002). The study showed that the online environment affects student academic performance differently depending on their original anxiety level: for those who were anxious about learning, the online situation detrimentally affects their performance. In another study, DeVaney (2010) compared the statistics anxiety of 120 graduate students enrolled in traditional on-campus or online statistics courses. Their statistics anxiety was measured through the Statistics Anxiety Rating Scales (STARS; Cruise et al., 1985) and attitude towards statistics through the Survey of Attitudes toward Statistics (STATS-28; Schau et al., 1995) in pre- and post-test conditions. Comparing statistics anxiety as well as attitudes toward statistics between the online and on-campus student groups, the researcher found higher levels of anxiety towards statistics for students in the online setting. Furthermore, he also found that students in the online courses held less favorable attitudes toward statistics as reflected in their emotional experience and perceived difficulty of the course. This study revealed the potential challenges that online courses might pose for students in a statistics class. There were still other researchers studying anxiety on a "macro-level" by looking into student anxiety as a composite status of anxiety stemming from various sources on the online educational platform. For example, Bolliger and Halupa (2012) followed a series of doctoral courses delivered online and gauged students' satisfaction and anxiety where students' anxiety was assessed through computer anxiety, internet anxiety, and online anxiety. It was found that these sources of anxiety have a

negative correlation with students' satisfaction with their online learning experience. Similar to Bolliger and Halupa's (2012) research, computer anxiety (Rosen & Weil, 1995; Saadé & Kira, 2007), and internet anxiety (Montelpare & Williams, 2000) were frequently studied together with test anxiety, competence, and satisfaction in research on online anxiety. Research investigating means to alleviate the anxiety for online students was also a vital topic, such as the study by Abdous (2019) that investigated how an online learning orientation could better prepare students and result in lower level of anxiety. His research utilized a one-item scale on 4,000 students and compared the relationship across different demographics and characteristics. His study showed that a preparation session before the online course significantly alleviated student's anxiety levels.

As much as we admire the researchers' efforts to study online anxiety, we would like to indicate three limitations of the current research. First, adopting instruments developed to measure anxiety in traditional educational settings may not capture the uniqueness of the online course setting. When assessing "state-specific" anxiety, the characteristics of the state must be presented saliently in the instrument to elicit respondents' true feelings toward the state. The assessment based on developed inventories for measuring anxiety could be an accurate measure as a trait-anxiety, but usually not specific to the "state" of the online course. Second, although the various types of anxiety, such as computer anxiety and internet anxiety, are essentially related to online course anxiety, online course anxiety is a specific type of anxiety. Different from casually surfing the internet or acquiring knowledge in a self-learning manner through the internet, online course anxiety is the experience of a particular population of students who are engaged in learning in courses formally offered by higher education institutions where their performance will be evaluated and bear significant consequences. Throughout our search, the "online" is rarely treated as a "state" but overlooked as an environment that has been studied in conjunction with other types of anxiety, such as test-anxiety in an online setting (Alibak et al., 2019), language anxiety in an online setting (Martin & Valdivia, 2017), and anxiety relating to online collaborative projects (Hilliard et al., 2020). If we want to shed light on online course anxiety as a factor affecting student learning in online courses in the higher educational setting, we need an instrument that characterizes the uniqueness of online courses compared to the traditional courses, and elicits students' negative feelings, such as worry, fear, and stress, when taking online courses. We propose that this need will be satisfied by the Scale of Online Course Anxiety (SOCA) we aimed to design.

The Uniqueness of Online Courses

As noted in Koerner and Dugas (2006), anxiety is best understood within the context, which in this study, is the online setting. To capture the uniqueness of the online course, it is essential to define online learning first. Although the ambiguity in terminology across online learning, distance learning, and e-learning had long been an issue, there was some common ground for researchers in the field (Moore et al., 2011; Singh & Thurman, 2019). The meta-analysis study by Singh and Thurman (2019) provided a scope for us to select our theoretical framework. Systematically reviewing how online learning has been defined in peer-reviewed journal articles from 1988 to 2018, Singh and Thurman (2019) summarized the evolution of the definition of online learning as (a) the technology is the "most abundant and clearly defined element" (p. 295); (b) the later definitions "include interactivity as a key element of online learning" (p. 300); (c) the later definitions delve into the topic of lack of communication; (d) the time element is a possible aspect when synchronous or asynchronous are compared as

attributions of online learning; and (e) the educational context element is utilized for “distinguishing between open learning environments and formal online learning ones” (p. 299).

Upon reviewing several theoretical frameworks that have been widely adopted in the field of online learning, we found: Moore and Kearsley’s (2011) framework based on his theory of Transactional Distance (Moore, 1993), which focuses on the role of dialog, structure, and autonomy played in the novel educational setting (i.e., online); Keegan’s (1980, 2013) framework that compares traditional and distance education from the aspects such as separation, communication, technology; Community of Inquiry framework (Garrison et al., 2000) which illustrates online learning as a process of developing a community, which revolves around social presence, teaching presence, and cognitive presence. Given these options, we decided to utilize Keegan’s (1980, 2013) framework as a guide when designing the structure and content of SOCA in the current study. The reason being that his work “corresponds to how online education is being conceptualized in the present day” (Lee, 2017, p. 16), as well as the dimensions in his framework closely aligned with the summarization of Singh and Thurman’s (2019) meta-analysis on concurrent studies in the field.

Defining distance education as “an institutionalized offering through public or private providers” (Keegan, 2013, p. 45), Keegan (1980, 2013) was one of the first scholars who systematically compared online education and traditional education to identify the unique characteristics of online education (i.e., a major form of distance education nowadays). Keegan (2013) identified five dimensions in which the online education environment inherently differs from the traditional one: (a) the quasi-permanent separation of teacher and learner; (b) the quasi-permanent absence of learning groups; (c) the role of the educational organization; (d) the place of the technological medium (media), and (e) the provision of two-way communication. During the last two decades that witnessed the growth of technology and development of online education, Keegan’s dimensions that differentiate the online education setting from the traditional education setting have been validated and strengthened by other researchers (Bernard et al., 2004; DeVaney, 2010; Lee, 2017; Moore et al., 2011; Picciano, 2002).

The first dimension of “quasi-permanent separation of teacher and learner” is arguably one of the essential characteristics that distinguish the online from traditional education (Keegan, 2013). The “quasi-permanent” part of the dimension indicates the separation between students and the instructor, and can vary from “nil, to voluntary, to compulsory” (Keegan, 2013, p. 45). For the convenience of further discussion, we name the dimension “separation from the instructor.”

The second dimension of “the quasi-permanent absence of learning group” describes the connections with peers by students or the instructor. Unlike a traditional classroom where a community of learners is physically available, such a community is only possible either by students’ initiatives or the instructor’s design. For our purposes, we name the dimension “separation from peers.”

The third dimension of “the role of the educational organization” pertains to the important role that public and private educational organizations play in accrediting scattered, individual, and private learning activities to formal and institutionalized learning. However, because SOCA focuses on personal perceptions and feelings within the higher education context, other forms of educational organization (e.g., MOOC) are beyond this study’s scope. Therefore, this dimension was not included in our instrument.

The fourth dimension of “the place of the technological medium” emphasizes the vital and dominant functionality that technology serves in the design, implementation, and delivery of online courses. Video, online textbooks, online forums, online course portals, to name a few, are widely utilized in online education but are almost non-existent in traditional classrooms. Learners may see technology, a new component of the learning environment, as a threat, challenge, or advantage depending on their savviness in technology, and experience online courses differently. We name this dimension “technological challenge.”

The last dimension of “two-way communication” emphasizes that students “should be able to initiate dialogue and not be just the recipient of it” (Keegan, 2013, p. 46). As the different forms of dialogue between instructor and students are essential to students’ learning, the ability to initiate dialogue by students, especially in the novel online environment, is essential to lessening their anxiety levels. We name this dimension “lack of two-way communication.”

As psychologists postulate that anxiety can be caused by being away from a familiar place into a new place where help may be unavailable (Grupe & Nitschke, 2013), we postulate that the online course anxiety is caused by the fundamental differences between the traditional classrooms with which students are familiar and the online environment that is novel to them. Keegan’s four dimensions of isolation from instructor, isolation from peers, role of technology, and two-way communication, are deemed as sources of online course anxiety. Thus, we adopted these dimensions as subscales of SOCA to measure the state-anxiety of the online course.

The study was designed with the purpose of developing an instrument (i.e., SOCA) to assess the degree of online course anxiety experienced by students in a higher education environment. The researchers aimed at answering the following research questions:

1. Is the factor structure derived from Keegan’s (2013) theoretical framework supported by the collected sample?
2. Is the SOCA a valid and reliable instrument for measuring online course anxiety for college students?

Methods

The instrument development followed Hinkin’s (1998) framework and followed the steps of (a) Item generation; (b) Questionnaire administration; (c) Initial item reduction; (d) Confirmatory Factor Analysis; and (e) Convergent/Discriminant Validity check.

Item Generation

The items in SOCA were originated in two parts. One of the co-authors of the study taught an online statistics course for years and asked students to write essays by the end of each semester to reflect their leaning experience in the online course. Over the years, more than 100 essays were cumulated. Although the essays were not explicitly designed for developing the online anxiety scale, they were utilized as the source of items of the scale to enhance ecological validity (Brewer & Crano, 2000) as these items can be traced back to students’ reflections of their learning experience right after an online course. The researchers analyzed the content of the essays to identify the themes of the qualitative data and aligned them with Keegan’s (2013) four dimensions (Table 1), and the coding process followed three-step approach of open coding, axial coding, and selective coding (Strauss & Corbin, 1998). Items were created from student input, and sometimes students’ original phrases were used. Then the researchers added items to enhance reliability of the subscales that did not have sufficient items. In the end, an initial pool of items for SOCA that included 35 items was created. For consistency of participants’ responses

to the constructs, a 5-point Likert scale with scores from 1 to 5 corresponding to the five options of “strongly disagree,” “slightly disagree,” “neutral,” “slightly agree,” and “strongly agree” was used.

Table 1
Dimensions and Example Quotations

Dimension	Example Quotations
Teacher sep	Another thing I would suggest is to make an appointment with the professor if you are having a hard time. That is something I did and it really did relieve me from the stress.
Peer sep	[In previous online courses] we had webinars and class activities that all of us participated and we used to interact with each one of us ..., which was helpful. I missed this in this online class... and working with my classmates could really ease things up.
Tech	I found myself doing the assignment last minute on the day the Aplia (online learning environment) homework system was malfunctioning, which freaks me out...and my grade certainly reflected this.
Lack comm	I just feel more comfortable when talking to the instructor (in a face-to-face environment).

Note. Teacher sep = the separation from instructors.
Peers sep = the separation from peers.
Tech = the technological challenge.
Lack comm = the lack of two-way communication.

Content Validity and Equivalence

Prior to the administration of the instrument, the researchers established agreement on items for content validity. As suggested in previous studies (Gravetter & Forzano, 2018; Hardesty & Bearden, 2004), face validity was judged based on whether the items appear to be suitable for its aims. Three reviewers were invited for their feedback regarding the face validity of the instrument. The wording of a few items was changed based on the feedback provided by the reviewers to make the items easy to comprehend. Then, the Content Validity Index (CVI; Lynn, 1986; Zammanzadeh et al., 2015) was examined via I-CVI (Item-CVI) and S-CVI/UA (Scale-CVI/Ave). Given there were only three reviewers examining the items, we chose the rather conservative criterion of I-CVI over .83 (Lynn, 1986) and S-CVI/UA over .9 for the items to be included in the instrument (Lynn, 1986; Polit & Beck, 2006). Items causing low I-CVI and/or S-CVI/UA were removed or rewritten after inspection. For the equivalence, the inter-rater reliability was checked as three reviewers categorized items into each pre-defined construct, and Fleiss' Kappa was calculated with the criterion of over .8, indicating great agreement (Gwet, 2014; Sim & Wright, 2005). Lastly, the pool of 24 items that met or exceeded the aforementioned criteria (I-CVI = 1; S-CVI/UA = 1; Fleiss' Kappa = .83) were distributed to prospective participants for data collection.

Instrument Administration

The administrated SOCA (Appendix A) contains four factors, including (a) the separation from the instructor (5 items); (b) the separation from peers (5 items); (c) the technological challenge (7 items), and (d) the lack of two-way communication (7 items).

The instrument was administered to college students in a higher education institution in the southwest area of the United States. The instrument was distributed to 207 students enrolled in 6 different online classrooms representing different content areas. The instrument was implemented via Qualtrics at the beginning of the semester. All the participating courses were

asynchronous online courses. Acknowledging the differences between asynchronous and synchronous online courses, we decided to focus on the asynchronous online course in the current study and investigate the anxiety in synchronous online courses in future research. Realizing the experience of taking an online course might change the anxiety the participants experienced over time, we set up a valid response period to control the confounding variable. That is, any survey that was returned later than the first three weeks of the semester were excluded. In the end, a total of 170 usable responses were collected, yielding an 82% response rate. The students recruited were from two different colleges with a roughly 50/50 split. Among all the participants, 73.5% of them were female. The courses were open to both undergraduate students ($n = 63$) and graduate students ($n = 107$). The average age of the participants is 34.8 ($SD = 9.9$), and the average number of online courses that the participants have taken is 9.0 ($SD = 7.6$), which included accredited online course experience in their associate degree up to the current program. Additionally, the data neither suffered from missingness item-wise ($< 1.2\%$) nor participant-wise ($< 1.5\%$), with rates that were considered inconsequential given the 5% threshold suggested by Schafer (1999). We utilized Multiple Imputation (MI), which is known as an efficient way to recover the missing data (Enders, 2010). The MI was conducted through mice package (Van Buuren & Groothuis-Oudshoorn, 2011) in R. Among the 24 items, responses to items 8 and 29 were reverse-coded to align with the rest of the items of the instrument so that the higher the scores, the higher the anxiety level for all items.

Data Analysis

Following the instrument administration, the researchers proceeded with statistical analyses to test the instrument's psychometrics, and the reciprocal procedures of revise and retest were incorporated throughout the analysis.

Conventionally, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were utilized over a randomly half-split sample to explore the nature of latent constructs (i.e., in EFA) and ascertain it in CFA based on the findings in EFA (Kline, 2015). Given that the item generation of SOCA was profoundly driven by Keegan's (2013) theoretical framework, the main scope of the analysis for this study it to confirm the reliability, validity, and alignment of factor structures of the instrument. Therefore, the researchers choose only to fit a CFA model with four aforementioned factors underlining the proposed 24 items through lavaan package (Rosseel, 2012) in R.

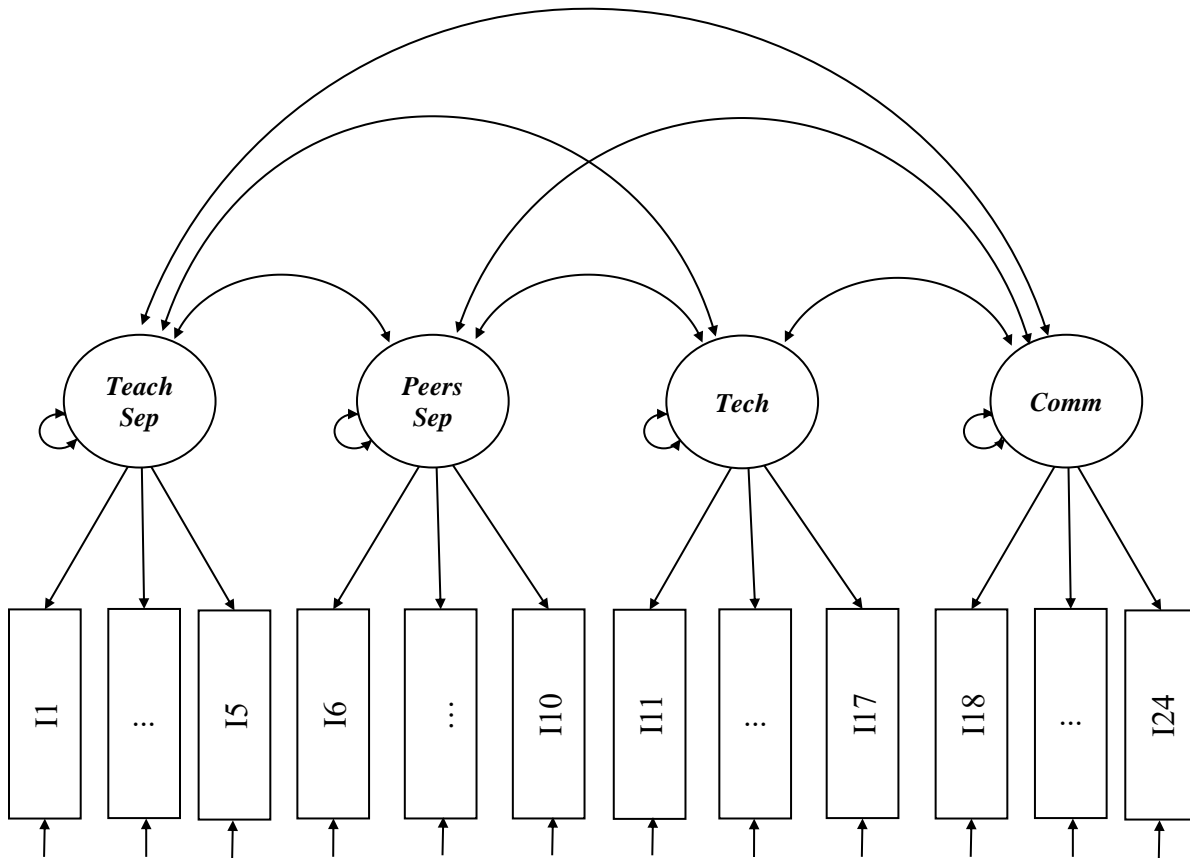
Firstly, the item reliability was tested by examining the standardized factor loadings. According to Hair and his colleagues (1998), a standardized factor loading over .7 is considered good reliability, whereas over .5 is acceptable as the cut-off. The researchers decided to remove items with standardized factor loading lower than .5, then proceed to the higher cut-off if necessary. The deletion of items was executed in a stepwise fashion as the model fit were inspected at each step. To ensure the confirmatory nature of the model, the item deletion was limited to be less than 20% (i.e., 5) of the total number of items (Hair et al., 1998). Then, the CFA model fit was examined through a variety of fit indices such as a) comparative fit index (CFI; Bentler, 1990), Tucker-Lewis index (TLI; Tucker & Lewis, 1973), root mean square error of approximation (RMSEA; Steiger & Lind, 1980), and standardized root mean square residual (SRMR; Muthén & Muthén, 2017). Per fitting criterion, the researchers adopted Hoyle and Panter's (1995) suggestion of CIF and TLI equal to or greater than .90 as acceptable fit, as well as Browne and Cudeck's (1992) suggestion of RMSEA/SRMR equal to or less than .08 as acceptable fit. As for a more ideal fit, we also considered the higher CFI/TLI value that over .95

and lower value of RMSEA/SRMR under .06 (Hu & Bentler, 1999; Tucker & Lewis, 1973). Next, the construct validity which included the convergent validity, and the discriminant validity were also examined. The Average Variance Extracted (AVE) were calculated for each construct, as well as the total model, and a threshold of over .5 was utilized as an indication of adequate convergence (Hair et al., 1998). The factor correlations were calculated and presented, and factor correlations less than .85 were considered as having an adequate level of discrimination (Kline, 2005).

Results

After fitting the data to a 4-factor CFA model guided by Keegan’s (2013) theory and removing the items with low standardized factor loading in a stepwise fashion, the final hypothesized factor structure is presented in Figure 1.

Figure 1
Hypothesized CFA Model



Item 8 and item 1 were deleted in a stepwise fashion according to their low standardized factor loadings (Table 2). The final model included four latent factors with 22 items retained, and the

comparative fit was adequate with CFI = .94 and TLI = .93. Moreover, the RMSEA = .06 and SRMR = .06 also indicated a close fit of the model with our sample.

Table 2
Model Fit Indices

Removed	Std. λ	CFI	TLI	RMSEA	SRMR
		.92	.91	.06	.06
Item 8	-.08	.92	.91	.07	.06
Item 1	.31	.94	.93	.06	.06

Note. λ = factor loading, SE = standard error, Std. = standardized.

For the item reliability, and standardized factor loadings were significant at .001 alpha level (Table 3). Overall, 15 standardized factor loadings were over the .7, and only two (item 8 = .56 and item 21 = .59) were under .6 yet still over the acceptable cut-off of .5. The item level reliability of SOCA was therefore achieved. The standardized loadings for “separation from instructors” (mean = .78, median = .78) and “separation from peers” (mean = .75, median = .80) indicated slightly higher reliability at the item level, while “technological challenge” (mean = .70, median = .69) and “lack of two-way communication” (mean = .73, median = .75) were slight lower.

Table 3
Factor Loadings for Confirmatory Factor Analysis

Factor	Item	λ	SE	Std. λ
The Separation from Instructors	1 I am afraid that my instructor is so separated from students in my online course that s/he may not know our feelings	.96	.08	.73
	2 Without face-to-face interaction, I worry the instructor may not see individual needs of her/his students.	1.17	.06	.87
	3 I worry that my instructor only sees me as a name in the grade book, rather than as an individual.	1.09	.06	.83
	4 I wish it were as easy for my online instructor to know how hard I try, as it is for a face-to-face instructor to know.	.89	.08	.69
The Separation from Peers	5 I am stressed when I anticipate that I will complete the course pretty much by myself.	1.03	.07	.77
	6 I worry that online courses do not provide learners the peer support they need.	1.08	.07	.85
	7 I feel stressed because the sense of isolation when taking an online course.	1.18	.07	.84
	8 I would like to have the same sense of belongingness to a learning community in the online course that I have in f2f classrooms.	.71	.09	.56
The Technological	9 I am nervous that the course materials are delivered in electronic version (e.g., online textbooks, slides).	.87	.09	.63
	10 Learning how to navigate in Blackboard or other online apps makes me nervous.	.83	.09	.66

The Scale of Online Course Anxiety

The Lack of two-way communication	11	I am often afraid that I may miss assignments because I am not familiar with the platform of the online course.	.98	.09	.69
	12	I feel anxious even before an online class starts because of the technical issues that I must deal with during the course.	1.11	.07	.80
	13	Realizing my learning in an online course is so much dependent on technology makes me uncomfortable.	.98	.07	.79
	14	I am afraid that I do not know the technology well enough to learn well in an online course.	.64	.08	.63
	15	I'm afraid my learning and performance in online courses may be harmed by technical setbacks (or complications).	.97	.08	.72
	16	Face-to-face interaction is more comfortable and natural than online interactions.	.95	.07	.76
	17	I could articulate my thoughts much better if I could meet my instructor face to face.	.98	.08	.75
	18	Not being able to ask questions I have during online lectures hinders my concentration on the instruction.	.99	.07	.74
	19	I feel worried that we might miss many opportunities for informal communication that we had in face-to-face classrooms.	1.03	.07	.77
	20	The asynchronous communication in the online course does not seem natural.	0.95	.08	.76
	21	I feel uncomfortable during the "waiting period" for others' responses in online communication.	.74	.09	.59
	22	I do not think online courses can offer adequate communication for deep discussion as needed.	1.03	.07	.74

Note. λ = factor loading, SE = standard error, Std. = standardized.
 All standardized factor loadings were significant at $p < .001$ level.
 Teacher sep = the separation from instructors.
 Peers sep = the separation from peers.
 Tech = the technological challenge.
 Lack comm = the lack of two-way communication.

Respectively, the AVE for each factor was .62 (separation from instructors), .59 (separation from peers), .50 (technological challenge), .54 (lack of two-way communication), and .55 (overall). All the AVE values were at or over .5, which indicated that SOCA exhibits an adequate level of convergent validity. The factor correlations were presented in Table 4, and all were less than .85, as well as in the expected directions, thus providing support for the discriminant validity.

Table 4
Factor Correlations

Factor	1	2	3	4
Teacher sep	1.00			
Peers sep	.76***	1.00		
Tech	.58***	.67***	1.00	
Lack comm	.81***	.84***	.69***	1.00

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.
 Teacher sep = the separation from instructors.
 Peers sep = the separation from peers.
 Tech = the technological challenge.
 Lack comm = the lack of two-way communication

In sum, the factor structure of SOCA, which stemmed from Keegan's (2013) theoretical framework, was supported by the CFA and SEM results. And psychometrically, the SOCA was found to be a valid and reliable instrument to measure students online course anxiety.

Discussion

This study has a noticeable limitation of sample size that we wish to address in future research. Although the sample size ($n = 170$) in this study fell within Boomsma's (1985) rule-of-thumb of a minimum sample size of 100 to 200, it violates other suggested numbers such as $N:q$ rule of 10 observations (Kline, 2015) or 5 observations (Bentler & Chou, 1987) per parameter estimated. For this study, we proposed the factor structure by having literature-grounded and theory-driven rationale; however, in light of the sample size, we have decided only to focus on the psychometric characteristics of the SOCA and have not incorporated variables that were potentially suitable for an invariance testing.

For future research, the invariance tests could be conducted to evaluate the generalizability of SOCA in instances such as the form of the course (e.g., fully online or hybrid online), the form of the instruction types (e.g., synchronous and asynchronous), and the demographic of students (e.g., undergraduate students and graduate student). We believe the SOCA could benefit from a larger size and broader spectrum of participants in a future study, thus ensuring higher power and better generalizability of the scale. Moreover, considering the negative relationship between anxiety and performance of students in online courses (Hauser, Paul, & Bradley, 2012; Stowell, & Bennett, 2010), creating the instrument is only the first step in a line of research that could improve the quality and outcome of online education. Using SOCA, we plan to identify factors in the design, implementation, and delivery of online courses in correlational studies, which will guide us in experimental research to find solutions to reduce anxiety and enhance student learning in the relatively new online environment.

Overall, the study contributes a much-needed instrument to measure online course anxiety (SOCA), which is theoretically sound and demonstrated to be reliable and valid. Starting with a psychological postulation that state-anxiety is caused by novelty, uncertainty, and unfamiliarity (Grupe & Nitschke, 2013), we adopted Keegan's (2013) model as a framework that identifies the fundamental differences between online and traditional courses, including separation from instructor, separation from peers, technological challenge, and lack of two-way communication. We developed items for the instrument from students' input of their experiences in online courses to ensure the ecological validity, while statistical analysis on the psychometric features of the instrument, including the analyses of factor structures, reliability, and validity, provided us with satisfactory evidence of soundness. When introducing the new instrument to fellow researchers who share our concern/interest in online education, we hope the instrument will be applied and tested further in future research. We believe such an instrument is needed for researchers who are interested in online education, especially those who are interested in ameliorating the negative feelings, such as anxiety, students experience when taking online courses.

Declarations

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author received approval from the ethics review board of Texas Tech University, USA for this study.

The author received no financial support for the research, authorship, and/or publication of this article.

References

- Abdous, M. H. (2019). Influence of satisfaction and preparedness on online students' feelings of anxiety. *The Internet and Higher Education, 41*, 34–44. <https://doi.org/10.1016/j.iheduc.2019.01.001>
- Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments, 1*–13. <https://doi.org/10.1080/10494820.2020.1813180>
- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology, 2*(1), 45–51.
- Alibak, M., Talebi, H., & Neshat-Doost, H. T. (2019). Development and validation of a test anxiety inventory for online learning students. *Journal of Educators Online, 16*(2).
- Al-Shboul, M. M., Ahmad, I. S., Nordin, M. S., & Rahman, Z. A. (2013). Foreign language reading anxiety in a Jordanian EFL context: A qualitative study. *English Language Teaching, 6*(6), 38–56. <https://doi.org/10.5539/elt.v6n6p38>
- Baloglu, M., Deniz, M. E., & Kesici, S. (2011). A descriptive study of individual and cross-cultural differences in statistics anxiety. *Learning and Individual Differences, 21*(4), 387–391. <https://doi.org/10.1016/j.lindif.2011.03.003>
- Beck, A. T. (1985). Theoretical perspectives on clinical anxiety. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the anxiety disorders* (p. 183–196). Lawrence Erlbaum Associates, Inc.
- Beck, A. T., & Clark, D. A. (1997). An information processing model of anxiety: Automatic and strategic processes. *Behaviour Research and Therapy, 35*(1), 49–58. [https://doi.org/10.1016/S0005-7967\(96\)00069-1](https://doi.org/10.1016/S0005-7967(96)00069-1)
- Beck, A. T., & Rush, A. J. (1985). A cognitive model of anxiety formation and anxiety resolution. *Issues in Mental Health Nursing, 7*(1–4), 349–365. <https://doi.org/10.3109/01612848509009461>
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238. <https://doi.org/10.1037/0033-2909.107.2.238>
- Bentler, P. M., & Chou, C. P. (1987). Practical issues in structural modeling. *Sociological Methods & Research, 16*(1), 78–117. <https://doi.org/10.1177/0049124187016001004>
- Bernard, R., Abrami, P., Lou, Y., & Borokhovski, E. (2004). A methodological morass? How we can improve quantitative research in distance education. *Distance Education, 25*(2), 175–198. <https://doi.org/10.1080/0158791042000262094>

- Besser, A., Flett, G. L., & Zeigler-Hill, V. (2020). Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students. *Scholarship of Teaching and Learning in Psychology*. <http://dx.doi.org/10.1037/stl0000198>
- Bolliger, D. U., & Halupa, C. (2012). Student perceptions of satisfaction and anxiety in an online doctoral program. *Distance Education*, 33(1), 81–98. <https://doi.org/10.1080/01587919.2012.667961>
- Boomsma, A. (1985). Nonconvergence, improper solutions, and starting values in lisrel maximum likelihood estimation. *Psychometrika*, 50(2), 229–242. <https://doi.org/10.1007/BF02294248>
- Brewer, M. B., & Crano, W. D. (2000). Research design and issues of validity. In H. T. Reis & C. M. Judd (Eds), *Handbook of research methods in social and personality psychology* (p. 3–16). Cambridge University Press.
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, 21(2), 230–258. <https://doi.org/10.1177/0049124192021002005>
- Cassady, J. C. (2004). The influence of cognitive test anxiety across the learning-testing cycle. *Learning and Instruction*, 14(6), 569–592. <https://doi.org/10.1016/j.learninstruc.2004.09.002>
- Celik, V., & Yesilyurt, E. (2013). Attitudes to technology, perceived computer self-efficacy and computer anxiety as predictors of computer supported education. *Computers and Education*, 60(1), 148–158. <https://doi.org/10.1016/j.compedu.2012.06.008>
- Conneely, S., & Hughes, B. M. (2010). Test anxiety and sensitivity to social support among college students: Effects on salivary cortisol. *Cognition, Brain, Behavior*, 14(4), 295.
- Cruise, R. J., Cash, R. W., & Bolton, D. L. (1985). *Development and validation of an instrument to measure statistical anxiety* [Conference presentation]. Annual Meeting of the American Statistical Association Statistics Education Section, Las Vegas, Nevada, United States.
- DeVaney, T. A. (2010). Anxiety and attitude of graduate students in on-campus vs. online statistics courses. *Journal of Statistics Education*, 18(1). <https://doi.org/10.1080/10691898.2010.11889472>
- Dunn, K. (2014). Why wait? The influence of academic self-regulation, intrinsic motivation, and statistics anxiety on procrastination in online statistics. *Innovative Higher Education*, 39(1), 33–44. <https://doi.org/10.1007/s10755-013-9256-1>
- Enders, C. K. (2010). *Applied missing data analysis*. Guilford Press.

Eryilmaz, M., & Cigdemoglu, C. (2019). Individual flipped learning and cooperative flipped learning: Their effects on students' performance, social, and computer anxiety. *Interactive Learning Environments*, 27(4), 432–442.

Eysenck, H. J. (1955). A dynamic theory of anxiety and hysteria. *The Journal of Mental Science*, 101(422), 28–51.

Eysenck, H. J., & Rachman, S. (2013). *The causes and cures of neurosis: An introduction to modern behaviour therapy based on learning theory and the principles of conditioning*. Routledge.

Garrison, D. R. (2000). Theoretical challenges for distance education in the 21st century: A shift from structural to transactional issues. *International Review of Research in Open and Distance Learning*, 1(1), 1–17. <https://doi.org/10.19173/irrodl.v1i1.2>

Gravetter, F. J., & Forzano, L. A. B. (2018). *Research methods for the behavioral sciences*. Cengage Learning.

Grupe, D. W., & Nitschke, J. B. (2013). Uncertainty and anticipation in anxiety: An integrated neurobiological and psychological perspective. *Nature Reviews Neuroscience*, 14(7), 488–501. <https://doi.org/10.1038/nrn3524>

Gwet, K. L. (2014). Handbook of inter-rater reliability: the definitive guide to measuring the extent of agreement among raters: [a handbook for researchers, practitioners, teachers & students]. In *Gaithersburg, MD: STATAXIS Publishing Company*.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). Prentice Hall.

Hardesty, D. M., & Bearden, W. O. (2004). The use of expert judges in scale development: Implications for improving face validity of measures of unobservable constructs. *Journal of Business Research*, 57(2), 98–107.

Hauser, R., Paul, R., & Bradley, J. (2012). Computer self-efficacy, anxiety, and learning in online versus face to face medium. *Journal of Information Technology Education: Research*, 11(1), 141–154. <https://doi.org/10.28945/1633>

Hilliard, J., Kear, K., Donelan, H., & Heaney, C. (2020). Students' experiences of anxiety in an assessed, online, collaborative project. *Computers & Education*, 143, 103675. <https://doi.org/10.1016/j.compedu.2019.103675>

Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 1(1), 104–121. <https://doi.org/10.1177/109442819800100106>

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, 70(2), 125–132. <https://www.jstor.org/stable/pdf/327317.pdf>

Hoyle, R. H., & Panter, A. T. (1995). Writing about structural equation models. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 158–176). Sage.

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>

Integrated Postsecondary Educational Data System. (2019). Spring 2017 and spring 2018, fall enrollment component. *Digest of Education Statistics*.

https://nces.ed.gov/programs/digest/d19/tables/dt19_311.15.asp

Keegan, D. J. (1980). On defining distance education. *Distance Education*, 1(1), 13–36. <https://doi.org/10.1080/0158791800010102>

Keegan, D. (2013). *Foundations of distance education*. (3rd ed). Routledge.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). Guilford Press.

Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford Press.

Koerner, N., & Dugas, M. J. (2006). A cognitive model of generalized anxiety disorder: The role of intolerance of uncertainty. In G. C. Davey & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment*, (p. 201–216). John Wiley & Sons.

Krusche, A., Cyhlarova, E., & Williams, J. M. G. (2013). Mindfulness online: An evaluation of the feasibility of a web-based mindfulness course for stress, anxiety and depression. *BMJ Open*, 3(11). <https://doi.org/10.1136/bmjopen-2013-003498>

Lee, K. (2017). Rethinking the accessibility of online higher education: A historical review. *The Internet and Higher Education*, 33, 15–23. <https://doi.org/10.1016/j.iheduc.2017.01.001>

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35(6), 382–385. <https://doi.org/10.1097/00006199-198611000-00017>

Martin, S., & Valdivia, I. M. A. (2017). Students' feedback beliefs and anxiety in online foreign language oral tasks. *International Journal of Educational Technology in Higher Education*, 14(1), 1–15. <https://doi.org/10.1186/s41239-017-0056-z>

Montelpare, W. J., & Williams, A. (2000). Web-based learning: Challenges in using the Internet in the undergraduate curriculum. *Education and Information Technologies*, 5(2), 85–101. <https://doi.org/10.1023/A:1009647400624>

- Mowrer, O. H. (1939). A stimulus-response analysis of anxiety and its role as a reinforcing agent. *Psychological Review*, *46*(6), 553. <https://doi.org/10.1037/h0054288>
- Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). E-Learning, online learning, and distance learning environments: Are they the same? *Internet and Higher Education*, *14*(2), 129–135. <https://doi.org/10.1016/j.iheduc.2010.10.001>
- Moore, M. G. (1993). Theory of transactional distance. *Theoretical Principles of Distance Education*, *1*, 22–38.
- Moore, M. G., & Kearsley, G. (2011). *Distance education: A systems view of online learning*. Cengage Learning.
- Muthén, L. K., & Muthén, B. O. (2017). *Mplus user's guide*. (8th ed.). Muthén & Muthén.
- Muris, P., Merckelbach, H., van Brakel, A., Mayer, B., & van Dongen, L. (1998). The Screen for Child Anxiety Related Emotional Disorders (SCARED): Relationship with anxiety and depression in normal children. *Personality and Individual Differences*, *24*(4), 451–456.
- National Center for Educational Statistics. (2018a). *2003–04, 2007–08, 2011–12, and 2015–16 National Postsecondary Student Aid Study*. Retrieved from https://nces.ed.gov/programs/digest/d18/tables/dt18_311.22.asp
- National Center for Educational Statistics. (2018b). *2003–04, 2007–08, 2011–12, and 2015–16 National Postsecondary Student Aid Study*. https://nces.ed.gov/programs/digest/d18/tables/dt18_311.32.asp
- Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist*, *37*(2), 91–105. https://doi.org/10.1207/S15326985EP3702_4
- Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Network*, *6*(1), 21–40.
- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing and Health*, *29*(5), 489–497. <https://doi.org/10.1002/nur.20147>
- Rosen, L. D., & Weil, M. M. (1995). Computer availability, computer experience and technophobia among public school teachers. *Computers in Human Behavior*, *11*(1), 9–31. [https://doi.org/10.1016/0747-5632\(94\)00018-D](https://doi.org/10.1016/0747-5632(94)00018-D)
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36. <http://www.jstatsoft.org/v48/i02/>

Saadé, R. G., & Kira, D. (2007). Mediating the impact of technology usage on perceived ease of use by anxiety. *Computers and Education*, 49(4), 1189–1204. <https://doi.org/10.1016/j.compedu.2006.01.009>

Saddik, B., Hussein, A., Sharif-Askari, F. S., Kheder, W., Temsah, M. H., Koutaich, R. A., Haddad, E. S., Al-Roub, N. M., Marhoon, F. A., Hamid, Q., & Halwani, R. (2020). Increased levels of anxiety among medical and non-medical university students during the COVID-19 pandemic in the United Arab Emirates. *Risk Management and Healthcare Policy*. 13, 2395–2406. <https://doi.org/10.2147/RMHP.S273333>

Salkovskis, P. M. (1985). Obsessional-compulsive problems: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, 23(5), 571–583. [https://doi.org/10.1016/0005-7967\(85\)90105-6](https://doi.org/10.1016/0005-7967(85)90105-6)

Salkovskis, P. M., & Warwick, H. M. C. (1986). Morbid preoccupations, health anxiety and reassurance: A cognitive-behavioural approach to hypochondriasis. *Behaviour Research and Therapy*, 24(5), 597–602. [https://doi.org/10.1016/0005-7967\(86\)90041-0](https://doi.org/10.1016/0005-7967(86)90041-0)

Schafer, J. L. (1999). Multiple imputation: A primer. *Statistical Methods in Medical Research*, 8(1), 3–15.

Schau, C., Stevens, J., Dauphinee, T. L., & Vecchio, A. Del. (1995). The development and validation of the survey of attitudes toward Statistics. *Educational and Psychological Measurement*, 55(5), 868–875. <https://doi.org/10.1177/0013164495055005022>

Sim, J., & Wright, C. C. (2005). The kappa statistic in reliability studies: Use, interpretation, and sample size requirements. *Physical Therapy*, 85(3), 257–268. <https://doi.org/10.1093/ptj/85.3.257>

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>

Steiger, J. H., & Lind, J. C. (1980, May). *Statistically based tests for the number of common factors*. [Conference presentation]. Annual Spring Meeting of the Psychometric Society, Iowa City, Iowa, United States.

Stowell, J., & Bennett, D. (2010). Effects of online testing on student exam performance and test anxiety. *Journal of Educational Computing Research*, 42(2), 161–171. <https://doi.org/10.2190/EC.42.2.b>

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research techniques*. Sage.

- Spielberger, C. D. (1966). Theory and research on anxiety. *Anxiety and Behavior*, 1(3). <https://doi.org/10.1016/b978-1-4832-3131-0.50006-8>
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the state-trait anxiety inventory*. Consulting Psychologists Press.
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1–10. <https://doi.org/10.1007/BF02291170>
- Unger, S., & Meiran, W. (2020). Student attitudes towards online education during the COVID-19 viral outbreak of 2020: Distance learning in a time of social distance. *International Journal of Technology in Education and Science*, 4(4), 256–266.
- van Buuren S, Groothuis-Oudshoorn K (2011). mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*, 45(3), 1–67. <https://www.jstatsoft.org/v45/i03/>
- Wang, C., Zhao, H., & Zhang, H. (2020). Chinese college students have higher anxiety in new semester of online learning during COVID-19: A machine learning approach. *Frontiers in Psychology*, 11, 3465. <https://doi.org/10.3389/fpsyg.2020.587413>
- Wombacher, K. A., Harris, C. J., Buckner, M. M., Frisby, B., & Limperos, A. M. (2017). The effects of computer-mediated communication anxiety on student perceptions of instructor behaviors, perceived learning, and quiz performance. *Communication Education*, 66(3), 299–312. <https://doi.org/10.1080/03634523.2016.1221511>
- Yang, Z., Asbury, K., & Griffiths, M. D. (2019). An exploration of problematic smartphone use among Chinese university students: Associations with academic anxiety, academic procrastination, self-regulation and subjective wellbeing. *International Journal of Mental Health and Addiction*, 17(3), 596–614. <https://doi.org/10.1007/s11469-018-9961-1>
- Young, D. J. (1991). Creating a low-anxiety classroom environment: What does language anxiety research suggest? *The Modern Language Journal*, 75(4), 426–437. <https://doi.org/10.1111/j.1540-4781.1991.tb05378.x>
- Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A. R. (2015). Design and implementation content validity study: Development of an instrument for measuring patient-centered communication. *Journal of Caring Sciences*, 4(2), 165–178.

Student Perspectives of Online Teaching and Learning During the COVID-19 Pandemic

Burhan Ozfidan

Florida Gulf Coast University, USA / Prince Sultan University, Saudi Arabia

Orchida Fayeze

Hala Ismail

Prince Sultan University, Saudi Arabia

Abstract

This exploratory study explores an array of student perceptions regarding their online learning experience. In the present circumstances where the COVID-19 pandemic has affected all fields of life, most educational institutions have resorted to online instruction and virtual meetings. The present study explored the variables contributing to student satisfaction with online teaching and learning effectiveness. Data were collected through an online survey. Python with Scikit-Learn was used for data analysis to implement regression functions and classify the data. The results of the study defined effective online teaching during the COVID-19 pandemic. In combination, eight criteria contributed to the definition: motivating students to accomplish, communicating effectively, meeting students' needs, providing access to a wide range of content, providing a well-organized course structure, providing numerous sources, providing explanatory feedback, and facilitating meaningful discussions. The results of the study are beneficial to understand what kind of factors contribute to student satisfaction concerning online transition during the COVID-19 pandemic. They will also help them develop a future support plan to help youth cope with virtual classes and online instruction.

Keywords: Online instruction, student perspectives, COVID-19 pandemic

Ozfidan, B., Fayeze, O., Ismail, H. (2021). Student perspectives of online teaching and learning during the COVID-19 pandemic. *Online Learning*, 25(4), 461-485.

DOI: 10.24059/olj.v25i4.2523

What is online teaching effectiveness? Many researchers conducting studies on effective teaching have investigated this construct with numerous different techniques. Research studies have investigated student validity ratings (Murray et al., 1990), the personal effectiveness of instructors on student ratings (Feldman 1984), the relationship of student characteristics on student ratings (Greenwald & Gillmore, 1997; Arbuckle & Williams 2003), and the relationship between student accomplishments and student ratings (Centra & Gaubatz 2000; Cohen, 1981). However, effective online teaching might look very different to some students, although several research studies have agreed on the principal types of teaching effectiveness in traditional classrooms.

Researchers have asserted the active role of students' perceptions by aggregating the different domains to determine efficiency. Marsh (1984; 2007) provides an evaluation of the reliability of students' perceptions in validating teaching practices in university teaching. He stated that "student ratings are clearly multidimensional, quite reliable, reasonably valid . . . , and are seen to be useful to students, faculty and administrators" (1984, p.749). Marsh (2007) proposed that effective teaching is contextual; to be valid, it must be studied in different settings and with different criteria. Greenwald (1997) is further concerned with concerns and usefulness of student ratings of instruction. He suggested that students' perceptions are affected by various dimensions other than teaching effectiveness while favoring the use of these ratings effectively. Likewise, the present study investigates the various domains of students' perceptions and illustrates the significance of virtual classes during the COVID-19 pandemic.

In the current study, participants provided a definition of effective online teaching during the Covid-19 pandemic. In combination, eight items contributed to the definition: motivating students to accomplish, communicating effectively, meeting students' needs, providing access to a wide range of content, providing a well-organized course structure, providing numerous resources, providing explanatory feedback, and facilitating meaningful discussions. These items, in an online classroom, may enhance connections between the instructor, the students, and the course content. This study created a dataset concerning the effectiveness of online teaching and learning during the present COVID-19 pandemic. The study highlighted the differences between online and traditional courses and assessed student perspectives on online teaching effectiveness. This study is important because the results will be beneficial to understand what kind of factors contribute to student satisfaction concerning online transition during the COVID-19 pandemic, as well as help them develop a future support plan to help students cope with virtual classes and online instruction.

Research Question

How do students describe effective online learning during the present circumstances where COVID-19 pandemic?

Literature Review

The COVID-19 pandemic has presented a real challenge for educators everywhere in the world. Hence, a need exists to investigate the perceptions of students who are enrolled in face-to-face classes and had to switch to online classes in a very short time. The current literature review focuses on investigating the different factors contributing to the students' perceptions of online learning.

Online Learning vs. Face-to-Face Classes

The advantages and the instructional features vary in online learning, which has proven to be successful over the years (Allen & Seaman, 2011; Brass, 2002; Chambers, 2002; Lindberg, 2004; O'Neil, Singh, & O'Donoghue, 2004). First and foremost, a differentiation must be made between online learning as courses in which all teaching and course material are online instead of definitions that include technology or web-based material that supports in-person courses (Allen & Seaman, 2011). Online learning refers to “the use of a wide variety of electronic media as well as information and communication technologies to achieve educational purposes” (Muljana & Luo, 2019, p. 20). The definition includes the electronic delivery of instruction through the Internet, Intranet, or multimedia platforms (Hall, 2003; O'Neil, Singh, & O'Donoghue, 2004; Ozfidan, & Burlbaw, 2020). The goal is to have a convenient and effective means of delivering classes to ensure that what a learner experiences in an online class is similar to a face-to-face class. Online learning is linked to technological advancement and is exponentially increasing, with some studies estimating 2002 to be the real starting point of this growth in the United States (Allen & Seaman, 2013). The growing need for online education can be recognized as a “market need,” and the great increase in online programs may satisfy the needs of students aiming for the convenience of online education (Eduventures, 2005). Students' readiness in online education reflects in their perceptions related with online vs face-to-face classes. Such readiness cover domains such as student attributes, time management, technical and communication competencies (Martin, Stamper & Flowers, 2020).

Both online and traditional classes have a number of overlapping factors for success and struggles. Gunawardena (1995) highlighted that social presence is necessary to increase communication in schooling. Yet he follows-up on the analysis of the impact of social presence in online environment as a means to perceive others as “real” in online communication. Connor contemplates the challenge of maintaining student engagement and achieving active learning in face-to-face environment (Connor, 2009). One of the most acknowledged benefits of online classes is convenience.

Perceptions of Students and Online Courses

Some research has sought to establish a link between students' perceptions and achievement. Some studies have validated the reliability of student perceptions in educational research (Marsh, 1984; McKeachie, 1979; Kocabas, Ozfidan, & Burlbaw, 2019). Many institutions are keen to conduct questionnaires to verify the opinions of student stakeholders. Researchers even incorporate student satisfaction as part of their definitions of teaching effectiveness (Gorsky & Blau, 2009). Further studies have indicated that high levels of student satisfaction are related to achievement (Zhang, 2005). Student satisfaction plays an active role not only in course completion but also in taking other online courses in the future (Matsunaga, 2016). Thus, more studies have recommended that student satisfaction can be used to enhance learning because it is directly linked to motivation and learning (Koohang & Durante, 2003). An evaluation of student perceptions provides new metrics for measuring learning experiences, unlike the deductive knowledge that a teacher's perspective provides. Pellegrino and Hilton speak of various dimensions that students reveal about their learning, such as lifelong, social and relationship skills, cultural sensitivity to other life perspectives, and digital skills (Pellegrino & Hilton, 2013). A considerable body of literature affirms that student satisfaction increases with high-quality online courses (Clawson, 2007).

Domains of Students' Satisfaction

Certain features distinguish online learning from face-to-face learning. Those features become the main factors that shape student experiences. Student satisfaction in various studies covers various domains or factors that are directly related to the success of the learning experience. In some studies, satisfaction is explored within an instructor's directions and support, satisfaction with their commitment to learning, and satisfaction with the course design and policies (Lo, 2010). Others have focused on dimensions of social presence, social interaction, and satisfaction (Bali & Liu, 2018). Some studies use student satisfaction as a parameter among other factors of online success. Other satisfaction domains that are explored are social presence, social interaction and collaborative learning (Spears, 2012), group learning environment, technology and preferences (Fortune, Spielman, & Pangelinan, 2011), as well as course design, learner interaction, student engagement and instructor presence (Gray & KiLoreto, 2016).

One of the most critical factors that affects the overall experience of students is the structure and instructional design of online courses. Instructional design and delivery is a common component of the success of the online learning experience. Several studies have explored the efficiency of instructional design (Bozarth, Chapman, & LaMonica, 2004; Wegner, Holloway, & Garton, 1999). However, linking factors like course structure and design to student performance and satisfaction require further study. Dabbagh affirms the link between student satisfaction and an adequate instructional method, support, and course structure (Dabbagh, 2007). Furthermore, Dabbagh (2007) identifies both the instructors and the students as key to achieving an effective learning environment, a view that builds on previous research identifying both parties as primary elements of a successful experience (Wegner, Holloway, & Garton, 1999). Gomez-Rey, Barbera, and Fernandez-Navarro (2018) link course design to the role of instructors because course design includes the design of instructional strategies for the learning environment.

Another important feature that affects the students' overall satisfaction with online classes is the role of the online teacher. Even though an extensive body of literature tackles the importance of the role of teachers in online classes, each has identified its unique elements based on their students' needs and learning environment. Thach and Murphy (1995) have identified eleven online instructor roles: "instructor, instructional designer, technology expert, technician, administrator, site facilitator, support staff, editor, librarian, evaluation specialist, and graphic designer" (p.59). Goodyear et al. (2001) identified "the additional roles of content facilitator, technologist, designer, manager/administrator, process facilitator, adviser/counselor, assessor, and researcher" (p.69). Abdulla (2004) combined Thach and Murphy's model of students' perceptions and Berge's (Berge, 1995) role-based educational model to report the differences between the perceptions of students and experts regarding the role of the online instructor. The findings pointed out a significant difference between students' perceptions and experts' perceptions regarding the most crucial online instructor roles. To the experts, the social role was the most important one, whereas the students considered the instructor role of provider of content knowledge as the most important one.

Gomez-Rey, Barbera, and Fernandez-Navarro (2018) acknowledged that the way studies have approached the role of a teacher (using what they call a "top-down or deductive" approach) was not the most representative of the efficiency of such a role. They promoted student perceptions as a bottom-up measure to assess the role of a teacher in online instruction (Gomez-Rey, Barbera, & Fernandez-Navarro, 2018). Moore (2003) said that offering support for students in an online environment should be "proactive" rather than reactive (Moore, 2003, p. 143). He

said that areas of student support included student-generated issues, technical issues, and emotional stress.

The interaction between teachers and students is an essential feature of the success of online learning. A lack of interaction between the teachers and the students is a major challenge for students in online classes and has been found to be an issue (Wilkes, Simon, & Brooks, 2006; Gregory, 2003). Thus, it becomes crucial to attend to this element to improve the quality of online courses. Research shows that learner-to-instructor interaction leads to higher student engagement in online courses (Dixon, 2010; Gayton & McEwen, 2007; Jung et al., 2002; Ozfidan, & Mitchell, 2020).

Among the most critical factors that affect overall student experiences is the quality of feedback that they receive from their teacher. Feedback is an essential element in the educational cycle of learning. In most research conducted about successful online learning environments, student satisfaction with interaction and feedback was key (Awofeso & Bamidele, 2016; Eom, Wen, & Ashill, 2006; Muilenburg & Berge, 2005; Ruey, 2010; Ozfidan, 2021; Song et al., 2004). Gaytan includes feedback as one of the means of creating interaction in an online environment, thus recommending that teachers utilize immediate and ongoing feedback (Gaytan, 2005). The idea of interactive feedback as an element of communication is further validated as support for the success of online courses (Harris, 2014).

The feedback given must be constructive and effective. For feedback to be considered constructive, it must include certain features as “being descriptive; timely; honest; useful; respectful; clear; issue-specific; supportive; motivating; action-oriented; solution-oriented; strictly confidential; trust; collaborative and informative” (Hamid & Mahmood, 2010, p. 226). For online classes, the constructive feedback students receive becomes even more important. Effective feedback is essential for the students to keep them engaged in their courses and the feedback must be given in a timely manner to compensate for the distance between the teacher and the students (Tanis, 2020). Instructor feedback can take several forms. Corrective instructor feedback, which is usually focused on the specific content of the task performance, may be categorized as no feedback is given, simple verification or knowledge of results, knowledge of correct response, elaborated feedback, and try-again feedback (Dempsey, Driscoll, & Swindell, 1993).

Method

Design and Participants

The study used a survey instrument to investigate students’ perspectives on effective online learning and teaching. According to IRB protocol (#2020-03-0033), all participants and instructors (who helped in data collection), were completely informed regarding the procedures of the study. Participation in the study was voluntary, and all data were stored confidentially. None of the participants’ identities were exposed. The data were collected in the spring semester in 2020. The survey link was emailed to 3465 undergraduate and graduate students in April 2020 and the last response was received in June 2020. Totally, 890 participants (Male=452; Female=438) completed the survey instrument for a response rate of about 25.6%. Of the responses received, the descriptive statistics of participants indicated that 70% of the participants were undergraduate students, and the rest (30%) were graduate students. The data was collected from a diverse population consisting of two U.S. institutions (408 participants) and one Saudi institution (482 participants). All the participants were able to speak English fluently. Additionally, 479 participants spoke Arabic; 118 participants spoke Spanish; 25 participants

spoke Urdu; 9 participants spoke French; 7 participants spoke Mandarin; and 5 participants spoke Turkish. Participants' majors were social science (83.5%) (e.g., Education, Political Science, Sociology, Business, Psychology, and so on) and the rest of them (16.5%) had an engineering background (Electrical Engineering, Computer Engineering, Civil Engineering, and so on).

Instrument

The survey began with demographic questions to identify the background information of the participants, and it continued with 5-point Likert-type scale questions (strongly disagree=1; disagree=2; neutral=3; agree=4; strongly agree=5). Thirty items highlighted the general perspective of effective online teaching, and the remaining six items reflected specific characteristics of teaching effectiveness. Thirty items measured teaching effectiveness consisting of student satisfaction on the effects of instructional design and delivery, effects of teacher roles on student satisfaction, student-faculty interaction on student satisfaction, and effects of quality of feedback on students' satisfaction. All items on the instrument were generated from the literature review. Each item on the instrument was grounded in various studies such as Hara and Kling (2000), Abrami et al. (1990), Cohen (1981), Marsh (1987), Northrup (2002), and Feldman (1984). These all items collectively form a measure for effective online teaching and learning. Additionally, there were two open-ended questions to describe the overall impression of online courses at the end of the survey instrument.

Data Collection

The researchers started collecting data in April 2020. The survey instrument was prepared in the Qualtrics program and sent out to participants. To collect the data, the researchers used their personal contacts with the department heads at three different universities. The prepared survey link was emailed to the department heads, and they spread the link to the instructors in their departments. Afterward, each instructor emailed the prepared survey link to all of their students before starting the class. Each instructor allowed their students to complete the survey during their class period. Each participant had to accept the consent form on the first page of the survey instrument before filling out the survey.

Data Analysis

For the data analysis of the study, the researchers conducted descriptive statistics such as means, standard deviations, and correlations (*rp*). The researchers used multiple regression to explain the level to which there was a linear relationship between a dependent variable and independent variables and classified the data. Multiple regression analysis, according to Dupont and Plummer (1998), "refers to a set of techniques for studying the straight-line relationships among two or more variables" (p. 592). The form of the multiple regression equation is as follows:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p + \varepsilon$$

As indicated above, the Y represents the dependent variable, and Xs are the independent variables. For the present study, the overall effectiveness of online teaching and learning items was the dependent variable, and this was regressed onto the thirty items, which were independent variables of the study. Because the study had many independent variables, the analysis indicated a multicollinearity issue. In other words, there were two items that were highly correlated with each other.

This caused an issue with understanding which independent variable contributed to the variance explained in the dependent variable. To solve the issue, the highly correlated items were removed from the scale. As a weighted average in which the regression coefficients (β 's) were

the weights, this multiple regression indicated the relationship between the dependent variable and the independent variables. Linear regression in Python with Scikit-Learn was performed, which is a library in Python that provides numerous supervised and unsupervised learning algorithms. The purpose of using Python with Scikit-Learn is to implement regression functions and classify the data.

The researchers also proposed two open-ended questions at the end of the survey instrument to allow students (participants) to reflect their attitudes, feelings, and understanding of online learning. The data downloaded from Qualtrics and categorized and identified repeating themes by coding (a word or simple phrase that summarizes the idea). After the data were downloaded, the researchers coded the data manually.

Findings

All thirty items in the instrument were found to be internally consistent (Cronbach’s Coefficient Alpha = .9), and Table 1 below shows that the item-to-overall correlations were all affirmative and at least moderate, showing some proof that the set of 30 items captured the principle of effective online teaching and learning. All items were found to be reliable. Therefore, the survey questionnaire that measured online teaching effectiveness for the students was reliable and valid.

How do students describe effective online teaching and learning? By using regression analysis, the researchers addressed this research question. The purpose of using regression was to find a principal group of items in the instrument that most intensely related to online teaching and learning effectiveness. Additionally, the students (participants) who completed the survey also wrote statements that described their overall impression of online courses. The results of open-ended questions were determined, in part, by the regression analysis’s results. The table displayed “the means and standard deviations” for each of the thirty items and “the overall item.” Likewise, Table 1 highlighted the overall effective online teaching and learning item of the correlation between each item. Item correlations and the overall item ranged from .57 to .81. Table 1 also indicated that the Standard Deviation (SD) range of the study is .79 – 1.19. According to Leys et al. (2013), “a high standard deviation indicates a heterogeneous group” (p. 765). Leys et al. also highlighted that “low standard deviation means data are clustered around the mean, and high standard deviation indicates data are more spread out” (p.765). The low SD of the study highlighted that the data points tended to be very close to the mean; the high SD of the study indicated that the data points were spread out over a large range of values.

Table 1

Descriptive Statistics: Means (M), Standard Deviations (S.D.), Correlations (rp)

Item	M	SD	rp
Communicate effectively	4.13	1.01	.75
Meet students’ need	3.98	0.79	.77
Provide meaningful examples	4.02	1.10	.69
Clear assignment instructions	3.78	1.02	.65
Self-motivation	4.06	0.96	.59
Diverse learning and teaching styles	3.88	1.06	.61
Encourage to take responsibility	4.10	1.10	.66
Foster critical thinking abilities	3.68	1.09	.71
Valuable discussion	4.03	1.11	.57
Provide explanatory feedback	4.31	1.05	.80

Encourage to improve	4.09	1.14	.65
Useful online equipment	4.32	1.12	.70
Easily to reach the instructor	3.67	0.96	.57
Various online activities	4.04	1.01	.67
Provide numerous sources	4.11	1.12	.77
Provide access to a wide range of content	4.21	1.15	.76
Natural interaction between student and instructor	3.79	1.07	.72
Natural interaction among the students	4.12	0.89	.73
Ask any questions freely	4.06	1.08	.61
Provide more successful work	4.01	1.12	.72
Comfortable learning atmosphere	4.56	1.16	.62
Friendly and warm classes	4.07	1.04	.58
Technical issues	4.15	1.11	.59
Provide a well-organized course structure	4.13	1.13	.78
Useful one-on-one virtual meeting	3.97	1.10	.70
Facilitate meaningful discussions	4.01	1.02	.78
Easy to manage course	4.32	1.14	.72
Respect to students	4.37	1.11	.58
Motivate student to accomplish	4.35	1.19	.81
Available out of course	4.21	1.01	.59

Note: Strongly disagree=1; disagree=2; neutral=3; agree=4; strongly agree=5.

An analysis of multiple regression was conducted to find the items to explain overall online teaching and learning effectiveness statistically. The dependent variable was online teaching and learning effectiveness, which was regressed onto the thirty items in the instrument (see the regression analysis Appendix A). Additionally, a plot of the residuals for the thirty items scaled against the anticipated values showed a linear relationship. The R^2 was .881 once all 30 items in the scale were included. Some of the items were removed based on their contribution from the scale. The items dropped from the scale were based on low B-weights, which were judged to be comparable because all items were measured on the same metric. First, the researchers removed seven items (see the last five items in Appendix A) from the scale because they had nonsignificant B-weights, which were almost zero. The remaining 23 items after removal generated an R^2 of .875.

Table 2
Multiple regression analysis

Item	R^2	B	t	p
Motivate student to accomplish		0.23	3.96	< .01
Communicate effectively		0.21	3.99	< .01
Meet students' needs		0.19	4.06	< .01
Provide access to a wide range of content		0.17	2.91	.02
Provide a well-organized course structure		0.16	2.35	< .01
Provide numerous sources		0.19	3.51	< .01
Provide explanatory feedback		0.15	2.79	.04
Facilitate meaningful discussions		0.14	2.11	.03
8 items	.859			

Note: R^2 for each model includes all items listed above and items below are removed.

The researchers totally removed three groups of items from the scale (see the entire scale in Appendix A). Eight items, which were not significant and had low B-weights, were removed

because they had very small unique contributions, and the remaining fifteen items after removal generated an R^2 of .866. Finally, seven items, which had nonsignificant B-weights, were also dropped from the scale, and the remaining eight items had an R^2 of .859. These last eight items remained on the scale were clearly and statistically reflected in overall online teaching and learning effectiveness.

Table 2 above shows that these eight items had very similar B-weights, and the t -test values of the items were measured and found higher than 2. Besides, these eight items were significant with $p < .05$. The eight items in the scale (as displayed in Table 2) included motivating a student to accomplish, communicate effectively, meet students' needs, provide access to a wide range of content, provide a well-organized course structure, provide numerous sources, provide explanatory feedback, and facilitate meaningful discussions. The remaining 22 items, which were removed from the scale, were generally very useful and helpful for an instructor and student but did not essentially predict online teaching and learning effectiveness (see Appendix A). The respondents of the study described a definition of online teaching effectiveness along with the eight items, as seen in Table 2.

Analysis of Open-ended Questions

The analysis of open-ended questions helped the researchers identify how instructors facilitated effective online teaching and learning. The students reflected their positive and negative perspectives. For instance, one of the students stated,

I believe online classes are beneficial for both students and instructors since both of them have more time to study and to achieve certain goals rather than time being lost on the face-to-face classes. Online courses require more self-motivation and time-management skills because we spend more time on our own without someone physically close to keep us focused on deadlines. Our instructor was always motivating us to accomplish. I had a great experience with online classes, and I developed new skills. Overall, online courses are well structured and provide too many informative documents for us.

Students highlighted that effective online teaching and learning consisted of motivating students and providing a well-organized course structure for sufficient academic success. According to one student, "Teachers should provide opportunities for students to personally connect to the subject matter and have them set their own goals and set up a system for self-monitoring and progress-tracking" to motivate students. The students reflected that instructors for effective online teaching and learning should provide numerous sources to meet student needs.

The open-ended data analysis reflected that effective online teaching and learning facilitated meaningful discussions among the students. It builds natural interaction among the students and between students and instructors. According to the response of one student,

Online classes increase the quality of education. I think online classes are more interactive than traditional classes. In my online classes, we had a very useful online discussion, and I learned lots of things from my classmates. My online classes' instructors were well-prepared and provided many useful sources.

Students reflected that effective online teaching brings strong and interactive work. To have an interactive class, one of the students stated, "Teachers need to incorporate an interactive element

on each slide and use digital storytelling in their courses. They should also create a simulated environment where learners can freely practice.” The students highlighted that instructors should be well prepared for their courses and provide access to a wide range of content in their field.

Providing explanatory feedback was also an essential factor in online teaching effectiveness. The open-ended data highlighted that giving explanatory feedback helps students with suggestions for development, learning strategies, and corrections for errors. One student summarized the online experience this way:

My online writing course was very good, and I was receiving useful feedback from my instructor. My instructor was explaining to me every single detail of my issues. When I didn't understand the written feedback, I was meeting with my instructor via Google Hangout to understand the problems clearly.

Most students in the study reflected that feedback was important because it encourages them to think critically about their work and reflect on what they need to do to develop it. According to a student, “My instructor’s meaningful feedback enhanced my critical thinking, reflective practice, and developed my relationships with my instructor, which is important in an online environment.”

On the other hand, some students reflected negative perspectives of online education and how this affected their courses. The open-ended data highlighted that some students did not like online courses since they cause too much stress. One student stated:

I had many technical issues (Internet, submission issues, etc.), and it was affecting my learning negatively. I was also not able to reach my professor easily. My professor was responding to my emails after a week, or I was being ignored. The instructions of the assignments were not clear enough, and I was not getting clarification from the instructor. These all were causing mental issues for me.

Some students indicated that traditional courses were better than online courses because they failed to learn the subject sufficiently.

Overall, the responses to the open-ended questions mostly reflected that the participants were happy with online courses, and with the instructors who made a strong effort to enable meaningful, well instructed, and carefully structured courses. The students expected instructors to engage with them. An effective instructor, according to the students, should help students motivate themselves, adapt to their numerous needs, and demand high-quality work. The instructors should also create an atmosphere to encourage students to work collaboratively and interactively with their instructors and peers.

Discussion

The study provides data on the unique situation in which the Covid-19 pandemic posed challenges for educators everywhere in the world. Most of the research about online classes lies within a very different context than the one governing this study, as most previous research draws from the experience of students’ choice of an online learning environment when face-to-face classes are not “convenient” (Haugen, LaBarre, & Melrose, 2001; Liaw & Huang, 2002; McEwan, 2001).

The current study examines the unique situation of a forced and abrupt online transition due to the COVID-19 lockdown. This variable is considered for two reasons that give this study substantial significance. First, it situates the study among the first to contribute to the initial body of knowledge in that area. The second is the global nature of the COVID-19 online transition, as most schools and universities from all over the world had to adopt this mode of education. Thus, it was relevant to report the experiences of students from a Saudi and a U.S. university, and the data collected had more depth because they were international rather than national. Ultimately, the correlation between the specified domains and student' perceptions offer a dataset for online instruction that validates theory through practice. The results were irrespective of the demographic differences related to gender, undergraduate/graduate status, academic major, age, and the number of online courses.

Thus, the emergent definition of effective online teaching during the COVID-19 pandemic encompassed the student satisfaction domains. In this study, participants provided a definition of effective online teaching during the COVID-19 pandemic. In combination, eight items contributed to the definition. These items were the following: motivating students to accomplish, communicating effectively, meeting students' needs, providing access to a wide range of content, providing a well-organized course structure, providing numerous sources, providing explanatory feedback, and facilitating meaningful discussions. In an online classroom, these items may enhance connections between the instructor, the students, and the course content.

The respondents recognized the importance of self-motivation for succeeding in online classes. This can be explained by the fact that the students in the study did not choose to be enrolled in online classes and that this enrollment was imposed on them due to the pandemic. This required a high level of self-motivation to continue and succeed in the online medium. This is also consistent with previous research that points to the importance of self-motivation for online classes (i.e., Stark, 2019; Berndtson & Makanyama, 2018; Lawrence, 2018; and Yurdugül & Menzi Çetin, 2015). Therefore, an effective online class for respondents was one that successfully motivated them to learn and made it easier for them to motivate themselves. This was done by creating multiple opportunities to connect to the course material and creating a system for the students to monitor and track their progress.

The respondents recognized the importance of an effective course structure and related that structure to the ease of accessing content. Interest in content is directly linked to motivation and, in turn, affects student learning. This finding is consistent with several studies that emphasize how students are more motivated with what they perceive as interesting content, or content related to their jobs (Brass, 2002; Burke & Moore, 2003; Adler, Milne, & Stablein, 2001). In addition to content, the respondents also pointed out that their online classes provided them with all the resources they needed to succeed.

The results indicated that one primary attribute of their online learning was that it provided them with a comfortable learning environment. This is consistent with findings of previous studies (i.e., Skordis-Worrall, Haghparast-Bidgoli, & Batura, 2015; Harris, 2014; Perreault et al., 2008) that also indicated that convenience and flexibility were key features that distinguished online classes from face-to-face classes.

Another essential attribute of online learning, according to the respondents, was that it provided them with the feedback they needed. The respondents in the study were isolated from their teachers and their classmates. Therefore, it was essential for them to receive quality

feedback regarding their progress and performance in their courses to improve their learning and to hold them to a high standard of performance. This result is consistent with previous findings that students perceived feedback as an important attribute of online learning to improve their learning and to keep them motivated (Pan & Shao, 2020; Tanis, 2020; Filius et al., 2018). This further strengthens the importance of receiving quality feedback to improve learning in online classes.

The respondents also highlighted interaction and discussions as important attributes of online classes. Interacting with the teachers and classmates became challenging during the lockdown due to the social distancing constraints. Therefore, the respondents valued the interaction opportunities and discussions in their online classes. The respondents viewed interaction as an important quality in a productive and effective online class. Creating an interactive online class can be very challenging for the teacher but might be facilitated by using videoconferencing tools, i.e., Google Meet and Zoom.

In their open-ended responses, the respondents highlighted some challenges that they faced in online classes. Technical difficulties were probably the most stated challenge. Another challenge was related to time management. Therefore, to ensure that online classes are effective, students must receive technical support regularly and receive guidance regarding managing study time.

Limitations and Future Research

The strengths of this study relate to number of participants and methodology. The researchers chose the group of participants to explore the perceptions of students towards their online learning and to use it as way to define and depict a picture of effective online learning. One of the areas of strengths of the study is that the sample size of the study allowed for generalizability of the findings. Although the size of the sample is a major area of strength, the study precludes conclusions regarding the socio-economic backgrounds of the participants and how it affected their perceptions of effective online learning. The Saudi participants, for instance, were all students in a private university and hence it is reasonable to assume similar socio-economic backgrounds. The major area of strength of this study is that it captures an exceptional situation where the students were forced to transit to online learning almost overnight. The study sheds light on a situation that affected students in almost every part of the world. However, that could also be a limitation to this study since this situation cannot be easily replicated. Another limitation of the study is that the perceptions of graduate and undergraduate students were not compared and may suggest an area for future research. Future research would also include comparing the results based on a racial breakdown and based on the students' perceptions of effective traditional face-to-face learning. Another factor deserving of future research would be comparing the perceptions of the online learning students to those of teachers.

Conclusion

The change of classes from face-to-face to online almost overnight due to the COVID-19 pandemic and the social distancing constraints posed a severe challenge to the educational system. This change might be sudden and inconvenient and might last for some time, but quality online classes that resemble the quality of education the students receive in a regular face-to-face class must be offered. The students in this study were able to paint a picture of what they perceived as an effective online class. The eight criteria that the students identified are motivating students to accomplish, communicating effectively, meeting students' needs, providing access to a wide range of content, providing a well-organized course structure,

providing numerous sources, providing explanatory feedback, and facilitating meaningful discussions. Those are the criteria that the students recognized as the definition of effective online teaching during the COVID-19 pandemic. Considering the results, it is recommended to use the picture that was painted by the participants in preparing online classes and to incorporate it into any teacher training course that targets improving online learning. Even though the context of the COVID-19 pandemic limits the results of the study, it has changed education forever, and many universities are currently planning to have online learning as the new norm going forward. Therefore, its of utmost importance to understand how students perceive their online learning experience. The future progress of online learning relies upon how we define it in the present.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received approval from the ethics review board of Prince Sultan University, Saudi Arabia for this study.

This study was supported by Applied Linguistics Research Lab (ALLAB) at Prince Sultan University, Saudi Arabia.

References

- Abdulla, A. G. (2004). Distance learning students' perceptions of the online instructor roles and competencies [Doctoral dissertation, Florida State University].
<http://www.citeulike.org/user/jrhode/article/1029039>
- Adler, R. W., Milne, M. J., & Stablein, R. (2001). Situated motivation: An empirical test in an accounting class. *Canadian Journal of Administrative Sciences*, 18(2), 101-116.
- Allen, E., & Seaman, J. (2013). Changing courses: Ten years of tracking online education in the United States. *Babson Questionnaire Research Group*. Retrieved from
<http://www.onlinelearningsurvey.com/reports/changingcourse.pdf>
- Allen, I. E., & Seaman, J. (2011). *Going the Distance: Online Education in the United States*.
http://sloanconsortium.org/publications/survey/going_distance_2011
- Awofeso, N., & Bamidele, M. (2016). Efficient Instructor Feedback: Perceptions of Online UAE Undergraduate and Postgraduate Public Health Learners. Proceedings of the International Conference on E-Learning, 1–12.
- Bali, S., & Liu, M. C. (2018). Students' perceptions toward online learning and face-to-face learning. *Journal of Physics: Conference Series*. doi:10.1088/1742-6596/1108/1/012094
- Berge, Z. L. (1995). The role of the online instructor/facilitator. *Educational Technology*, 35(1), 22-30.
- Berndtson, R., & Makanyama, L. (2018). Online learning for geography undergraduates: Student perceptions and motivations. *Geography Teacher*, 15(4), 145–155.
doi:<https://doi.org/10.1080/19338341.2018.1524779>
- Bonestroo, W. J., & De Jong, T. (2012). Effects of planning on task load, knowledge, and tool preference: A comparison of two tools. *Interactive Learning Environments*, 20(2), 141-153.
doi:10.1080/10494820.2010.484253
- Bonwell, C., & Eison, J. (1991). *Active learning: Creating excitement in the classroom*. 1991 ASHE-ERIC Higher Education Reports. Washington, D.C.: Jossey-Bass.
- Bozarth, J., Chapman, D., & LaMonica, L. (2004). Preparing for distance learning: Designing an online student oriented course. *Educational Technology and Society*, 7(10), 87-106.
<https://www.jstor.org/stable/jeductechsoci.7.1.87>
- Brass, K. (2002). Pushing E-learning. *Sales and Marketing Management*, 154(3), 56.
- Brown, K. M. (1996). The role of internal and external factors in the discontinuation of off-campus students. *Distance Education*, 17(1), 44-71. <https://doi.org/10.1080/0158791960170105>

- Burke, L. A., & Moore, J. E. (2003). A perennial dilemma in O.B. education: Engaging the traditional student. *Academy of Management Learning & Education*, 2(1), 37-53.
- Chambers, J. (2002). This time we get to do it right. *Community College Week*, 14(20), 8.
- Choy, S., McNickle, C., & Clayton, B. (2002). Learner expectations and experiences: An examination of student views of support in online learning. *National Center of Vocational Education and Research*.
https://www.researchgate.net/publication/37377463_Learner_expectations_and_experiences_an_examination_of_student_views_of_support_in_online_learning
- Clawson, S. L. (2007). *Does quality matter? Measuring whether online course quality standards are predictive of student satisfaction in higher education* [Doctoral dissertation, Capella University]. ProQuest Dissertations Publishing.
- Connor, E. (2009). Perceptions and uses of clicker technology. *Journal of Electronic Resources in Medical Libraries*, 6(1), 19-32. doi:10.1080/15424060802705145
- Dabbagh, N. (2007). The online learner: characteristics and pedagogical implications. *Contemporary Issues in Technology and Teacher Education*, 7(3), 217-226.
<https://www.learntechlib.org/primary/p/22904/>
- Dixon, M. (2010). Creating effective student engagement in online course: What do students find engaging? *Journal of the Scholarship of Teaching and Learning*, 1(13), 1-13. EJ890707
- Eduventures. (2005). *Developing Effective Channels to Corporate and Government Markets, Part I*. Boston: Eduventures: LLC.
- Eom, S., Wen, H., & Ashill, N. (2006). The determinants of students' perceived learning outcomes and satisfaction in university online education: An empirical investigation. *Decision Sciences Journal of Innovative Education*, 4(2). doi:doi: 10.1111/j.1540-4609.2006.00114.x
- Felder, R. M., & Brent, R. (2005). Understanding student differences. *Journal of Engineering Education*, 49(1), 57-72. doi:10.1002/jee.2005.94.issue-1
- Fersen, J. W., & Boyd, L. G. (2005). Caught in the web quality. *International Journal of Educational Development*, 25, 317-331. <https://doi.org/10.1016/j.ijedudev.2004.12.002>
- Filius, R. M., de Kleijn, R. A., Uijl, S. G., van Rijen, H. V., & Grobbee, D. E. (2018). Promoting deep learning through online feedback in SPOCs. *Frontline Learning Research*, 6(2), 92-113. EJ1197913
- Fortune, M., Spielman, M., & Pangelinan, D. (2011). Students' perceptions of online or face-to-face learning and social media in hospitality, recreation and tourism. *Journal of Online Learning and Teaching*, 7(1), 1-16.
- Francola, K. (2001). Why online learners drop out. *Workforce*, 10, 52-60.

- Gaytan, J. (2005, Spring). Effective assessment techniques for online instruction. *Information Technology, Learning, and Performance Journal*, 33(1), 25-33.
- Gayton, J., & McEwen, B. C. (2007). Effective online instructional and assessment strategies. *American Journal of Distance Education*, 21(3), 117-132. doi:10.1080/08923640701341653
- Gomez-Rey, P., Barbera, E., & Fernandez-Navarro, F. (2018). Students' perceptions about online teaching effectiveness: A bottom-up approach for identifying online instructors' roles. *Australasian Journal of Educational Technology*, 34(1). <https://doi.org/10.14742/ajet.3437>
- Goodyear, P., Salmon, J., Spector, J. M., Steeples, C., & Tickner, S. (2001). Competences for online teaching: A special report. *Educational Technology Research and Development*, 49(1), 65-72. <https://doi.org/10.1007/BF02504508>
- Gorsky, B., & Blau, I. (2009). Online teaching effectiveness: A tale of two instructors. *The International Review of Research in Open and Distributed Learning*, 10(3), 1-27. doi:<https://doi.org/10.19173/irrodl.v10i3.712>
- Gray, J., & KiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation*, 11(1), 1-20. EJ1103654
- Greenwald, A.G. (1997). Validity concerns and usefulness of student ratings of instruction. *American Psychologist*, 52, 1182-1186.
- Greenwald, A.G. & Gilmore, G.M. (1997). No pain, no gain? The importance of measuring course workload in student ratings of instruction, *Journal of Educational Psychology*, 89, 743-751.
- Gregory, V. L. (2003). Students perceptions of the effectiveness of Web-based distance education. *New Library World*, 104(10), 426-431. <https://doi.org/10.1108/03074800310504366>
- Hall, B. (2003). FAQs about e-learning. www.brandonhall.com/public/faqs2/faqs2.htm
- Hamid, Y., & Mahmood, S. (2010). Understanding constructive feedback: A commitment between teachers. *Journal of Pakistan Medical Association*, 60(3), 224-227.
- Hara, N., & Kling, R. (2000). Students' distress with a web-based distance education course: An ethnographic study of participants experiences. *Information, Communication and Society*, 3(4), 557-579. <https://doi.org/10.1080/13691180010002297>
- Harris, G. E., & Kelly, G. (2004-2006). The development and implementation of online undergraduate systems security courses: Lessons learnt. *Information Technology, Learning, and Performance Journal*, 22(3), 65-82.

Harris, P. e. (2014). Perceptions of Online versus Face-to-Face Learning of Educational Leadership Graduate Students. *European Journal of Educational Sciences*, 1(1), 30–37. <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1236642&site=ehost-live>. Acesso em: 24 set. 2020.

Haugen, S., LaBarre, J., & Melrose, J. (2001). Online course delivery: Issues and challenges. *Issues in Information*, 127-131.

Jung, I., Choi, S., Lim, C., & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in Web-based instruction. *Innovations in Education and Teaching International*, 2, 153-162. <https://doi.org/10.1080/14703290252934603>

Ke, F., & Xie, K. (2009). Toward deep learning for adult students in online courses. *Internet and Higher Education*, 12(3/4), 136-145. doi: 10.1016/j.iheduc.2009.08.001

Kocabas, S., Ozfidan, B., & Burlbaw, L. M. (2019). American STEM Education in Its Global, National, and Linguistic Contexts. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(1), em1810.

Koohang, A., & Durante, A. (2003). Learners' perceptions toward the web-based distance learning activities/assignments portion of an undergraduate hybrid instructional model. *Journal of Information Technology Education*, 2(1), 105-113.

Laine, L. (2003). Is e-learning effective for I.T. training? *T+D*, 57(6), 55-60.

Lawrence, A. J. (2018). *Instructor caring: Using Self-Determination Theory to understand perceptions, measurement, and impact of instructor caring on motivation and learning in online contexts*. <http://search.ebscohost.com/login.aspx?direct=true&db=ddu&AN=23B384B6AB4D7965&site=ehost-live>

Leys, C., Ley, C., Klein, O., Bernard, P., & Licata, L. (2013). Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology*, 49(4), 764-766.

Liaw, S., & Huang, H. (2002). How web technology can facilitate learning. *Information Systems Management*, Winter, 19(1), 56-61. <https://doi.org/10.1201/1078/43199.19.1.20020101/31477.8>

Lindberg, M. (2004). Attitudes towards distance education and hybrid courses based on quality of student experience. *Proceedings of the Midwest Instruction and Computer Symposium*.

Lo, C. (2010). How student satisfaction factors affect perceived learning. *Journal of the Scholarship of Teaching and Learning*, 10(1), 47-54.

- Marsh, H. W. (1984). Students' evaluations of university teaching: Dimensionality, reliability, validity, potential biases, and utility. *Journal of Educational Psychology*, 76(5), 707-754. <https://doi.org/10.1037/0022-0663.76.5.707>
- Marsh H.W. (2007) Students' evaluations of university teaching: Dimensionality, reliability, validity, potential biases and usefulness. In R.P. Perry & J.C. Smart (Eds.) *The scholarship of teaching and learning in higher education: An evidence-based perspective*. Springer. https://doi.org/10.1007/1-4020-5742-3_9
- Martin, F., Stamper, B. & Flowers, C. (2020) Examining student perception of readiness for online learning: Importance and confidence. *Online Learning*. 24(2), 38-58. <https://doi.org/10.24059/olj.v24i2.2053>
- Matsunaga, S. (2016). College students' perceptions of online learning: Knowledge gain and course effectiveness. *The Online Journal of Distance Education and e-Learning*, 4(2), 20-30. <https://www.tojdel.net/journals/tojdel/articles/v04i02/v04i02-02.pdf>
- McEwan, B. (2001). Web-assisted and online learning. *Business Communications Quarterly*, 64(2), 98-103. <https://doi.org/10.1177/108056990106400211>
- McKeachie, W. J. (1979). Student ratings of faculty: A reprise. *Academe*, 65(6), 384-397. doi: 10.2307/40248725
- Moore, M. G. (2003). Editorial: Learner support. *The American Journal of Distance Education*, 17(3), 141-143.
- Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: a factor analytic study. *Distance Education*, 26(1), 29-48. doi: 10.1080/01587910500081269.
- Muljana, P. S., & Luo, T. (2019). Factors contributing to student retention in online learning and recommended strategies for improvement: A systematic literature review. *Journal of Information Technology Education: Research*, 18, 19-57.
- Oigara, J., & Keengwe, J. (2013). Students' perceptions of clickers as an instructional tool to promote active learning. *Education and Information Technologies*, 18, 15-28. doi:10.1007/s10639-011-9173-9
- O'Neil, K., Singh, G., & O'Donoghue, J. (2004). Implementing elearning programmes for higher education. *Journal of Information Technology Education*, 3, 313-323. <http://jite.org/documents/Vol3/v3p313-323-131.pdf>
- Ozfidan, B. (2021). Verbal working memory and short-term memory: Bilingual vs monolingual children. *3L: Southeast Asian Journal of English Language Studies*, 27(3).
- Ozfidan, B., & Burlbaw, L. (2020). Teachers' Perspectives and Attitudes towards Computer-Assisted Language Learning (CALL). *Revista de Cercetare si Interventie Sociala*, 71.

Ozfidan, B., & Mitchell, C. (2020). Detected difficulties in argumentative writing: The case of culturally and linguistically Saudi backgrounded students. *Journal of Ethnic and Cultural Studies*, 7(2), 15-29.

Pan, X., & Shao, H. (2020). Teacher online feedback and learning motivation: Learning engagement as a mediator. *Social Behavior & Personality: An International Journal*, 1(10), 1–10. doi:<https://doi.org/10.2224/sbp.9118>

Pellegrino, J. W., & Hilton, M. L. (2013). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. National Academies Press.

Perreault, H., Waldman, L., Alexander, M., & Zhao, J. (2008). Graduate business students perceptions of online learning: A five year comparison. *Delta Pi Epsilon Journal*, 50(3), 164–179. EJ837823

Ruey, S. (2010). A case study of constructivist instructional strategies for adult online learning. *British Journal of Education Technology*, 41(5), 706-720. <https://doi.org/10.1111/j.1467-8535.2009.00965.x>

Skordis-Worrall, J., Haghparast-Bidgoli, H., & Batura, N. &. (2015). Learning online: A case study exploring student perceptions and experience of a course in economic evaluation. *International Journal of Teaching and Learning in Higher Education*, 27(3), 413-422.

Song, L., Emise, S. S., Janette, R. H., & Myung-Hwa, K. (2004). Improving online learning: student perceptions of useful and challenging characteristics. *Internet and Higher Education*, 7(1), 59_70. doi:10.1016/j.iheduc.2003.11.003

Spears, L. R. (2012). *Social presence, social interaction, collaborative learning, and satisfaction in online and face-to-face courses*. Iowa State University: Doctoral dissertation. <http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=3983andcontext=etd>.

Stark, E. (2019). Examining the role of motivation and learning strategies in student success in online versus face-to-face courses. *Online Learning*, 23(3), 234–251.

Tanis, C. J. (2020). The seven principles of online learning: Feedback from faculty and alumni on its importance for teaching and learning. *Research in Learning Technology*, 28, 1-25. doi:<https://doi.org/10.25304/rlt.v28.2319>

Thach, E. C., & Murphy, K. L. (1995). Competencies for distance education professionals. *Educational Technology Research and Development*, 43(1), 57-79.

Wang, Y. (2003). Assessment of learner satisfaction with asynchronous electronic learning systems. *Information & Management*, 41(1), 75-86. [https://doi.org/10.1016/S0378-7206\(03\)00028-4](https://doi.org/10.1016/S0378-7206(03)00028-4)

Wegner, S., Holloway, K., & Garton, E. (1999). The effects of internet-based instruction on student learning. *Journal of Asynchronous Learning*, 3(2), 1-9.

Wilkes, R., Simon, J., & Brooks, L. (2006). A comparison of faculty and undergraduate students' perceptions of online courses and degree programs. *Journal of Information System Education*, 17(2), 131-140.

Yurdugül, H., & Menzi Çetin, N. (2015). Investigation of the relationship between learning process and learning outcomes in e-learning environments. *Eurasian Journal of Educational Research*, 58, 57-74.

Zhang, D. (2005). Interactive multimedia-based e-learning: A study of effectiveness. *The American Journal of Distance Education*, 19(3), 149-162.
https://doi.org/10.1207/s15389286ajde1903_3

Appendix A

Multiple Regression Analysis Results

Item	<i>R</i> ²	B	<i>t</i>	<i>p</i>
Motivate student to accomplish		0.23	3.96	< .01
Communicate effectively		0.21	3.99	< .01
Meet students' needs		0.19	4.06	< .01
Provide access to a wide range of content		0.17	2.91	.02
Provide a well-organized course structure		0.16	2.35	< .01
Provide numerous sources		0.19	3.51	< .01
Provide explanatory feedback		0.15	2.79	.04
Facilitate meaningful discussions		0.14	2.11	.03
8 items	.859			
Useful online equipment		0.09	1.33	.22
Useful one-on-one virtual meeting		-0.08	1.31	.21
Foster critical thinking abilities		0.07	1.29	.22
Provide more successful work		0.05	1.28	.20
Easy to manage course		-0.06	1.21	.25
Natural interaction between student and instructor		0.06	1.19	.26
Natural interaction among the students		0.07	1.13	.26
15 items	.866			
Provide meaningful examples		-0.06	0.92	.42
Clear assignment instructions		0.07	0.90	.40
Diverse learning and teaching styles		0.07	0.85	.39
Encourage to take responsibility		-0.05	0.91	.43
Encourage to improve		-0.04	0.76	.51
Various online activities		-0.06	0.67	.38
Comfortable learning atmosphere		0.05	1.01	.36
Ask any questions freely		-0.07	0.95	.31
23 items	.875			
Valuable discussion		0.04	0.34	.84
Easily to reach the instructor		0.02	0.17	.81
Respect to students		0.01	0.48	.76
Technical issues		0.03	0.11	.67
Self-motivation		0.01	0.12	.85
Friendly and warm classes		0.01	0.15	.91
Available out of course		0.02	0.25	.75
30 items	.881			

Note: “*R*² for each model includes all items listed above and items below are removed.”

Appendix B Survey Instrument

1.	Gender:	<input type="checkbox"/> Male <input type="checkbox"/> Female
2.	Nationality: _____	
3.	Languages that you speak: (Please check all that apply)	<input type="checkbox"/> Arabic <input type="checkbox"/> English <input type="checkbox"/> French <input type="checkbox"/> Mandarin <input type="checkbox"/> Spanish <input type="checkbox"/> Turkish <input type="checkbox"/> Urdu <input type="checkbox"/> Other: _____
4.	College	<input type="checkbox"/> College of Humanities <input type="checkbox"/> College of Law <input type="checkbox"/> College of Engineering <input type="checkbox"/> College of Business and Administration <input type="checkbox"/> College of Computer & Information Sciences

Student Satisfaction on Effects of Instructional Design and Delivery

	SA	A	N	D	SD
It is easy to navigate the subject learning material in online classes.					
Online classes encourage students' aspiration to learn.					
Students during online classes are given sufficient opportunities to interact with each other.					
Online classes classify clear topics and require instruction to complete assignments in a timely manner.					
Online classes require instruction in online discussion.					
Self-motivation is important to be successful in online classes.					
Online classes allow diverse learning perspectives and styles.					
Online classes provide numerous sources that help student learning					
Online classes include various activities for students to foster critical thinking abilities.					

Effects of Teacher Roles on Student Satisfaction

	SA	A	N	D	SD
Instructors encourage to take responsibility for my own learning					
Instructors provide explanatory feedback.					
Instructors need to provide sufficient contact information for the students.					
Online classes provide access to a wide range of content.					
Online classes provide activities for critical thinking.					
Online classes provide different types of assessment.					
During online classes, students are able to get help as needed.					
Students are provided adequate opportunity to discuss with instructors					

Beliefs of students on online classroom platform

	SA	A	N	D	SD
Online classes' design follows a consistent structure.					
Online classes encourage interactions with the classmates.					
Online classes provide good interaction between instructor and student					
Online classes provide a good quality discussion.					
Online classes provide valuable course materials.					
The assignments in online classes help students master course content.					
The exams in online classes provide an accurate assessment of knowledge of course content.					
Online classes' platforms provide online technicians when needed.					
Online classes increase academic success.					
Online classes contain enough learner support that links to campus resources.					
Online classes deliver adequate resources.					

Effects of student-faculty interaction on students' satisfaction

	SA	A	N	D	SD
Online classes allow for a natural interaction between me and my instructor.					
My instructors responded clearly to my questions.					
I feel I could ask questions freely on my online class.					
I can easily reach my instructors.					
I can express my disagreement with my instructors.					
I can ask my instructors to repeat if I didn't understand.					
My instructors listen if I have something to say.					

Effects of quality of feedback on students' satisfaction

	SA	A	N	D	SD
I received feedback on my assignments on a timely manner.					
The feedback I received helped me improve my learning.					
My instructors provided me with multiple forms of feedback					
I could ask my instructors to explain their feedback.					
I can easily negotiate my feedback with my instructors					
The feedback I received on my assignments was clear.					
The feedback I received encouraged me to improve.					

Online vs. face-to-face classes

	SA	A	N	D	SD
I think I learn more in online courses than in face-to-face courses.					
I prefer online courses to face-to-face courses					
I feel more comfortable participating in online course discussions than in face-to-face course discussions.					
Online classes require more study time than face-to-face courses.					
Online classes are harder than face-to-face classes.					
Retention rates are higher with online learning					

Online classes require more self-motivation and time-management skills					
Face to face classes build a better interaction between student and instructor					

Open-ended Questions

- Describe your overall impression of online classes.
- In your opinion, what are the strengths/weaknesses of online classes?
- What are one to three specific things about transitioning to online classes that you liked/disliked?
- What are one to three specific things about transitioning to online classes that especially supported your learning?
- What parts of the online classes aided your learning the most?
- What parts of online classes were obstacles to your learning?
- Do you have any specific recommendations for improving online classes? What changes that can be made to online classes to improve your learning?

Reflecting on Best Practices for Online Learning in a Post-COVID-19 World

Nathan Schrenk

Kelly Alves

Drew Van Dam

Brianne Schrenk

Liberty University, USA

Abstract

When the novel coronavirus 2019 caused many schools to immediately go online in March 2020, many instructors had significant training and experience teaching residentially but little to no experience teaching online courses. All classes were immediately converted to online, and some schools are still uncertain as to when they will return to full traditional classroom settings. Regardless of online experience, all instructors were needed to learn to adapt to online teaching immediately. This change created a need for all faculty members to receive the training and support necessary to make the online process as smooth and effective as possible. In this Best Practices perspective, we identified useful and successful practices to help students learn in the online courses. With the knowledge of data driven support and awareness of effective online teaching strategies, instructors can make the most of online teaching sessions.

Keywords: COVID-19, novel coronavirus, online teaching, asynchronous courses, distance learning, online pedagogy

Schrenk, N., Alves, K., Van Dam, D., & Schrenk, B. (2021). Reflecting on best practices for online learning in a post-COVID-19 world. *Online Learning*, 25(4), 486-504.

DOI: 10.24059/olj.v25i4.2460

In the spring of 2020, when the COVID-19 pandemic spread across the world, most schools and classes were immediately converted to asynchronous online formatting (Cai et al., 2020; Cheng, 2020). At least 1,102 colleges and universities in the U.S. went online, which affected more than 14 million higher education students (CNBC, 2020). Some instructors had experience or training with online instruction and were prepared to immediately transition residential classes to online; however, an estimated 80% of instructors were not ready for this change (Marcus, 2020). This article will present concerns and considerations when teaching asynchronous classes online and will list approaches that are found to be successful.

Questions and Methodology

To investigate the transition from residential to online classes after the spread of the COVID-19, we desired to first lay a foundation using the history of online education along with investigating the ramifications the spread of COVID-19 had on education in April 2020 (Gudmundsdorttir & Hathaway, 2020; Zhou & Zhou, 2020). As instructors in a university that teaches online, but still faced challenges along with our students in adapting to the pandemic and its effects on our teaching, we sought to identify strategies we could use. Our work was guided by the following questions:

1. How are students and faculty impacted by availability of technology particularly in lower income areas (Chatterjee, 2018; Hall et al., 2020)?
2. What are the major challenges faced when converting synchronous classes to completely asynchronous (Picciano, 2019; Tereseviciene et al., 2020)?
3. What resources are found to be most effective for both students and faculty to promote student success (Ally, 2019; Weidlich & Bastiaens, 2018)?
4. How can students and instructors best apply these factors to facilitate an effective transition (Bequidenhout, 2018; Radovan, 2019)?

We will report our findings from this literature-supported reflective inquiry in three parts: background, research, and application. Ideally, this can serve to not only help students, instructors, and administrators understand current research but also facilitate the development of best practices for teaching online classes (Cam et al., 2016; Watson et al., 2017). This information inform how universities support teachers when they transition from synchronous to asynchronous courses in short periods of time (Kaden, 2020; Means & Neisler, 2021).

Background

Online Education

Picciano (2019) found that 20 million Americans were enrolled in at least one completely online course, which was an increase from 6.4 million just three years earlier. Data collected prior to the onset of COVID-19 showed that online schools and programs were growing in enrollment (Miller, 2021; Ornalles, 2019; Watson et al., 2020). Large and small public colleges, as well as proprietary schools, were showing increased enrollment in online workforce certification programs, undergraduate programs, and graduate programs (Hart et al., 2021; Ilgaz, 2019; Martin & Bolliger, 2018). Residential courses have been shown to have limitations based on time constraints for adult learners and students with jobs (Chatterjee, 2018; Jin et al., 2019). Online programs provide equivalent opportunities to traditional in-person learning for all students regardless of age, gender, social status, etc. (Cam et al., 2016; Hall et al., 2020; Kara et al., 2019). In fact, Yarbrough (2018) found evidence that many older adult learners become more comfortable with online courses to avoid negative perceptions from younger adult classmates

more familiar with the course material. Younger students are also showing preference towards classes that are more computer based rather than traditional delivery (McClannon et al., 2018; Ornalles, 2019). However, many schools question the equality of expectations and standards the online courses and programs can offer compared to those of traditional residential courses and programs (Cam et al., 2016; Cramp et al., 2019; Ilgaz, 2019). Maintaining the same outcomes is essential.

Coronavirus Impact on Education

In Spring 2020, many institutions were forced to immediately transition to online learning as COVID-19 quickly spread and governments were forced to eliminate large gatherings and enforce social distancing (Cheng, 2020; Connelly et al., 2020; Zhou & Zhou, 2020). Crawford et al. (2020) examined the COVID-19 response of 20 colleges and universities around the world and found that educational structures and resources vary among different countries; however, governmental funding and endowment were shown to have the greatest impact on a school's ability to quickly transition to online learning (Hall et al., 2020; Nakamura, 2017). Regardless of timing, the change to online learning required that faculty members abruptly change their own mindsets and instructional approaches to prepare effective and engaging online lessons and develop new teaching strategies. It is essential that educational institutions promote and support faculty members in this pursuit (Bezuidenhout, 2020; Jaggars, 2021; Miller, 2019).

Research Perspectives

Access and Availability

Hall et al. (2020) found that the largest barrier for schools to initially make the decision to go online was the available technology for faculty and students to conduct class remotely. Many students did not have computers or internet access when they were not on campus (Chatterjee, 2018, Joosten et al., 2020; Osvath, 2018). Garcia et al. (2020) found that only 23.7% of low income students had a computer at home and 7.7% did not have internet access at home; they also found that 51.3% of students had no experience using internet frequently at home. Public wireless fidelity (Wi-Fi) could offer immediate fixes for some situations, and some colleges made extended Wi-Fi hotspots available for students to use in their cars while close to the school (Crawford et al., 2020). Comcast set noncustomer home hotspots available for public use (Xfinity, 2020). However, problems still arose in that some students had no more than mobile devices (cell phones), and some faculty members (including adjunct instructors) did not have a personal computer and used classroom machines for their course technology administration (Chatterjee, 2018; Harris, 2020; Horvitz, 2017; Johnson & Barr, 2021).

The United States Congress passed into law the Coronavirus Aid, Relief, and Economic Security (CARES) Act in March 2020 providing \$30.7 billion of additional funding for schools with discussions of up to an additional \$540 billion through the Health and Economic Recovery Omnibus Emergency Solutions (HEROES) Act (Jordan, 2020).

Jordan (2020) found that much of the CARES Act funding went to pay for meal programs, and \$3 billion went to the state governors for discretionary funds but not directly for technology. Even when schools had the technology available, the instructors had to learn hardware and software themselves as well as be prepared to work with student technology issues (Gudmendsdottir & Hathaway, 2020). Garcia (2020) found that only 43.4% of instructors had received software training with only 32.5% being proficient with the technology. With this lack of availability and proficiency, recommendations for some schools were to reduce class assignments or to assign "incomplete" grades for students with complications (Harris., 2020).

Many schools created additional pass/fail grades for students to elect so online formatting would not adversely affect their GPA (Marcus, 2020). Some schools were able to find assistance through partnering with private industry (Chatterjee, 2020). An estimated 87% of Americans have a smartphone (Berry, 2015). The availability of free mobile device applications led some schools to use Open Educational Resources (OER) and Mass Open Online Courses (MOOC) (Nakamura, 2017; Hew et al., 2018; Watson et al., 2017; Zhou et al., 2020). Free of cost to students or the school, an immediate response from instructors who were accustomed to traditional teaching was to assign similar MOOCs for students or setting up OER shells which could all be accessed via mobile applications (Hew et al., 2018; Zhou et al., 2020). All individuals with cell phones or mobile devices (regardless of data plans) could connect to the school or public WiFi hotspots to utilize these tools (Chatterjee, 2018; Xfinity, 2020).

Asynchronous vs. Synchronous

Among the initial challenges for faculty was the loss of specific days and times for meetings (Crawford et al., 2020; Kessler, 2016). For some schools that had technology and video conferencing software available, some instructors opted to hold class meetings online at the regularly scheduled time (Bailey et al., 2020; Cai & Wang, 2020).

This scheduling became a challenge after COVID-19, however, when many students with jobs were required to alter their work hours, which conflicted with the initially scheduled class times (Ilgaz, 2019; Means & Neisler, 2021). Teaching asynchronously online created an entirely different mindset for instructors accustomed to traditional class meeting times (Jin et al., 2019; Picciano, 2019). The available research addressed some of the largest concerns for instructors new to online teaching.

Online Discussion Forums

With the expectation that quarantine allowed students to work asynchronously from home, online discussion boards became a substitute for classroom discussion on reading assignments. While many instructors may be familiar with the concept of online discussion board forums there are important precautions and actions that are essential to facilitate quality discussions (Cornell et al., 2019; McClannon et al., 2018; Selhort et al., 2017; Thomas & Thorpe, 2019). Research shows that to effectively incorporating discussion boards requires the instructor to provide clear communication and support and to identify the specific elements that will determine the grade such as length, grammar, topics, and number of posts (McAlvage et al., 2018; Selhort et al., 2017). This communication component was similar to the directions an instructor would create for essays or short answer responses, but these directions must be stated clearly in the discussion prompt (Little et al., 2018). Bezuidenhout (2018) cautioned that like a traditional class discussion, some students may use initial comments to try to follow the gist or similar patterns instead of displaying authentic reading. This study further suggests that requiring citations and instructor interactions is an effective approach to solving this problem.

Selhort et al. (2017) discussed the importance for instructors to be active. This is not only to monitor for language, appropriate content, and preventing confrontation, but more importantly to turn posts into strands (Little et al., 2018; McClannon et al., 2018). In addition, Ally (2019) recommended that instructors not simply read a text and make a post, but to interact the same way students and an instructor would in a classroom setting. Much like a classroom discussion, Selhort et al. (2017) and Miller (2021) suggest that instructors should ask a question and follow through with scaffolding information and facilitating interactions between students to address the reading assignment.

An additional discovery that Selhort et al. (2017) found regarding participation is the students who were found to be active in the classroom made the same number of contributions online, but surprisingly many students who were typically less active in classroom conversation showed increased activity in online comments. Speculation was that some students have a greater comfort level with digital conversation as they may commonly have conversations with friends and family via electronic devices. However, this posed the concern of student's experience with anonymity in public online forums like Reddit or Yelp where responses may be less cordial and sometimes include offensive language or content. This emphasizes the active role that instructors must play in reading comment strands and steering conversations in productive directions (Little et al., 2018).

Many common learning management systems (LMS) allow students to post videos. Zachos et al. (2018) suggested that leveraging the popularity of social media outlets, such as Instagram and TikTok and incorporating the use of student videos could increase participation in discussion boards by making them more engaging and enjoyable for students. Selhort et al. (2018) contends that when students feel engaged with the discussion forum then not only do responses increase but students check for replies more frequently and hope for larger discussion strands.

One main debate is how to effectively address late posts (Cornell et al., 2019). Much like in traditional classroom settings, if a student is unable to attend class, then no matter the quality of comment they make, the intent of discussion is lost. In a virtual setting, students will rarely look back on a previous post for new comments (Thomas & Thorpe, 2019). McClannon et al. (2018) suggested that instructors can help by posting a closing comment to help summarize main points of the prompt. Referencing specific student posts and names can help establish a presence and encourage a positive environment for students to have unique quality replies (Tereseviciene et al., 2020).

Assessment

Newton (2020) identified that among the 340,000 online exams taken after COVID-19 forced millions of students online, fewer than 1% of students cheated; however, academic honesty remained an area of concern for many faculty members. Cramp et al. (2019) and Stack (2015) found testing to be one of the largest disputes among faculty wanting to ensure authentic and genuine test and quiz completion in asynchronous settings. Many mobile applications and types of online software have been created to help students. Many mobile applications and online programs have been developed to help students. Although many of these resources can be helpful, others can be counterproductive. MathWay and PhotoMath allow students to simply enter a problem or take a picture with a device to get detailed steps to follow as well as the final answer. Chegg Inc. offers access to over 2,600 instructor solution manuals as well as services in many subjects where students can submit problems and receive detailed answers within 24 hours. Course Hero allows students to post their own work for others and download previous assignments from other members. All these resources are among the top results of a search if students use a search engine like Google for help in a subject. These programs and others like them can be useful resources for asynchronous learning, particularly at times when instructors are unavailable; however, they are frequently abused by students (Hart et al., 2021; Kare et al., 2019). Even with the myriad of programs available that could potentially facilitate a lack of academic honesty, Cramp et al. (2019) still found similar testing results whether synchronous or asynchronous for most students. Cramp et al. (2019) also identified good strategies for test-taking, such as setting appropriate time limits, randomizing test question values, and

randomizing the questions themselves. Some software also allows the creation of pools of questions to randomly be selected so students may or may not see the same problems on an assessment.

Many schools have testing centers, but due to COVID-19, those were closed (Hall et al., 2020). As important as it is to monitor and control a test, asynchronous classes have a challenge ensuring student authenticity (Stack, 2015). For example, Hosler (2020) listed special software that can assist: keystroke verification software like KeystrokeDNA or TypingDNA, text matching software like Turnitin, and variable testing software Test of Variables of Attention (T.O.V.A.). Although these programs can limit academic dishonesty, they can be expensive. Free video teleconferencing software such as Skype and Zoom can allow observation of the student as they test via webcam or screen share. This method offers its own complications, however. Using this strategy requires that testing times be scheduled with the instructor or proctor, which can be difficult in an asynchronous setting (Kara et al., 2019; Yarbrough, 2018). This can be time-consuming and inconvenient for the instructor to schedule students individually, and proctors may also require additional funding.

Some schools used lockdown browsers to avoid the issue of academic dishonesty while taking a test (Cramp et al., 2019). Respondus is a well-known third-party company, and some schools use software that have it embedded. However, this can cost the school or student money as well, and some software will need to be downloaded onto the student's computer. This can cause difficulty if students need to use public computers. There are additional challenges if the students have multiple devices available, as this software will not discern students using secondary devices (Chatterjee, 2018).

Some instructors used traditional submission of scratch paper (Stack, 2015). There are free mobile applications, such as AdobeScan, that can take pictures of sheets of paper and convert the pictures into portable data formatted (PDF) files, which can then be submitted to the instructor. However, the problem with students' lack of showing work or having work that is difficult to decipher has been shown to be worse in online education (Watson et al., 2017; Weidlich & Bastiaens, 2018). When all work is completed on electronic devices, students often neglected to write out their work or fail to take sufficient notes (Bezuidenhout, 2018; Tereseviciene et al., 2019).

Cramp et al. (2019) performed a comprehensive review of all forms of testing from invigilation (in person, remote live, and remote recorded) to location (on campus, exam center, and remote), to format (paper, using school computer, and online bring your own device). The findings showed that the approach towards assessment is less important than the communication and reinforcement from the instructor. This study established that academic dishonesty could occur in any assessment system. Asynchronous testing requires different approaches with students working remotely, but the assessment requirements can be possible for students to complete around their schedule (Ornalles, 2019; Yarbrough, 2018). Expectations must be maintained in all testing approaches, and while academic dishonesty can occur in any setting the instructor must be cautious and strategic when planning the assessment approach (Cramp et al., 2019). When COVID-19 forced students to work online from home, there were not many options for testing. Therefore, the instructor's flexibility and knowledge of the available options benefitted student's performance best (Newton, 2020).

Campus Anywhere

One benefit of asynchronous online education is that learning can occur wherever and whenever around a student's schedule (Ally, 2018; Horvitz, 2017; Johnson & Barr, 2021;

Radovan, 2019). Online learning allows students to work from the convenience of their homes, while traveling, during a break at work, when they get home after work, during late night or early morning hours, or any other time that is convenient (Mehl & Fose, 2019; Ornalles, 2019). The course structure should align with the flexibility of asynchronous instruction (Bezuidenhout, 2018; McClannon et al, 2018). Some resources can be created as direct material instruction for students, while some videos can provide students with direction to seek their own resources (Pacciano, 2019; Weidlich & Bastiaens, 2018).

Completing online work outside of traditional business hours can also benefit the faculty (Martin & Bolliger, 2018). Students may need less assistance during typical business hours, allowing instructors time during the day to prepare lessons and complete other work. As a result, instructors may want to be prepared to help students in the evenings and on weekends to accommodate this non-traditional schedule (Picciano, 2019; Yarbrough, 2018). Baldwin and Trespalacios (2017) and Kara et al. (2016) encouraged online instructors to no longer restrict teaching to business hours but, within reason, be prepared to work during students' available times. Many evidence-based strategies are available to assist instructors in online teaching.

MOOCs

MOOCs provide educational opportunities for students at no cost (Joonsten et al., 2020; Nakamura, 2017; Zhou & Zhou, 2020). Considering financial complications that schools and students mentioned (Garcia, 2020), MOOCs offer a solution for faculty to provide instruction and support for students. Alone, MOOCs hold no official credit hours or certification; however, Nakamura (2017) identified these courses as options that offer a wide variety of content from trade classes to graduate level courses for any student. Hew et al. (2018) suggested that these preconstructed courses are possibly more engaging for students than traditional courses. Zhou and Zhou (2020) recognized major American universities such as Cornell and Harvard offer convenient content ranging from high school classes through doctoral level courses. Horvitz (2017) and Johnson & Barr (2021) discussed the workforce and recreation classes designed to teach students trades such as car maintenance or basketry. MOOCs do not provide credits that can be transferred, but they can provide students a gradebook and certificate of completion for instructors to verify participation (Hew et al., 2018; Nakamura, 2017; Zhou & Zhou, 2020).

Adult Learning

Gross & Clark (2018) stated that 40% of all college students are 25 years of age or older and maintain employment outside of school. With COVID-19 forcing these students online, faculty should consider the needs of adult learners and non-traditional college students (Ornelles, 2019). Adult learners have very different experiences in education than traditional students (Hart et al., 2021; Jin et al., 2019). Trends and teaching approaches can change over time; Kara et al. (2019) found that many adult learners felt intimidated by observing younger classmates who seemed more knowledgeable and would often become discouraged in traditional classroom settings. Online education balances the student abilities and helps students to avoid feeling disconnected (Jin et al., 2019; Yarbrough, 2018). In an online setting many of the variances among students are less obvious which reduces biases and allows all students to have more similar opportunities and experiences (Cam et al., 2016).

Video Lectures

Cheng (2020) found that when teachers familiar with synchronous classroom learning went online, a common initial plan was to turn to video lecture during the course scheduled time; these videos could be recorded and posted in the schools LMS. However, videos are often less helpful than intended and often need improvement (Bezuidenhout, 2018; Weidlich & Bastianes,

2018). Ally (2019) found there to be little attendance for these video lectures and few authentic views when posted into the LMS. Additionally, many of the videos were over an hour in duration. Videos found to be most viewed and helpful for students were 3 to 5 minutes and allowed students to select the specific topics where they may need additional support (Martin & Bolliger, 2018; Watson et al., 2017). The scheduled online class time (even when the same as the originally scheduled class) were what created problems for students whose work schedules were changed due to COVID-19 (Crawford et al., 2020) as well as for students with a lack of technology (Garcia, 2020).

Bailey et al. (2020) and Jaggars (2021) found professional videos to be more helpful for students. These studies were found to have better audio and video quality and had fewer mistakes (verbiage or content) than instructor-made videos. When instructors worked from home after COVID-19, there were problems with family, pets, and other distractions from home (Cummins, 2020). One of the leaders in free online videos is Khan Academy (2020). Their videos are grouped and sequenced, are limited in duration to single topics that can be viewed individually or continuously and use hardware to provide high quality videos. Students report success and satisfaction with the Khan Academy video lecture structure. YouTube has a wide variety of videos, but presenter verification is limited, whereas Khan Academy only uses qualified and trained instructors. Therefore, instead of an instructor's initial inclination to develop their own videos, students may benefit more by leading them in the direction of quality and established videos that are already available online.

Support and Strategies

Based on the concerns and considerations for residential instructors to become effective online instructors, there is a need to identify data-driven methods that promote successful online learning strategies. Distance learning requires a different mentality than traditional pedagogy, so open dialogue will help instructors (Bezuidenhout, 2018; Osvath, 2018). In post COVID-19 education, many students are new to online learning as well, so if instructors can plan well-founded approaches and create a positive environment, then all stakeholders can be successful in class (Cai & Wang, 2020; Kaden, 2020).

Planning and Management

Traditional classroom administration allows time for instructors to discuss planning, structure, and expectations with the ability for students to ask questions; however, online classrooms require a different format (Baldwin & Trespalacios, 2017; Radovan, 2019). When COVID-19 forced students to be home and no longer in the classroom these open discussions could not occur. Posting announcements in the LMS and sending emails have become essential (Kaden, 2020). Students can reply and send emails, but may not always follow through, so repetitively including detailed and thorough information is necessary (Benzuidenhout, 2018). Cheng (2020) mentioned that frequently students new to online learning may make assumptions prior to viewing detailed announcements or instructions, so multiple times per week or even daily communication can help reinforce expected requirements.

Learning Tasks and Work Plans. Many students reported a lack of success in online courses because of being behind in material rather than a lack of understanding (Ally, 2019; Picciano, 2019). In traditional classes students have a mindset of planning the day before class and reviewing in class structure and time management needed; however, online classes can allow for students to lose track of time and get behind in material (Radovan, 2019). Research suggests that providing timelines and work plans to students helps them be more successful (Bezuidenhout, 2018; Martin & Bolliger, 2018). A dichotomy of students existed after the spread

of COVID-19 as some students were forced into quarantine; some students rarely left home and some students' work demands increased, which complicated their schedules (Cummins, 2020). Although the reasons may have varied, many students fell behind or lost track of time during COVID-19. Some students that stayed home would lose track of days or get busy with projects around the house. Students with increased work schedules had additional struggles with time management (Robinson, 2020). Setting long-term and short-term goals in online learning is essential (Ally, 2019).

Physical and Mental Health. Physical activity is shown to have a significant impact in education (Jensen, 2020). Online learning has the potential to be challenging since learners may be more stagnant and less active than when attending classes at a school (Ally, 2019). Promoting activity will help students be more successful academically (Cheng, 2020; Cai & Wang, 2020). Jaggars (2021) and Connelly et al. (2020) both discussed the importance of considering not only the physical health in a post COVID-19 system and the need for students to take precautions to stay safe, but also dealing with the stress of changing to online learning. Miller (2021) encouraged instructors to provide leniency as many students experience more stress and anxiety than they share with instructors. Communication can often be more important than deadlines, and this communication can allow instructors to make individualized plans for students to create a routine. This interaction with the instructors can significantly decrease stress and anxiety for students (Cai & Wang, 2020; Connelly, 2020).

Communication

While residential classes can have discussions during multiple class meetings, online courses need to rely on digital communication (Bouchey, 2021; Weidlich & Bastiaens, 2018; Zachos et al., 2018). This communication should not be limited to email (Zachos et al., 2018). Students should be encouraged to have their school email and LMS applications on their mobile devices with notifications, but text messaging and social media can be helpful as well and aligns with a student's comfort zone (Gudmundsdottir & Hathaway, 2020). Cornell et al. (2019) suggested instructors have separate personal and professional accounts, which allow them to maintain appropriate, professional relationships with students. With the increased technology promotion and requirements during the COVID-19 pandemic and beyond, the notifications and use of technology-based forms of communication will promote immediate responses and clarify expectations (Robinson, 2020).

Reach Out. Considering that anxiety levels for students after COVID-19 proved to be much higher than for instructors, reaching out became more important (Chung, 2020; Kessler et al., 2016). While the instructors may have felt unprepared to go online, students experienced unprepared professors in combination with anxiety about grades and course credits (Cai et al., 2020). The instructor should be the first to engage in open communication and should frequently maintain a line of correspondence with all students (Cornell et al., 2019; McClannon et al., 2018). This connection can serve as the replacement for residential classes that meet multiple times per week (Cornell et al., 2019). Once students who struggle were identified, the instructors were positioned to consider additional (even daily) communication and schedule tutor sessions (Bezuidenhout, 2018; Martin & Bolliger, 2018). While this might seem like an intuitive, even easy strategy, Young (2020) found that almost 20% of online learners report not having any personal communication with their instructor during a course.

An instructor's quick response time to a student's email will make a big difference regarding a student's experience in the online class (Georgiou, 2018; Radovan, 2019). When students evaluate online courses the frustration of an instructor taking too long to reply

outnumbered all other complaints combined, and the second most common complaint was the instructor not replying to emails at all (Martin & Bolinger, 2018). To assuage these challenges, Ally (2019) recommended replying within 48 hours and acknowledged that since instructors expect action from students, then reciprocating is an effective approach. There will be times that instructors cannot reply, but an effective strategy is for instructors to have their email and LMS application on their personal device as well (Cornell et al., 2019). The better an instructor can communicate, the more comfortable and less stressed students will be while trying to learn during COVID-19 and beyond (Young, 2020).

Increase Feedback. Classroom instructors may not have been fully aware of the value of the communication that occurs in the classroom setting, which is somewhat diminished by online instruction. This reduced communication can result in increased student stress (Young, 2020). Feedback for projects should include extensive and thorough guidance on what was correct and how to improve work. In many cases, emailing or reaching out to students directly can provide meaningful assistance that online learners may have required (Bouchev, 2021; Mehl & Fose, 2019). This was compared to when an instructor would hand an assignment back and make a comment at that time in addition to anything written. In traditional classroom learning, students can discuss submission of work with instructors and their thoughts prior to deadlines; this can allow instructors to provide detailed feedback on items such as length or specific content that could provide higher grades (Ally, 2019). However, when instructors teaching online provide feedback on grades, they should consider time for students to adjust and resubmit assignments for a better-quality assignment (Bezuidenhout, 2018).

Work Groups. Residential students frequently created work or study groups to provide mutual support (Thomas & Thorpe, 2019); however, finding collaborators and forming a group can be difficult after COVID-19 with quarantine (Cummins, 2020). This has always been an issue for online students. In times of emergency instruction, former residential students were also missing out on peer interactions, including discussion, dialogue, encouragement, and support (Baldwin & Trespalacios, 2017; Thomas & Thorpe, 2019). Cornell et al. (2019) and McClannon (2018) stated that when students have a sense of community, they can have a sense of presence. Instructors can facilitate the work groups through implementation of teleconferencing software such as Zoom and can also promote social media usage for students to communicate with one another (Zachos et al., 2018). These work groups can help students with tutoring and academic reinforcement, but also provide the encouragement and support that occurs in traditional classroom courses (Cornell et al., 2019). Using social media and communication applications, students can create pairs or peer groups and, even in quarantine, can schedule video sessions while they work (Young, 2020). Scheduled work group sessions can also pose as scheduled class time for accountability to continued progress (Robinson, 2020).

Announcements. While working remotely during COVID-19 students still needed the same frequent instruction and direction (Young, 2020). Research shows that instructors should post an announcement listing the weekly requirements at least twice a week (Baldwin & Trespalacios, 2017; Watson et al., 2017). These announcements provided students with clear communication needed for assignments, but also serve as a reminder for students (Ally, 2019). If the announcements come by email or LMS messaging, they can open dialogue opportunities for students to reply with questions (Martin & Bolliger, 2018).

Lectures. Residential instructors that move to online teaching often use document cameras or webcams to record a lecture they would have taught in the classroom and post the video for students (Baldwin & Trespalacios, 2017). Prior to the pandemic, Kesslet et al. (2016)

found that 91% of online instructors initially planned synchronous virtual meetings. However, online students did not often watch these lectures; online students seemed to prefer to be efficient and will be more prone to use Google (2020) to search keywords for individual topics individual topics they find challenging (Tereseviciene et al., 2019; Bezuidenhout, 2018). Grouping material with more videos that are shorter in length can be more effective (Watson et al., 2017). The Khan Academy (2020) videos may be more reliable and accurate than YouTube or Google videos, so guiding students to find verified resources will help (Tereseviciene et al., 2020). In a post-COVID-19 world, it is essential for students to utilize the internet for finding reliable and helpful resources (Young, 2020). Creating videos from home provides complications with background noises, poor equipment, incorrect grammar, and even material inaccuracies since teachers rarely edit or adjust fallacies the way publishers have editors that monitor multimedia (Cummings, 2020). By instructors providing easy access and direction to locate these resources, time can be more efficiently spent with other strategies and students benefit from quality videos (Cai et al., 2020; Cheng, 2020; Young, 2020).

Application of Findings

As faculty and students enter the stress and unknown of teaching and learning in a post-COVID-19 world, structure and communication are critical. Students need clear direction through instructions and announcements. The instructor needs to open individual contact early just as they would in traditional classes and have many avenues and vehicles to do so. Reciprocal communication will allow both the instructor and students to seek information when needed.

Instructors should provide students with strategies and detail best approaches. Like traditional classes in which students learn differently, professors will need a spectrum of resources available for teaching students online and need to communicate these options early when teaching online during COVID-19 quarantine. Follow-through is essential; instructors need to ensure students are not ignoring or missing the important communication details. Students will feel more confident and be more productive if they have a plan and clear direction.

Instructors need to provide thorough and swift feedback. They need to be flexible and even allow students opportunities to improve performance; assumptions cannot be made that students are being lazy or not paying attention. The traditional process of how students would ask for guidance in a classroom is very different from that of learning in a post-COVID-19 distance learning setting. If the students were confused, then leniency should be allowed, and students should have the opportunity to still show proficiency.

With students already feeling distant in communication and direction, instructors need to take actions to continue to openly communicate with students by both asking questions and reinforcing progress. Support comes from reminders along with direction. With the wealth of resources available for students, instructors need to help students find what works for them.

Students and instructors are in this together. Whether residential classrooms or online learning, an instructor's job is to see students master material. There are many plans and approaches the instructor can use to work with students individually to achieve that success.

Limitations

Many of the strategies and research presented are ubiquitous for all disciplines; however, some of the software programs and references mentioned will be specific to the subject of mathematics. Readers will still want to collaborate with colleagues and department chairs for websites and mobile applications specific to their content area. As of the completion of this paper

in October 2020, little research had been peer-reviewed and published providing school responses to COVID-19 globally. The articles included are from China, which may differ from other countries. Much of the online pedagogy research will identify results of online and distance learning approaches that were tested prior to COVID-19 and updates were added as additional publications became available.

Conclusion

Many schools have committed to remaining online indefinitely and other schools are unsure as to what approaches work best for their student body (Crawford et al., 2020). However, all instructors may benefit from knowing good strategies for teaching online (Ally, 2019; Bezuidenhout, 2018). Concerns will continue to exist for the foreseeable future, additional considerations must be taken when utilizing distance learning (Picciano, 2019). Stress levels have increased for faculty and students alike from uncertainty and safety (Kaden, 2020). Faculty need to create a plan on how to address managing the classroom from home and need to communicate that with their students (Chung, 2020). Student instruction can be enhanced by learning and applying helpful and effective approaches for teaching asynchronous online courses (Cai et al., 2020; Cheng, 2020).

References

- Ally, M. (2019). Competency profile of the digital and online instructor in future education. *International Review of Research in Open and Distributed Learning*, 20(2), 302–318. <https://doi.org/10.19173/irrodl.v20i2.4206>
- Bailey, J., Hess, F., Cerf, C., Conoway, C., El-Mekki, S., Erquiaga, D., . . . White, J. (2020). A blueprint for back to school. *American Enterprise Institute*. <https://www.jstor.org/stable/resrep24606>
- Baldwin, S. J., & Trespalacios, J. (2017). Evaluation instruments and good practices in online education. *Online Learning*, 21(2). <https://doi.org/10.24059/olj.v21i2>
- Berry, M., & Westfall, A. (2015). Dial D for distraction: The making and breaking of cell phone policies in the college classroom. *College Teaching* 63, 62–71. <https://doi.org/10.1080/87567555.2015.1005040>
- Bezuidenhout, A. (2018). Analysing the importance-competence gap of distance educators with the increased utilisation of online learning strategies in a developing world context. *International Review of Research in Open and Distributed Learning*, 19(3), 263–281. <https://doi.org/10.19173/irrodl.v19i3.3585>
- Bouchev, B., Gratz, E., & Kurland, S. (2021). Remote student support during COVID-19: Perspectives of chief online officers in higher education. *Online Learning*, 25(1), 28–40. <https://doi.org/10.24059/olj.v25i1.2481>
- Cai, R., and Wang, Q. (2020). A six-step online teaching method based on protocol-guided learning during the COVID-19 epidemic: A case study of the first middle school teaching practice in Changyuan City, Henan Province, China. *Insight Educational Front*, 5(1), 469-480 <https://doi.org/10.15354/bece.20.rp010>
- Cam, S. S., Yasar, G., Toraman, C., & Erdamar, G. K. (2016). The effects of gender on the attitudes towards the computer assisted instruction: A meta-analysis. *Journal of Education and Training Studies*, 4(5), 250–261. <https://doi.org/10.11114/jets.v4i5.1515>
- Chatterjee, K. (2018). Shaping the future: An online education ecosystem. *Childhood Education*, 94(4), 56–59. <https://doi.org/10.1080/00094056.2018.1494445>
- Cheng, X. (2020). Challenges of “School’s out, but class’s on” to school education: Practical exploration of Chinese schools during the COVID-19 pandemic. *Scientific Insight Educational Front*, 5(2), 501–516. [Doi.org/10.2139/ssrn.3565605](https://doi.org/10.2139/ssrn.3565605)
- Chung, B., Xu, D., & Eichhorn, S. (2018). Increasing interpersonal interactions in an online course: Does increased instructor email activity and voluntary meeting time in a physical classroom facilitate student learning? *Online Learning*, 22(3), 193–215. doi.org/10.24059/olj.v22i3.1322

CNBC. (2020). How coronavirus dramatically changed college for over 14 million students. *Make it*. <https://www.cnbc.com/2020/03/26/how-coronavirus-changed-college-for-over-14-million-students.html>

Conolly, C., Crepeau-Hobson Franci, Kennedy-Paine, C., & Woitaszewski, S. (2020). *Returning to school after COVID-19: Strategies for schools*. National Association of School Psychologists. <http://ezproxy.liberty.edu/login?url=https://search-proquest-com.ezproxy.liberty.edu/docview/2413943324?accountid=12085>

Cornell, H. R., Sayman, D., & Herron, J. (2019). Sense of community in an online graduate program. *Journal of Effective Teaching in Higher Education*, 2(2), 117–132. <https://jethe.org/index.php/jethe/article/view/52/25>

Cramp, J., Medlin, J. F., Lake, P., & Sharp, C. (2019). Lessons learned from implementing remotely invigilated online exams. *Journal of University Teaching and Learning Practice*, 16(1). <https://ro.uow.edu.au/jutlp/vol16/iss1/10>

Crawford, J., Butler, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P., & Lam, S (2020). COVID-19: 20 Countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching* 3(1), 1–20. <https://doi.org/10.37074/jalt.2020.3.1.7>

Cummins, E. (2020). Shirking from home. *Vox*. <https://www.vox.com/the-highlight/21317485/work-from-home-coronavirus-covid-19-zoom-distraction-animal-crossing>

Garcia, E., Weiss, E., & Engdahl, L. (2020, April 17). Access to online learning amid coronavirus as far from universal, and children who are poor suffer from digital divide. *Economic Policy Institute*. <https://www.epi.org/blog/access-to-online-learning-amid-coronavirus-and-digital-divide/>

Georgiou, M. (2018). Issues that revolve around the concepts of distance education and e-learning. *International Association for Development of the Information Society*. <https://eric.ed.gov/?id=ED590272>

Gross, N., & Clark, K. (2020). Adult college students; The undercovered 6.6 million. *Educational Writers Association*. <https://www.ewa.org/blog-higher-ed-beat/adult-college-students-undercovered-66-million#:~:text=In%20fact%2C%20thanks%20to%20economic,enrolled%20in%20higher%20education%20currently.>

Gudmundsdottir, G. B., & Hathaway, D. M. (2020). “We always make it work”: Teachers’ agency in the time of crisis. *Journal of Technology and Teacher Education*, 28(2), 239. <http://ezproxy.liberty.edu/login?url=https://search-proquest-com.ezproxy.liberty.edu/docview/2410497208?accountid=12085>

Hall, J., Roman, C., Jovel-Arias, C., & Young, C. (2020). Pre-service teachers examine digital equity amidst schools' COVID-19 responses. *Journal of Technology and Teacher Education*, 28(2), 435. <http://ezproxy.liberty.edu/login?url=https://search-proquest-com.ezproxy.liberty.edu/docview/2410497004?accountid=12085>

Harris, D. N. (2020). *A broad strategy for schools during the COVID-19 pandemic*. The Brookings Institution. <http://ezproxy.liberty.edu/login?url=https://search-proquest-com.ezproxy.liberty.edu/docview/2383693604?accountid=12085>

Hart, C. M. D., Xu, D., Hill, M., & Alonso, E. (2021). COVID-19 and community college instructional responses. *Online Learning*, 25(1), 41–69. <https://doi.org/10.24059/olj.v25i1.2568>

Hew, K. F., Qiao, C., & Tang, Y. (2018). Understanding student engagement in large-scale open online courses: A machine learning facilitated analysis of student's reflections in 18 highly rated MOOCs. *International Review of Research in Open and Distributed Learning*, 19(3), 69–93. <https://doi.org/10.19173/irrodl.v19i3.3596>

Horvitz, B. S. (2017). Future directions for research on online technical education. *Community College Journal of Research and Practice*, 41(6), 381–385. <https://doi.org/10.1080/10668926.2016.1270241>

Hosler, A. (2020). *How schools are preventing students from cheating online*. The Degree360. <https://www.onlinedegrees.com/degree360/student-focus/fighting-back-against-virtual-cheaters.html>

Ilgaz, H. (2019). Adult learners' participation in a blended learning environment: A case study on imposed pace learning. *Malaysian Online Journal of Educational Technology*, 7(4), 15–29. <https://eric.ed.gov/?id=EJ1233902>

Jaggars, A. (2021). Introduction to the special issue on the COVID-19 emergency transition to remote learning. *Online Learning*, 25(1), 1–7. <http://dx.doi.org/10.24059/olj.v25i1.2692>

Jin, B., Kim, J., & Baumgartner, L. M. (2019). Informal learning of older adults in using mobile devices: A review of the literature. *Adult Education Quarterly: A Journal of Research and Theory*, 69(2), 120–141. <https://doi.org/10.1177/0741713619834726>

Jensen Learning Corporation (2020). *Jensen Learning*. <https://www.jensenlearning.com/>

Johnson, J. E., & Barr, N. B. Moving hands-on mechanical engineering experiences online: Course redesigns and student perspectives. *Online Learning*, 25(1), 209–219. <https://doi.org/10.24059/olj.v25i1.2465>

Jones, H. (2020). TikTok's popularity surges amid COVID-19 pandemic. *The Daily Campus*. <https://www.smudailycampus.com/ae/tiktoks-popularity-surges-amid-covid-19-pandemic>.

- Joosten, T., Lee-McCarthy, K., Harness, L., Paulus, R., & Online Learning Consortium (OLC). (2020). Digital learning innovation trends. *Online Learning Consortium*. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED603277>
- Jordan, P. (2020). What congressional funding means for K-12 schools. *Future Ed*. <https://www.future-ed.org/what-congressional-covid-funding-means-for-k-12-schools/>
- Kaden, U. (2020). COVID-19 school closure-related changes to the professional life of a K–12 teacher. *Education Sciences*, 10(6), 165. <http://dx.doi.org.ezproxy.liberty.edu/10.3390/educsci10060165>
- Kara, M., Erdogdu, F., Kokoç, M., & Cagiltay, K. (2019). Challenges faced by adult learners in online distance education: A literature review. *Open Praxis*, 11(1), 5–22. <https://www.learntechlib.org/p/208075/>.
- Kessler, G. (2016). What can we learn from our colleagues? A framework for virtual classroom
- Little, C. W., Clark, J. C., Tani, N. E., & Connor, C. M. (2018). Improving writing skills through technology-based instruction: A meta-analysis. *Review of Education*, 6(2), 183–201. <https://doi.org/10.1002/rev3.3114>
- Liu, S., Yang, L., Zhang, C., & Xiang, Y. (2020). Online mental health service in china during the COVID-19 outbreak. *Lancet Psychiatry*, 7(4), 17–18. [doi.org/10.1016/S2215-0366\(20\)30077-8](https://doi.org/10.1016/S2215-0366(20)30077-8)
- Marcus, J. (2020). Pass/fail grades may help student during the COVID-19 crisis but could cost them later. *The Hechinger Report*. <https://www.pbs.org/newshour/education/pass-fail-grades-may-help-students-during-the-covid-19-crisis-but-could-cost-them-later>
- Marcus, J. (2020). Will this semester forever alter college? No, but some virtual tolls will stick around. *The Hechinger Report*. <https://hechingerreport.org/will-this-semester-forever-alter-college-no-but-some-virtual-tools-will-stick-around/>
- 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. <http://doi.org/10.24059/olj.v22i1.1092>
- McAlvage, K., & Rice, M. (2018). Access and accessibility in online learning: Issues in higher education and K–12 contexts. From “OLC Outlook: An environmental scan of the digital learning landscape.” *Online Learning Consortium*. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED593920>
- McClannon, T. W., Cheney, A. W., Bolt, L. L., & Terry, K. P. (2018). Predicting sense of presence and sense of community in immersive online learning environments. *Online Learning*, 22(4), 141–159. <https://olj.onlinelearningconsortium.org/index.php/olj/index>

Means, B., & Neisler, J. (2021). Teaching and learning in the time of COVID: The student perspective. *Online Learning*, 25(1), 8–27. <https://doi.org/10.24059/olj.v25i1.2496>

Mehl, M., & Fose, L. (2016). Digital academic revolution mentorship competency: #1 The Declaration—Mentoring the process of learning with screencast assessment—Plugging into students' digital DNA a decade later. *Online Learning Consortium*. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED570939>

Miller, G., Benke, M., Chaloux, B., Ragan, L. C., Schroeder, R., Smutz, W., Swan, K., & Online Learning Consortium (OLC). (2019). *Leading the E-Learning Transformation of Higher Education: Meeting the Challenges of Technology and Distance Education*. Online Learning Consortium. <https://onlinelearningconsortium.org/book/leading-e-learning-transformation-higher-education-meeting-challenges-technology-distance-education/>

Miller, K. E. (2021). A light in students' lives: K–12 teachers' experiences (re)building caring relationships during remote learning. *Online Learning*, 25(1), 115–134. <https://doi.org/10.24059/olj.v25i1.2486>

Nakamura, M. (2017). The state of distance education in Japan. *Quarterly Review of Distance Education*, 18(3), 75–87. https://books.google.com/books?hl=en&lr=&id=4g9bDwAAQBAJ&oi=fnd&pg=PA75&dq=The+state+of+distance+education+in+Japan.+&ots=iZ90O-VqX7&sig=rqxnhhSOe4BFA1dtOUoybdoFV_4#v=onepage&q=The%20state%20of%20distance%20education%20in%20Japan.&f=false

Newton, D. (2020). Another problem with shifting education online: cheating. *The Hechinger Report*. <https://hechingerreport.org/another-problem-with-shifting-education-online-cheating/>

Ornelles, C., Ray, A. B., & Wells, J. C. (2019). Designing online courses in teacher education to enhance adult learner engagement. *International Journal of Teaching and Learning in Higher Education*, 31(3), 547–557. <http://www.isetl.org/ijtlhe>

Osvath, C. (2018). Ready learner one: Creating an oasis for virtual/online education. *Journal of Language and Literacy Education*, 14(1). <http://jolle.coe.uga.edu>

Picciano, A. G. (2019). Artificial intelligence and the academy's loss of purpose. *Online Learning*, 23(3), 270–284. <https://doi.org/10.24059/olj.v23i3.2023>

Radovan, M. (2019). Should I stay, or should I go? Revisiting student retention models in distance education. *Turkish Online Journal of Distance Education*, 20(3), 29–40. <http://doi.org/10.17718/tojde.598211>

Respondus. (2020). *Respondus: Assessment tools for learning systems*. Respondus, Inc. <https://web.respondus.com/>

- Robinson, B. (2020). 9 tips to be productive when working at home during COVID-19. *Forbes*. <https://www.forbes.com/sites/bryanrobinson/2020/03/14/9-tips-to-be-productive-when-working-at-home-during-covid-19/#1b1003635a38>
- Selhorst, A. L., Klein, E., & Harrison, J. (2017). Cohort-specific online discussion experiences: A collaborative and multidisciplinary approach to improving student learning. *Contemporary Issues in Education Research*, 10(4), 241–254. <https://doi.org/10.19030/cier.v10i4.10038>
- Stack, S. (2015). Learning outcomes in an online vs traditional course. *International Journal for the Scholarship of Teaching and Learning*, 9(1). <http://doi.org/10.20429/ijstl.2015.090105>
- Tereseviciene, M., Trepule, E., Dauksiene, E., Tamoliune, G., & Costa, N. (2020). Are universities ready to recognize open online learning? *International Education Studies*, 13(2), 21–32. <https://doi.org/10.5539/ies.v13n2p21>
- Thomas, G., & Thorpe, S. (2019). Enhancing the facilitation of online groups in higher education: A review of the literature on face-to-face and online group-facilitation. *Interactive Learning Environments*, 27(1), 62–71. <http://dx.doi.org.ezproxy.liberty.edu/10.1080/10494820.2018.1451897>
- Watson, F. F., Castano Bishop, M., & Ferdinand-James, D. (2017). Instructional strategies to help online students learn: Feedback from online students. *TechTrends: Linking Research and Practice to Improve Learning*, 61(5), 420–427. <http://dx.doi.org.ezproxy.liberty.edu/10.1007/s11528-017-0216-y>
- Weidlich, J., & Bastiaens, T. J. (2018). Technology matters—The impact of transactional distance on satisfaction in online distance learning. *International Review of Research in Open and Distributed Learning*, 19(3), 222–242. <https://doi.org/10.19173/irrodl.v19i3.3417>
- Xfinity. (2020). Zfinity WIFI hotspot access opens nationwide in response to coronavirus. Xfinity. <https://www.xfinity.com/support/articles/open-xfinity-WiFi-hotspots>
- Yarbrough, J. R. (2018). Adapting adult learning theory to support innovative, advanced, online learning—WVMD model. *Research in Higher Education Journal*, 35. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1194405>
- Young, J. (2020). Coronavirus has led to a rush of online teaching. Here is some advice for newly remote instructors. *EdSurge*. <https://www.edsurge.com/news/2020-03-11-coronavirus-has-led-to-a-rush-of-online-teaching-here-s-some-advice-for-newly-remote-instructors>
- Zachos, G., Paraskevopoulou-Kollia, E.-A., & Anagnostopoulos, I. (2018). Social media use in higher education: A review. *Education Sciences*, 8. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1201119>

Zhou, L., Wu, S., Zhou, M., & Li, F. (2020). “School’s Out, But Class’s On,” the largest online education in the world today: Taking China’s practical exploration during the COVID-19 epidemic prevention and control as an example. *Best Evidence of Chinese Education* 4(2), 501–519. <https://doi.org/10.15354/bece.20.ar023>