

# I-HE 2022 - Digital Reset: European Universities Transforming for a Changing World: Introduction to the Special Issue

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This Special Issue is an outcome of a cooperation between the Online Learning Journal (OLJ), the Center for Open Education Research (COER), and the European Association of Distance Teaching Universities (EADTU)<sup>1</sup> at the Innovating Higher Education Conference 2022 (I-HE 2022), held in Athens on 19-21, October 2022. As part of this cooperation, COER Members<sup>2</sup> organized a research track on open, distance, and digital education at the conference. The call for papers received more than 50 submissions; however, 16 were accepted for presentation in Athens, and four selected authors or author teams were encouraged to submit their papers to the OLJ. We are pleased that the pre-selection at the conference was confirmed by the journal's double-blind review process with all four papers accepted for publication in this COER-EADTU special issue of the OLJ.

*Digital Reset: European Universities Transforming for a Changing World*, the conference's theme, suggested the ongoing change propelled by the Covid-19 pandemic. Digitalization and transformation are inherent in open, distance, and digital education. ODDE has always been, is, and will be forward-looking by nature. However, the pandemic has pushed all higher education institutions to pass the gate of digitalization at all levels and signaled that such a crisis would not be the last one that compels institutions to move online, which means transformation will and should continue. In this special issue, the four selected studies focus on the field's different yet compelling transformation areas.

The first paper, **Clicking with Confidence**, co-authored by Elaine Beirne, Mairéad Nic Giolla Michíl, Mark Brown, and Conchúr Mac Lochlainn from Dublin City University (DCU), Ireland, brings a new perspective on the use of MOOCs to increase the digital confidence of online learners. As self-efficacy is one of the crucial aspects of retention in online education, the study offers a MOOC course to help learners gain these essential and required mastery skills. In their study, Beirne et al. examined the online learning self-efficacy improvement of 135 MOOC participants and found that besides increased self-efficacy in the pre-defined fields of time management, technology navigation, distance learning, and online communication, the learners also reported increased happiness, hope, and excitement after the course. Overall, the results project a practical and pedagogical use of MOOCs for the readiness of learners in online learning.

The second paper, **Impact of Online Exams on the Quality of Distance learners' exam and exam revision experience** by Simon Cross, Maria Aristeidou, Klaus-Dieter Rossade, Carlton Wood, and Carlton Wood from the Open University UK, problematizes the online exam experience of learners and compares online exams that were held during the pandemic with sit-in exams before the pandemic. The rigorous research design applied a quantitative approach to compare two datasets (pre-pandemic and during-pandemic). Notably, the results demonstrated no significant difference between learners' online and in-person exam experiences. Additionally, the results showed increased satisfaction with the online exam environment. Amidst the increasing tendency of institutions to move to remote exams, the study provides significant evidence for the possibility of sustainable, more accommodating, and quality exams in an online format. This is undoubtedly a topic of interest not only for institutions teaching at scale and looking for online solutions, but also for institutions seeking paths to sustain their internationalization and quality enhancement even during crises.

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<sup>1</sup> <https://eadtu.eu/>

<sup>2</sup> <https://uol.de/coer/coer-members>

Gabi Witthaus, in her paper titled **A capabilitarian model for online engagement derived from an exploration of the experiences of refugees in online higher education**, zoomed out on the pandemic-oriented crises and took our attention to the refugee crisis. This study connected a sociological derivative -capabilitarian understanding- adroitly with the engagement phenomenon to propose a resilient approach to the refugee problem. As a result of the qualitative analysis, Witthaus suggests a capabilitarian engagement model for online learning. The model is promising in many aspects given that engagement is a crucial element of learning, specifically online education. While this is the case, admittedly, the engagement of disadvantaged learners has yet to be widely addressed or examined. The author built the online engagement guidelines for the displaced learners on the engagement model of Bond et al. (2020) and Redmond et al.'s (2018) framework. The study is evidently one that will be referred to extensively by online education specialists who work with and for humanitarian programs.

The last paper, **Massive Omission of Consent** by Eamon Costello, James Brunton, Richard Bolger, Tiziana Soverino, and Clément Juillerac from DCU, brings the relatively ignored subject of "consent" in big data use to the attention of the reader by means of a systematic review. Referring to big data that have been introduced to our lives with the increasing pace of digitalization, Costello et al. problematize the ethics approval omission in one of the big data pools, namely MOOCs research. The authors conducted a systematic review to seek an answer to whether the studies in the field adhere to the basic ethics requirements in their practice by reporting ethics-related consent, issues, and processes in the manuscript. The study found that only a small fraction of reviewed studies reported the ethical processes satisfactorily. This is a significant result since it underscores the need for researchers to consider rigor not only in terms of methodology but also in the approach to ethics in the analysis of big data.

This special issue enables us to read and reflect on four papers that intertwined the challenges of digital transformation with new evidence through rigorous and comprehensive research. We are happy to present the interesting results of these four papers; a) a successful utilization of MOOCs for increased digital confidence by Beirne et al.; b) promising results in terms of online examination compared to in-person exams by Cross et al.; c) a gap-filling approach to the engagement to accommodate displaced learners in the digital learning world by Witthaus; and d) a crucial reminder, if not a warning, to pay more attention to ethics in big data research in the digital education field by Costello et al.

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# Clicking with Confidence: Influence of a Student Co-Designed MOOC on Students' Emotions and Online Learning Self-Efficacy

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## Abstract

The COVID-19 pandemic has taught us that being able to learn online is now a crucial life skill and cannot be left to chance. Pedagogical interventions are critical to support students in building their digital skills and confidence, given identified links between online learning readiness and academic success. Based on this premise, the purpose of this study is to investigate the influence of an online learning preparatory MOOC on students' emotions and levels of online learning self-efficacy (OLSE). The paper begins by illustrating how the design and delivery of the MOOC had the potential to provide participants with the necessary mastery experiences, vicarious experiences, verbal persuasion, and affective regulation opportunities to evaluate and develop their online learning self-efficacy beliefs. Students starting or continuing their higher education online because of COVID-19 were encouraged to take the MOOC as part of their development. Students' self-reports of their emotion and OLSE were compared pre- and post-MOOC. Paired sample t-tests found significant differences in all four dimensions of OLSE following participation in the MOOC. Participants reported higher levels of Self-Efficacy Navigating Technology, Self-Efficacy Managing Time, Self-Efficacy Learning at a Distance, and Self-Efficacy Communicating Online. Additionally, changes in learners' emotions were observed post-MOOC. Most participants reported feeling anxious about online learning before the MOOC. This changed, however, post-MOOC, with the majority feeling positive and hopeful about online learning following the two-week course. The paper concludes by discussing the implications for practice.

*Keywords:* Online learning, self-efficacy, emotion, MOOC, self-efficacy beliefs

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While most educators want to *click* beyond the COVID-19 pandemic, it remains a challenging and valuable learning experience. The pandemic tested our resilience and contributed to renewed interest in the role of emotion in teaching, learning, and assessment. The need to support learners with a “pedagogy of care” has been paramount throughout the pandemic (Buckley-Marudas & Rose, 2021; Burke & Larmar, 2020). However, a kinder and softer form of online pedagogy by itself does not address the anxiety, trepidation, and very real challenges students face in becoming effective online learners. Learning online is not the same as learning in a traditional classroom and requires mastery of a different skill set. The pandemic has taught us that these skills cannot be assumed, and that carefully designed interventions are required to acknowledge and support students' affective experiences as they move to a new modality and develop their digital capacity to be successful online learners. This paper reports the impact of a MOOC co-designed with students to support the development of online learning self-efficacy (OLSE) in response to the COVID-19 crisis. The findings demonstrate how the MOOC as a support intervention, anchored in a wider life-skill framework, played a valuable role in the context of the pandemic where most students learned online out of necessity rather than by choice.

## Literature Review

In the past, education research has focused primarily on the role of cognition and the rational brain in learning at the expense of affect (Beirne, 2020). Fortunately, in more recent years, research has taken an “affective turn” (Zembylas, 2021). In this section, a scoping review will briefly explore the current understanding of the role of emotion and self-efficacy in educational contexts, and previous intervention research in these areas will also be examined.

### Emotions in Education

Awareness of the role emotions play in academic settings (i.e., academic emotions) has been growing for several years (O'Regan 2003; Pekrun et al., 2002). However, the global health pandemic has produced greater interest and created more questions about the relationship between emotions and learning in higher education contexts (Raccanello et al., 2022; Katzman & Stanton, 2020). An expanding body of literature overwhelmingly recognises academic emotion as a crucial factor that can constrain or facilitate the learning experience. Studies have shown that emotion can have an impact on the learning process through attention, memory, motivation, and self-regulation (Pekrun, 2011).

Emotions are frequently classified by their valence as either positive (e.g., hope, excitement) or negative (e.g., anxiety, frustration) and generally, positive emotions are seen to be more conducive to learning (Tan et al., 2021). However, the situation is often more complex and can depend more on whether the emotion is activating or deactivating (Pekrun, 2006). In some cases, negative activating emotions such as frustration or anxiety can enable learning and achievement (Pekrun & Perry, 2014; Rowe & Fitness, 2018).

The current study aligns with a dynamic perspective of emotions, which views emotions to be under constant change, varying situationally and over time (Dörnyei, 2009), and emerging from person-environment interactions (Pekrun et al., 2011; Schutz et al., 2006). It can thus be deduced that a change in the mode of learning, especially under the unique external conditions of the COVID-19 pandemic, had the potential to be emotionally overwhelming, eliciting strong emotional responses among students that may influence their participation and performance.

Previous research indicates that anxiety is a problem faced by online learners, especially first-time online students (St Clair, 2015) and that other negative emotions such as fear, anger, and helplessness have been found to be higher in online students compared to students in traditional classes (Butz et al., 2015).

Understanding learners' emotions under the unique and challenging conditions of transitioning to higher education and an online mode of delivery is an important step in supporting students during and after this process. Studies focusing on emotion and well-being in higher education contexts during the pandemic are not uncommon (e.g., Raccanello et al., 2022; Visser & Law-van Wyk, 2021), however, the current study seeks not only to identify students' emotions but also track how they change following participation in an online learning preparatory MOOC.

### **Self-Efficacy in Education**

Self-efficacy is posited to be an important component of learning success. As a key element of social cognitive theory, self-efficacy "refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Notably, it is an individual's *belief* in their own ability and does not necessarily equate to the reality of actual ability. Self-efficacy is hypothesised to play a key role in human agency, affecting decision making, effort, perseverance, and resilience (Bandura, 1997). People with high self-efficacy for a task are more likely to participate, expend more effort, and persist at that task in the face of difficulties (Bandura, 1997).

The current study focuses more specifically on online learning self-efficacy (OLSE) which refers to one's confidence to perform academic tasks successfully in an online environment. While less advanced than research in relation to self-efficacy for face-to-face learning, existing studies indicate that OLSE is associated with successful online learning experiences. Studies have shown that OLSE can be a predictor of achievement (Ergul, 2004; Joo et al., 2013), retention (Holder, 2007; Yukselturk et al., 2014), perceived learning (Alqurashi, 2019; Wright et al., 2006), satisfaction (Artino, 2008; Landrum, 2020; Shen et al., 2013), and engagement (Pellas, 2014; Prior et al., 2016). The ability to self-regulate and motivate oneself to engage in the learning process is important for all students, independent of the learning environment. The importance, though, is amplified in an online or distance learning environment where the instructor is not always visually or synchronously present and learners have to take greater responsibility for the management and control of their own academic progress (Milligan & Littlejohn, 2014; Stephen et al., 2020; Terras & Ramsay, 2015).

Like emotion, self-efficacy beliefs are not fixed traits but vary across activity domains and situational conditions (Bandura, 1997). The multifaceted nature of online learning suggests that OLSE will vary across the different tasks or situations associated with the online learning context. Many researchers, however, have noted that a large proportion of studies have focused on computer self-efficacy or self-efficacy in relation to technology use, disregarding other aspects of the online learning experience (Alqurashi, 2019; Shen et al., 2013; Zimmerman & Kulikowich, 2016). Shen et al. (2013) demonstrated that OLSE is multi-dimensional by identifying five dimensions: (i) self-efficacy to complete an online course, (ii) self-efficacy to interact socially with classmates, (iii) self-efficacy to handle tools in a Course Management System (CMS), (iv) self-efficacy to interact with instructors in an online course, and (v) self-efficacy to interact with classmates for academic purposes. Similarly, Zimmerman and Kulikowich (2016) developed the Online Learning Self-Efficacy Scale (OLSES) which includes

other aspects of online learning, such as self-directedness, communication skills, time-management skills, and technology use. An adapted version of the OLSES is the scale used in the current study because it was deemed to be more holistic and relevant to the learning context.

### **Developing Self-Efficacy Through Pedagogical Interventions**

The important links between self-efficacy and learning success has meant that improving self-efficacy via teaching, learning support, and curriculum design has been the focus of several studies. For example, Bartimote-Aufflick et al. (2016) identified 17 intervention studies published since 2000 that compared self-efficacy under different conditions or monitored self-efficacy over time. Findings from the studies identified showed that self-efficacy could be improved because of completing a course, participating in a particular learning activity, or when certain teaching strategies were employed. The studies were conducted among postgraduate and undergraduate students across a wide range of countries. Strategies used to promote self-efficacy included drawing on the affordances of multimedia and e-learning material, facilitating peer-interaction, providing additional resources for challenging concepts, and encouraging students to share personal experiences (Bartimote-Aufflick et al., 2016). Collectively, the findings of this review indicate the potential of pedagogical or learning interventions in enhancing self-efficacy among higher education students.

A few studies have looked specifically at the impact of study skills courses on self-efficacy (Macaskill & Denovan, 2013; Rodriguez & Armellini, 2017; Wernersbach et al., 2013). Rodriguez and Armellini (2017) report on the role of a study skills MOOC in increasing self-efficacy among a sample of undergraduate and professional learners. Albeit a small sample ( $n = 32$ ), they found statistically significant increases in both general self-efficacy and self-efficacy in relation to specific study skills upon completion of the MOOC. This raises the question of whether similar results can be found in larger scale interventions. While limited research exploring this question is available, in a brief analysis of the components of MOOCs, Hodges (2016) indicates that MOOCs can play a role in enhancing self-efficacy at scale. However, the potential of MOOCs in terms of supporting learner self-efficacy needs further investigation, which the current study seeks to address.

Underlying many of these studies is the proposition from Bandura (1986), as part of the social cognitive theory, that individuals develop self-efficacy beliefs by interpreting information regarding their own capabilities and that this information can stem from several sources. In the next section we will look more closely at these information sources and how the design of the MOOC facilitated each one.

## The Learning Context

### *The MOOC*

*A Digital Edge: Essentials for the Online Learner* is a MOOC developed by Dublin City University's (DCU) National Institute of Digital Learning (NIDL) in collaboration with the Irish Universities Association (IUA). The MOOC was rapidly developed and first offered in September 2020 to address the challenges faced by college and university students as they began or continued their higher education online during COVID-19. Hosted on the FutureLearn platform, the two-week course requires approximately 3 hours of learning per week. The content is structured around four main themes: Ways of Thinking and Ways of Working (Week 1), and Tools for Working and Tools for Thriving (Week 2). For a more detailed breakdown of each week's themes see Table 1 and Table 2. The course is open to learners all over the world and aims to support them to learn how to learn online. A distinctive feature of the course is the co-design and facilitation by students who share their tips, advice, and first-hand experiences about effective online learning.

**Table 1**

*Overview of Course Week 1*

Week 1					
Ways of Thinking			Ways of Working		
<i>Explore different ways of thinking to become a successful online learner</i>			<i>Develop better ways of working online</i>		
1.4	Know thyself	ARTICLE	1.11	How do I work?	POLL
1.5	What type of thinker are you?	ARTICLE	1.12	Where will I work?	ARTICLE
1.6	What type of online learner are you?	ARTICLE	1.13	How can we work together?	DISCUSSION
1.7	Seven habits of highly effective learners	VIDEO (02:04)	1.14	How can I stay on track?	POLL
1.8	Steer your own course	ARTICLE	1.15	How do I work purposefully	ARTICLE
1.9	Message in a bottle	ARTICLE			
1.10	Press pause	DISCUSSION			

**Table 2**

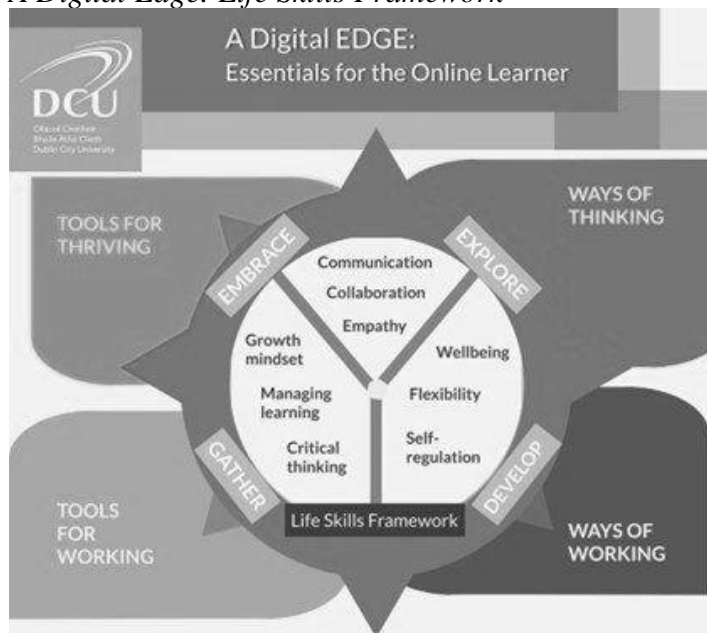
*Overview of Course Week 2*

Week 2					
Tools for Working			Tools for Thriving		
<i>Gather the tools needed to work online</i>			<i>Embrace the mindset to thrive online</i>		
2.3	Get connected	ARTICLE	2.11	Balancing act	ARTICLE
2.4	Get your toolkit	ARTICLE	2.12	Your wellbeing	ARTICLE
2.5	Get exploring	ARTICLE	2.13	Dynamics of space	VIDEO (01:43)
2.6	Get planning	VIDEO (02:04)	2.14	Juggling and connecting	VIDEO (01:27)
2.7	Get working	ARTICLE	2.15	Think, reflect, think!	ARTICLE
2.8	Get backed-up	EXERCISE	2.16	Beware!	ARTICLE
2.9	Get specific	DISCUSSION	2.17	A worry shared...	POLL

**Learning Design.** The design and development of curricula and learning activities in the MOOC are aimed at improving the lifelong learning competences of students. To achieve this, the course is anchored in the LifeComp Framework (Sala et al., 2020) and the Learning Compass 2030 (OECD, 2019). Figure 1 presents a visual representation of how these models were synthesised. The instructional approach adopted in the MOOC was influenced by the design principles underlying the FutureLearn platform, which promote visual learning and learning through conversation and storytelling (FutureLearn, 2018).

**Figure 1**

*A Digital Edge: Life Skills Framework*



Central to the design of the MOOC was the need to facilitate the four information sources posited by Bandura to influence self-efficacy: i) enactive mastery experiences, ii) vicarious experiences, iii) verbal persuasion, and iv) physiological and affective sources. Table 3 describes each of these four information sources and details how the course format and content and the corresponding learner experience over the two weeks could potentially facilitate each one.



**Table 3**  
*Sources of Self-Efficacy Development in the MOOC*

<b>Information Source</b>	<b>Description</b>	<b>Relation to MOOC</b>
Enactive Mastery Experiences	An individual's prior experiences with the task at hand, or a similar task, which can serve as an indicator of capability. Past successes can build confidence, while failures can weaken it. The difficulty of a task and the amount of effort required also contribute to a person's sense of self-efficacy. Enactive mastery experiences are determined to be the most influential source of efficacy information as they are accomplishments that we have experienced ourselves, for which we have tangible experiential evidence of success (Bandura 1997).	The MOOC was an authentic online learning experience. Participation in an online course can give students tangible evidence that they can learn successfully online. It was expected that the non-formal, low risk nature of the course would encourage participation, even among less experienced learners.
Vicarious Experiences	Social comparisons, which allow individuals to perceive their abilities in relation to the successes or failures of others, such as peers and role models. Observing others, with whom they can identify, succeed at a task can provide individuals with a sense of confidence in their own ability to perform similar tasks (Bandura 1997).	The MOOC was co-designed and co-facilitated by students who had prior experience learning online. Participant's vicarious experience was encouraged through the use of real-life examples and testimonials from these students. Testimonials were included in the course content as quoted text and audio clips. Student facilitators were also available for the 2 weeks to answer questions and share their experiences in the discussion forums at the end of each step. Participants were encouraged to ask questions and draw on the knowledge and experience of the student facilitators. By observing the successes of their peers, learners can generate efficacy beliefs that they too can obtain success through persistence and effort.

Verbal Persuasion	Positive encouragement and feedback from others. Realistic affirmations from others can boost self-efficacy perceptions. Often considered a weaker source of self-efficacy as compliments can often be given loosely without substantiation (Bandura 1997).	Positive verbal persuasion was provided through the discussion forums by both the instructors and the student mentors to help participants believe that they can cope with difficult situations when learning online.
Physiological and affective states	The influence of our body's physical and emotional reactions to certain situations and tasks on self-efficacy. Experiences of anxiety, stress, arousal, fatigue, for example, and their accompanying physical manifestations, can leave a student with a low perception of their ability to persist in a task.	Well-being, emotional regulation and co-regulation were key components of the pedagogical framework of this MOOC. Polls incorporated at four points throughout the course encouraged learners to reflect and share how they were feeling about learning online (See Fig 2.). The polls supported self-regulation among the learners and raised awareness of emotion in online learning. The poll format allowed participants to respond anonymously while also being able to see how their peers were feeling.

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**Figure 2**

*Examples of In-Course Poll*

Which of the following statements best describes how you are currently feeling about being an online learner?

- I'm feeling happy
- I'm feeling anxious
- I'm feeling excited
- I'm feeling angry
- I'm feeling unhappy
- I'm feeling overwhelmed
- I'm feeling comfortable

## Methodology

### Research Questions

The following research questions were examined in this study:

1. Can an online learning preparatory MOOC improve OLSE among learners?
2. Do students' emotions toward online learning change following participation in the MOOC?

### Participants

Participants were individuals enrolled in the first iteration of the MOOC, *The Digital Edge: Essentials for the Online Learner*, in September 2020, who completed both a pre-course and post-course questionnaire. In total, 135 participants completed both questionnaires, forming the sample for this study. Among this sample, 98 were females (73%), 34 were males (25%), 1 person responded as “other” (0.7%), and 2 chose the option “prefer not to say” (1%). Over two-thirds of participants were entering their first year of college or university but undergraduates in subsequent years and postgraduates were also included in the pool of respondents.

Overall, 6,598 individuals enrolled in this first iteration of the MOOC, but it was not possible to determine how the study’s sample compared to this wider population of learners due to European data privacy rules and platform data sharing limitations.

### Research Design and Procedure

A repeated measures design was adopted, using pre- and post-course questionnaires to i) identify initial levels of OLSE and emotional responses to online learning, and ii) trace changes in learners’ self-efficacy beliefs and emotions related to their learning experience. Two online surveys were administered. Both surveys were embedded in the course for voluntary student response.

The pre- and post-course questionnaires were designed to capture data pertaining to participants’ demographics, emotional states, and online learning self-efficacy.

### Demographic Variables

Participants were asked to self-report demographic information, including gender and academic status. For academic status, participants were asked to report whether they were a new student (i.e., entering their first year of college or university) or a continuing student (i.e., in subsequent years of college or university).

### Emotional States

A list of six discrete emotion states was used to collect data pertaining to student affect. The list was derived from previous studies on learning-centric emotions (Beirne, 2020; D’Mello, 2013; Pekrun et al., 2011). Participants were asked to select the emotion they experienced most strongly. Responses were subsequently used to generate a new binary variable with the categorically positive emotions coded as 1 and categorically negative emotions coded as 0.

### Online Learning Self-Efficacy

Self-efficacy was measured using a scale adapted from Zimmerman and Kulikowich (2016). Adaptation involved the removal and re-wording of items to facilitate a global audience and the learning context in question. Participants were asked to rate 20 online learning-related tasks using a 5-point Likert scale. A rating of 1 signified that they believed that they would not

be able to perform the task at all; a rating of 5 signified that they believed that they could perform the task extremely well.

## **Results**

### **The Dimensions of Online Learning Self-Efficacy**

An exploratory factor analysis was conducted to identify the dimensions of OLSE. An oblique rotation method was applied because each self-efficacy dimension was assumed to be correlated with one another. Factor loadings below .30 were suppressed. Four factors with eigenvalues  $> 1$  were extracted from the factor analysis. The four-factor solution accounted for 67% of total variance and the four factors were internally consistent yielding Cronbach Alpha's of .878, .892, .848, and .900, respectively. None of the four subscale reliability analyses revealed items whose removal would increase the subscale's alpha coefficient. The Kaiser-Meyer-Olkin measure of sampling adequacy (.893) and Bartlett's Test of Sphericity ( $p=.001$ ) both indicated that factor analysis is appropriate.

**Table 4**  
*Results of Exploratory Factor Analysis*

	Factor Loadings				
	1	2	3	4	
Navigate online course materials efficiently	.996				
Find the course syllabus online	.857				
Overcome technical difficulties on my own	.849				
Learn to use new online tools	.692				
Submit assignments online	.685				
Use the library's online resources efficiently	.442				
Search the Internet to find or gather information for online learning	.334		.329		
Manage time effectively		.929			
Develop and follow a plan for completing all required work on time		.845			
Complete all assignments on time		.803			
Focus on coursework when faced with distractions		.719			
Meet deadlines with very few reminders	.418	.570			
Communicate effectively with other students online			.974		
Communicate effectively with my instructor online			.842		
When a problem arises, promptly ask questions in the appropriate forum			.710		
Communicate using asynchronous technologies			.708		
Use synchronous technology to communicate with others			.582		
Complete a group project entirely online			.479		
Learn without being in the same physical room as other students				.995	
Learn without being in the same physical room as the instructor				.935	
	Cronbach Alpha	.878	.892	.848	.900

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.<sup>a</sup>

a. Rotation converged in 6 iterations.

Items loading on component 1 predominantly relate to using and navigating technology for learning. Items loading on component 2 are mainly associated with self-motivation and time management. Items loading on component 3 concern communicating using technology. The items loading on component 4 relate to learning at a distance. The component correlation matrix is shown in Table 5.

**Table 5***Component Correlation Matrix*

Component	1	2	3	4
1	-			
2	.494	-		
3	.587	.529	-	
4	.569	.432	.552	-

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

The components resulting from this factor analysis were used to create four subscales: Component 1, *Navigating Technology*; Component 2, *Time Management* (this includes items relating to motivation); Component 3, *Communicating Online*; Component 4, *Learning at a Distance*. Evidence of convergent and divergent validity was examined using correlational techniques. The results of these correlation analyses are shown in Table 4 and 5.

### Can a Preparatory MOOC Improve OLSE Among Learners?

To answer this research question, paired samples t-tests were conducted to compare changes between pre-and post-MOOC scores for each of the four dimensions of OLSE. Results from these analyses, presented in Table 6, reveal that there are significant differences between the means for each dimension of OLSE. The post-MOOC scores are significantly higher than the pre-MOOC scores in all cases. Effect sizes for these findings range from moderate to large (Cohen, 1988). The standardised difference between the pre- and post-course means for self-efficacy to communicate online is notably large.

**Table 6***Paired T-Tests and Cohen's d Statistics for the Four OLSE dimensions*

Variable		N	M	SD	T	p	Cohen's d
Navigating Technology	Pre	135	3.732	0.694	-5.124	<.001	0.441
	Post	135	3.973	0.649			
Time Management	Pre	135	3.656	0.833	-5.076	<.001	0.437

	Post	135	3.933	0.699			
	Pre	135	3.415	0.762	-9.667	<.001	0.832
Communicating Online	Post	135	3.936	0.643			
	Pre	135	3.374	0.916	-5.485	<.001	0.472
Learning at a Distance	Post	135	3.767	0.745			

**Do Students' Emotions Toward Online Learning Change Following Participation in the MOOC?**

To answer this research question, descriptive statistics collected pre- and post-MOOC were analysed. Before the MOOC, frequency counts for each emotion revealed that “anxiety” was the emotion felt most strongly by most participants (54%) and approximately 62% of the participants reported negative emotion overall (see Table 7).

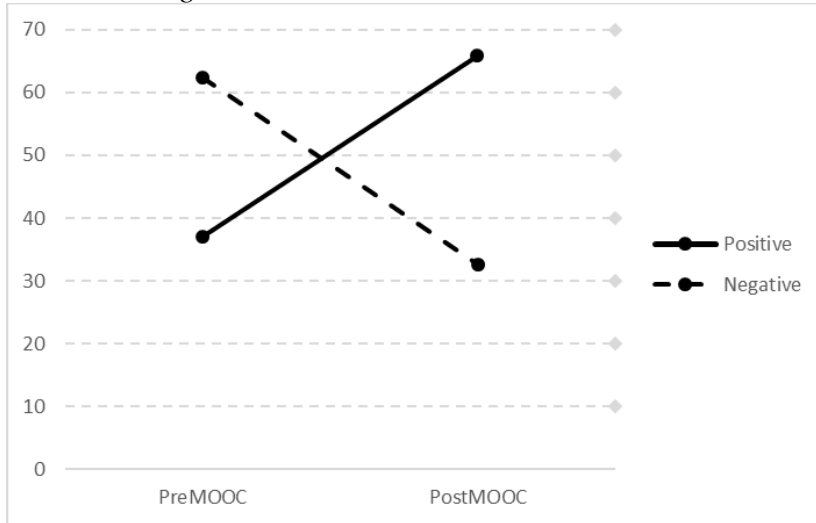
**Table 7**  
*Emotion Descriptive Statistics*

Emotion	Pre-MOOC		Post-MOOC	
	N	%	n	%
Positive Sentiment	54	37.0	91	65.8
Excitement	23	17.0	33	24.4
Happiness	7	5.2	11	8.1
Hope	20	14.8	45	33.3
Negative Sentiment	81	62.3	44	32.6
Anger	4	3.0	2	1.5
Anxiety	73	54.1	40	29.6
Hopelessness	7	5.2	2	1.5
Blank	1	0.7	2	1.5
	135	100.0	135	100.0

However, the distribution changed among the post-MOOC data. “Hope” was the emotion felt most strongly by the plurality of learners (33%) on completing the MOOC and nearly two-thirds of participants reported positive emotion overall (66%). Figure 3 further illustrates the change in participants' overall sentiment (positive or negative) towards online learning pre- and

post-MOOC.

**Figure 3**  
*Overall Changes in Sentiment Pre- and Post- MOOC*



Drawing on the binary sentiment data, Figure 4 presents a more detailed breakdown of individual sentiment changes following MOOC participation. These results show that 37% of participants changed their sentiment towards online learning post-MOOC. Nearly all these people changed from negative to positive sentiment.

**Figure 4**  
*Distribution of Sentiment Changes from Pre to Post-MOOC*





## Discussion

The purpose of this study was to explore emotion and OLSE among higher education students in the context of COVID-19 and examine the influence of an online learning preparatory MOOC on these variables.

All four dimensions of OLSE were enhanced after experiencing a two-week online learning preparatory MOOC. Following participation in the MOOC, participants reported feeling more confident in their ability to i) navigate the technological aspects of learning online, ii) communicate in an online environment, iii) manage their time while learning online, and iv) learn without being in the same room as their instructor or peers. The biggest increase was for self-efficacy to communicate online. Notably, learning through conversation is a key design principle underpinning the course and the wider FutureLearn platform (FutureLearn, 2018). These findings align with existing research that has shown that OLSE can be improved over time (Bartimote-Aufflick et al., 2016) as well as the notion that competence and confidence can be improved through authentic mastery experiences (Pajares, 1997). The question remains, however, as to whether the improvement can be attributed to participation in the MOOC. Nevertheless, the findings can be seen to extend the previous narrative exploring the potential of MOOCs (Hodges 2016) or online orientations more generally (Abdous, 2019) in enhancing self-efficacy at scale.

When reflecting on the move to online learning because of the pandemic, students experienced the full range of emotions listed. While nearly a third of students reported feeling hopeful and excited about learning online, anxiety was the strongest emotion for the majority. Other negative emotions such as hopelessness and anger were also reported, but by fewer people. The prevalence of anxiety at this time is not surprising and was also found in other studies which focused on students' emotions during the pandemic (Chien et al., 2022; Novara et al., 2022). A comparison with post-MOOC emotion reports indicates a shift in students' emotions after the two weeks. Following the MOOC, most students reported feeling positive about online learning, with hope being the emotion participants felt most strongly. For over a third of participants, their strongest emotion changed from a categorically negative emotion before the MOOC to a positive one after. These findings contribute to existing research that explores how situational factors such as course content and design can impact emotion (D'Mello et al., 2014) and, more specifically, indicate the potential of MOOCs in scaffolding the online learning experience.

Overall, these findings are important, given that higher self-efficacy and positive emotion are associated with learning success (Bartimote-Aufflick et al., 2016; Tan et al., 2021).

### Implications for Online Teaching and Learning

Interventions to foster positive emotion and self-efficacy constitute an area of interest for higher education institutions and practitioners as they endeavour to encourage and support student well-being, confidence, and, ultimately, learning success. Cleveland-Innes et al. (2016) highlight the important role of online learning preparatory courses stating that:

... there is a need to pay attention to the skills students need to develop to become successful online learners. It also underscored that prior levels of education and even previous course attempts may not have helped students to develop these essential skills (p. 596).

While other MOOCs and short courses exist, it is important to note that our findings are interpreted in the context of COVID-19 and the MOOC described in this paper, and we would caution against making broader generalisations. In that regard, based on the findings in the

current study, we recommend that the MOOC, *The Digital Edge: Essentials for the Online Learner*, be used as a pedagogical intervention to improve OLSE among higher education students when aiming to enhance learner's confidence communicating when learning online. Notably, since the MOOC's development, it has now become a core feature of Dublin City University's student induction program, with over 2500 students having completed the course. While there is merit to embedding or contextualising such interventions at an institutional level, the MOOC with its co-facilitation by students also shows the value of more learner-driven and self-directed initiatives. In this respect, there are two key lessons from the MOOC experience. First, the MOOC demonstrates the value and importance of incorporating a strong student voice in the learning design process. Students need to be part of the design team as co-authors rather than simply the end audience. Second, the MOOC confirmed that students should not be left to their own devices in learning how to learn online and in developing their self-regulatory dispositions and positive emotions towards studying in digital environments. Such interventions as described in this paper can play a valuable role, especially when intentionally designed and anchored in a framework to support emotion, digital well-being, and online learning readiness.

## Limitations

This final section highlights some limitations that should be considered. First, as in other studies with similar themes, there is a limitation in using self-reported instruments as they are subject to measurement errors and personal biases. Second, this investigation was non-experimental in nature which limits the interpretation and generalisability of the results. While the post-course questionnaire was embedded at the end of the MOOC, the researchers have no indication of the extent to which participants completed the MOOC. Similarly, we cannot account for any other interventions or student experiences that could have influenced their self-efficacy between completing the pre- and post-course questionnaires. Most institutions developed new resources to support their students throughout the crisis and the impact of this material is impossible to determine. In addition, the effect of the pre-test as an intervention could have had a bearing on the score of the post-test. Also, low response rates, attributable to the longitudinal nature of the study and high dropout rates in MOOCs more generally, along with the self-selecting sample, limit the representativeness and generalisability of the findings. Finally, it was not possible to track the *stickiness* of the positive changes reported by students over the first few weeks and beyond of their online study, which raises a methodological challenge for future researchers.

## Conclusion

There is every indication that online and hybrid learning options in higher education will become more prevalent in the post-pandemic era. Furthermore, digital literacy and the ability to learn online will become increasingly relevant to life-long learning in the workplace as well as assisting students to become active contributors to society. It is our responsibility as educators to support and care for students as they strive to negotiate the demands of learning in an ever-evolving digital society. The strong association established in the literature between learning success and both emotion and self-efficacy indicates that these variables are important to consider in helping students be successful and persevere in the face of challenges. This study, therefore, sought to examine the effect of a MOOC on students' emotions and OLSE beliefs and the results indicated positive changes for both constructs post-MOOC.

Investigating the effects of a learning intervention on students' OLSE and emotion extends knowledge in both fields but also provides actionable learnings from the pandemic for higher education educators and policy makers. A systematic review of pandemic-related online learning readiness literature conducted by the authors in conjunction with the current study highlighted the need to bridge theory and research with practice. It showed limited knowledge of the literature and that, while many studies arising from the pandemic had headline recommendations for practice, well-designed interventions to support student success for online learning were scarce (Beirne et al., 2022).

Overall, this study offers positive new insights for practice, but there is still much to be done in this area. More longitudinal research is needed to investigate self-efficacy and emotion in online learning contexts. Understanding the temporal dynamics of these constructs and related learner and situational variables could hold important insights for pedagogical interventions. The inter-relationships between these variables and online learning readiness also warrants further inquiry (Chien et al., 2022).

### **Declarations**

Ethical approval for the study was granted by the Research Ethics Committee in Dublin City University. The authors have no conflicts of interest to declare.

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# The Impact of Online Exams on the Quality of Distance Learners' Exam and Exam Revision Experience: Perspectives from the Open University UK

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## Abstract

This paper reports findings from a research study at The Open University, UK into the quality of distance learners' online exam experience and the differences in experience between online (pandemic) and in-person (pre-pandemic) modes of examination. Our research responds to the ongoing need for greater insight into the exam experience and is uniquely positioned in two ways. First, we made use of a robust reference dataset collected before the COVID-19 pandemic and compared this with a second survey administered a year after the pandemic started; second, we asked students about their experience preparing and revising for the exam as well as the exam itself. Exam revision represents an important transitional period for learners. Our results show that, overall, the shift to online remote exams did not impact the quality of distance learners' experience of revising for exams or taking the exam itself. We found no significant change in the revision experience across six of eight measures, including the learning benefits of learning while revising, enjoyment, and support. However, students reported feeling less anxious when revising for online exams. The quality of the exam experience itself was largely unaffected by the move from in-person to online remote exams. No significant differences were found for seven of the nine measures of exam experience. However, we found satisfaction with the exam environment was significantly higher for online exams and that learners felt the online exam was harder than they expected. Age and gender differences are also explored.

*Keywords:* online examinations, digital assessment, exam revision, student experience, higher education

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Interest in online e-assessment has intensified since the outbreak of COVID-19 pandemic in 2020, resulting in often substantial changes in how, where, and when assessment happens (Aristeidou & Cross, 2021) and with universities now planning to make more use of online assessment (Universities UK, 2022). However, while there is an ongoing need for greater insight into the exam experience (Bevitt, 2015; QAA, 2007), the novel changes that students have experienced in the last few years require specific attention.

One key area of change has been summative assessment and, most notably, the end-of-course examination. Hillier (2014) describes eight aspects that influence the student experience of using technology during exams: affective factors, teaching and learning, validity, reliability, security (including cheating), practicality, production (taking the exam), and adoption (attitude towards the exam). While such factors should relate to how students experience any examination, practices associated with conventional exams have been so normalised that they only become of interest if there is pedagogic or practical deviation or change.

Technology-mediated exams represent one such deviation from normative practice, whether this relates to technology being used to directly answer exam questions regardless of location (e.g., Böhmer et al., 2018), monitoring of the (usually home) environment in which the exam is being taken (e.g., Patael et al., 2022), and/or the exchange and transmission of hand-written manuscripts for marking. Reedy et al. (2021) note a significant variety in online assessment strategies and formats.

This paper reports findings from a research study at the Open University, UK into the quality of distance learners' online exam experience and the differences in experience between online and in-person modes of examination. Our research is uniquely positioned in two ways. First, we made use of a robust reference dataset collected before the COVID-19 pandemic and compared this with a second survey conducted since the pandemic started; second, we asked students about their experience preparing and revising for the exam as well as the exam itself. Exam revision represents an important transitional period for learners (Entwistle & Entwistle, 2003). This paper contrasts 16 measures relating to the exam revision and exam taking experience to determine whether the shift in assessment mode from conventional in-person exams to online remote exams has impacted learners' assessment experiences. Data from STEM subjects and from arts and social science subjects are analysed individually and compared. The second part of the paper investigates age- and gender-related differences. A discussion section reviews the key findings.

## **Literature Review**

Researchers have explored a range of innovation in online exams including the method of production (paper, bring-your-own-device, home computer), modes of submission (by hand, digital scan, digital), location in which the exam is taken (exam hall, home study), assessment method (same or different assessment format, questions, procedure) or several in combination. When a practitioner speaks of using an "online exam" this could be a reference to anything from an online essay submission to a fully automated, computer-marked online examination (James, 2016). Consequently, care should be taken when interpreting headline research findings about online exams without acknowledgement of the necessary nuance and context. Sometimes a comparative study is possible, but, where not, researchers will ask respondents to self-report whether and how they perceive the difference or change.

Ilgaz and Afacan Adanir (2019) contrasted student performance in online and face-to-face exams while controlling for assessment approach. They found that distance learners generally had positive perceptions of online exams and performed better in a mid-term, online, multiple-choice exam than in an end-of-course, face-to-face, multiple-choice exam (p.1262). They reported no significant difference between learners' perceptions about online exams and their academic achievement, age, gender, or subject area.

Others have made comparisons between online and physical locations. These tend to find that most students, albeit a sometimes-slim majority, prefer online exams to written exams taken collectively in an exam hall. For example, in the US, a study by Stowell and Bennett (2010) (n=69) found that just over half of students indicated a preference for the online exams and those that did scored higher for classroom test anxiety (i.e., anxiety related to taking face-to-face exams). Recently, a survey (n=185) by Afacan Adanir et al. (2020) found that more than half of students at a state university in Turkey preferred online exams over traditional paper-based exams and valued the benefits to logistics and improved teaching and learning. The study also notes differences in student perception and experience between countries, potentially indicating cultural differences. Khan et al.'s (2021) survey of university students studying in India and Saudi Arabia (n=207) report that learners believe online exams to be "more advantageous" than conventional exams, highlighting perceived value in authenticity of grading and efficiency of time, effort, and expenditure.

The impact of online exams on students' learning (both as they revise, take, and reflect on the assessment) and their confidence and ability to demonstrate that learning have been considered by several studies. Khan et al. (2021) report that students agree that "online exams could facilitate a more adaptive learning approach than pre-paper-based ones" and that "using cutting-edge technology in online examples enables students to take a new learning approach." Eltahir et al. (2022) report that, on average, the 1742 students responding to their survey at Ajman University (UAE) rated as "moderate" (on a five-point scale from "very low" to "very high") question items such as "e-exams enable me to show a better academic achievement" although there is reasonable variability. Earlier, Hillier (2014) found that students did not believe that taking an exam on a computer had impacted their ability to demonstrate knowledge in more ways than paper-based exams. Recently, Domínguez et al. (2022) have found academic performance during online exams was higher than for face-to-face exams and preference for online exams is higher than for face-to-face exams.

One drawback of most recent studies comparing student experiences of online and conventional approaches to exams is that they tend to ask about one relative to the other. Less common are the use of context-independent question items (i.e., questions that could be asked of any exam experience without regard to mode, location or technology used). This is, in part, because such a comparison requires the same quality of data to be collected before the change or intervention took place and, in the case of reactive studies such as those relating to the COVID-19 pandemic started, this is not possible.

One research project already conducting detailed investigations into the student experience of assessment, including exams, before the COVID-19 pandemic started was the Open University (UK) Student Experience of Feedback, Assessment and Revision (SEFAR) project. Predicated on a long-standing interest in understanding the student assessment experience, this project administered two comprehensive surveys to a representative sample of undergraduate distance learners in 2015 (Cross et al., 2016) and early 2020. The study investigated the relationship between the learning experience revising for an exam and the

experience of the exam itself. Cross et al. (2016) identified five distinct factors: exam experience, learning from revision, revision design, revision resource quality, and question literacy (ability of the student to understand what the exam question were asking). The study found a strong correlation between how much learners enjoyed revising and how much they enjoyed the exam itself, and a moderate correlation was found between the degree that learners used revision as a reflective activity and their satisfaction with the exam grades that they received, their sense of exam preparedness, and feeling satisfied the exam gave them the opportunity to perform to their best.

Test anxiety prior to and during examinations is a well-studied aspect of the assessment experience. Gender differences (male/female) have been identified across a range of studies (e.g., Ajmal & Ahmad, 2019; Ballen et al., 2017; Conijn et al., 2022). However, there has been less research into how age interacts with perceived experience and while some examples exist (e.g., Arora, 2021; Okada et al., 2018), there is a need for further study in this area.

The literature signals a need to understand whether a transition to online exams impacts the student experience of preparing for and taking the assessment. Furthermore, it indicates that the effects of this transition on student anxiety may differ by gender and age. Consequently, our four research questions were:

RQ1: Do student experiences of revising for a conventional exam and a remote online exam differ?

RQ2: Do student experiences of sitting a conventional and a remote online exam differ?

RQ3. Are older students' experiences similar to those of younger students with respect to pre-exam anxiety and mark satisfaction?

RQ4. Are female students' experiences similar to those of male students with respect to pre-exam anxiety and mark satisfaction?

## Method

In this study, we compare survey data about the student experience of revising for and taking conventional examinations before the COVID-19 pandemic (our reference dataset) with data about the student experience of taking remote online exams at home from a second survey conducted after the pandemic started.

### Survey Instruments

We focus on student responses to 16 question items in both surveys. The first set of questions contained seven items asking about the experience of revising for the exam (revision experience instrument). The second set of questions contained nine items about their exam experience (exam experience instrument). The question items used were, in part, developed from, or extended from, item constructs used previously (Dermo, 2009; Gibbs & Dunbar-Goddet; 2007; Vattøy et al., 2021) and piloted in 2015 (Cross et al., 2016). The survey questions, in part, seek to probe additional exam aspects such as anxiety (Falcikov & Boud, 2007), exam preparedness (Payne & Brown, 2011), grade satisfaction and enjoyment. The experience of revising for an exam is quite distinct from the experience of taking the exam and the relationship between the two, where it exists at all, is not straightforward (Cross et al., 2016). The two sets of

questions were piloted with students and their feedback was integrated into the final version of the survey.

Two items in the revision experience instrument ask whether the student felt prepared and understood what they needed to revise (important for the interpretation of the learning experience of the activity itself); two ask about their learning experience (revision as a reflective activity and an opportunity for new learning such as from previously skipped content); one confirms whether workload (allocated revision time) may have been an issue (this could also be used as a surrogate to indicate good revision design); and two ask about how they felt about the experience (anxiety and enjoyment).

Where possible, the exam experience instrument questions matched those of the revision experience instrument. They asked whether the student felt prepared for the exam, whether they understood the questions (the questions were clear), whether the question mapped well against learning outcomes (that they were able to demonstrate what they had learned) and how they felt about the experience (anxiety, enjoyment, and difficulty). One question item asked about the quality of the exam environment (physical location of the student to take the exam online), and two asked about the post-exam experience to gauge how positively the exam was viewed after it happened (whether there was a sense of achievement and whether students were satisfied with the principal output of an exam—the quality of the grade received).

Students were asked to agree or disagree with each one of the instrument questions, on a scale of 1 to 5 (where 1 = strongly disagree; 5 = strongly agree), and survey design good practice was followed (Oppenheim, 1992).

### **Student Experience of Feedback, Assessment and Revision (SEFAR) study**

The two survey instruments were used in both surveys. The first survey was conducted early in 2020 and is hereafter referred to as the SEFAR2020 survey. This was the second iteration of the university's SEFAR survey. The sample used for the survey (n=6,300) comprised an equal number of undergraduate students studying Open University Levels 1, 2, and 3 modules (this was considered a good approximation for Year 1, 2 and 3) and representation from our four subject faculty areas was proportional to the number of students studying based in each. Besides questions about exams, the SEFAR2020 survey included approximately 100 other question items covering assessment criteria, formative assessment, tutor grading and feedback, assessment literacies, assessment networks, and innovation in assessment practice. At the university, when a module ends in an exam, the grade that a student receives is usually based on a combination of the scores received for coursework and final exam itself. Hereafter we use the term 'exam score' (what students often refer to as their 'mark') to acknowledge this subtle but important distinction. While not used in this analysis, the dataset offers further opportunities for exploring the relationships among various aspects of the assessment experience (Cross et al., 2016).

### **Student Experience of Pandemic Exams (SEPE) study**

The second survey was administered between February and March 2022. For the purposes of this paper the survey will hereafter be referred to as the Student Experience of Pandemic Exams (SEPE) survey. The sample predominantly consisted of students who took online remote exams in 2020 or 2021; however, a sub-group who had had their exams cancelled in 2020 or 2021 and a group who had never taken a university exam were also included. Survey branching accommodated these different experiences. Besides questions relating to the analysis presented below, the survey asked about other aspects of the online assessment experience: what

they liked and disliked about taking an online exam; issues of trust, validity, reliability, security, and practicality; and barriers to adoption. Both surveys received approval from the university's human research ethics committee.

### Participants and Context

The total number of responses for the two surveys was similar (Table 1) and the response rates were considered acceptable. Both surveys were conducted online using a sample provided by the university's Student Research Panel and participants were recruited from the university's four faculties: the Science, Technology, Engineering and Maths (STEM) faculty; the Faculty of Social Sciences and Humanities (FASS); the Faculty of Business and Law (FBL); and the Faculty of Wellbeing, Education, and Language Studies (WELS). Basic demographic data drawn from university records was added to the survey results prior to analysis. One limitation of this is that the university only records gender by the binary "male" or "female" designations.

**Table 1**

*Total Number of Responses, Response Rates, Summary of Respondent Age, Gender and Number of Respondents with a Declared Disability*

Survey name		SEFAR2020	SEPE
Response rate		9.1%	5.6%
Responses	Total	572	562
	35 years old or younger	212	201
	36-55 years old	243	242
	56 years old or older	117	119
	Male	200	226
	Female	372	336
	Declared disability	79	77

There is no statistically significant difference between the two datasets with respect to age ( $t(1132) = .033$ ,  $p = .212$ ), gender ( $\chi^2(1) = 3.33$ ,  $p = .068$ ) and declared disability ( $\chi^2(1) = .03$ ,  $p = .862$ ). The data is considered to adequately represent the university's population of undergraduate learners although, in both surveys, a slightly greater portion of older learners responded to the invitation to participate than did younger learners. The authors judged the response rates to be like other comparable surveys conducted by the university.

We used a subset of these responses for the purpose of our analysis. The reason for doing so was two-fold. First, both surveys related to the broader assessment experience so only a proportion of those responding had taken an exam (the remaining students had experienced different end-of-module assessment such as a report, essay, or other assignment). Second, during the pandemic, some modules cancelled or substituted exams, meaning students did not have the opportunity of taking an exam remotely.

A sub-set comprising 168 responses to the SEFAR2020 survey and a sub-set comprising 190 responses to the SEPE (from students who had taken at least one online remote exam) were selected for use in our analysis. The latter sample included students from 57 modules who had participated in a great range of different types of online remote exam. This distinguishes our study from those that tend to focus on a particular assessment configuration. Of those selected



from the SEPE survey (n =190), 88.9% had participated in a remote online exam that was “extensively or mostly completed using a computer” while 20.0% had taken remote exam at home using a paper script that was scanned and sent back. In this report we use the term “online remote exam” (often shortened simply to “online exam”) to collectively refer to this range of exam taking although we acknowledge that for a small proportion of respondents, this was not a predominantly digital experience.

There was also substantial variation in the question types used in the online remote exams included in our SEPE sample (Table 2). Equations or other numerical working, short answer questions and multiple-choice questions were most often used for STEM subjects while long answer questions were more common for FASS subjects. In most cases, students were offered a degree of flexibility as to when to take the exam. This is considered a reasonable representation of the exam assessment adopted by the modules included. The period over which students were permitted to start the exam differed between the online exams. The most widely adopted approach was offering a 24-hour time window (39%) but periods of three days (19%) and seven or more days (20%) were also common. Conventional exams are usually hand-written and administered simultaneously in hired halls across the UK although a range of adjustments, such as support for students with disability to take exams at home, is provided. While there is no detailed breakdown of question types, these will be like those taken remotely because the remote exam scripts were derived from those developed for conventional exams.

**Table 2**

*Online Remote Exam Question Types Experienced by SEPE Participants*

<b>Question type</b>	<b>n</b>	<b>%</b>
Equations or other numerical workings	115	60.5%
Multiple choice questions	83	43.7%
Writing short answers of a paragraph or less	93	48.9%
Writing longer answers of more than a paragraph but less than a page	80	47.3%
Writing more than a page (e.g., an essay)	76	40.0%
Producing visual output such as drawings, photographs, or diagrams	39	20.5%
Producing audio output such as speaking (either recording or live)	3	1.6%
Self-reflection	17	8.9%

*Note:* Exams could include more than one question type.

The following table (Table 3) shows the number of responses received from all four of the main university faculties (FASS, FBL, STEM, and WELS). A small number of responses from students studying access modules or the university's Open degree were removed because these categories were not directly comparable. Our intention had been to analyse data from each of the four faculties separately in case differences among subject areas emerged. Responses from FBL and WELS were considered too low, so we decided to focus analysis on responses from the faculties of STEM and FASS. This enabled us to compare two distinct subject areas (between STEM modules, and arts and social science modules).

**Table 3***Survey Response by Faculty*

<b>Faculty</b>	<b>SEFAR2020 survey (Conventional exam)</b>	<b>SEPE survey (Online remote exam)</b>
FASS	55	42
FBL	18	17
STEM	61	118
WELS	8	8

In summary, our dataset comprised students from different subject disciplines with experience with a variety of conventional exams (taken pre-pandemic) and online remote exams (taken mostly during the pandemic).

**Data Analysis**

SPSS Version 26 was used for our statistical analysis. Mann-Whitney U tests were performed on survey responses to each scale item individually to explore students' revision (RQ1) and exam (RQ2) experience differences between conventional and online remote exams. Mean (M) and, where relevant, standard deviation (SD) are reported. Sample sizes are given in the tables. Prior to the assessment of the relationship between our variables, groups with a sample size smaller than twenty were removed from the tests (i.e., WELS and FBL student responses). An alpha level of .05 was used for all the analyses. Chi Squared tests were used to explore differences with age (RQ3) and gender (RQ4). To facilitate analysis of our third research question we simplified the response categories to "Agree" (the sum of "agree" and "strongly agree" responses), "Neither agree nor disagree," and "Disagree" (the sum of "strongly disagree" and "disagree" responses). We used data from all four Faculties (Table 3) and divided this into two groups: 35 years and under, and 36 years and older. This broadly separates learners into a group comprising those identified as the "Net generation" or younger (Jones et al., 2010). Within the context of supported distance learning, we felt it appropriate to refer to the first as "younger learners" and the second "older learners." We note that in other contexts these terms may signify different age groupings.

## Results

This section reports survey results relating to the experience of revising for an exam and taking an exam for two faculties.

**Experience of Revising for Exams**

There were no significant differences between the experience of revising for conventional exams and online remote exams among STEM students. Table 4 shows the mean responses score (from a Likert scale ranging from 1=strongly disagree to 5=strongly agree) and the p-value derived from a Mann-Whitney Test that compared the two.

**Table 4***STEM Students' Experience Mean Scores of Revising for Their Exam (n = 179)*

Question	Conventional exam (n = 61)	Online remote exam (n = 118)	U-value	Sig. (p-value)
I was clear about what I should revise.	3.84	4.04	3203.00	.20
Revising helped me reflect and consolidate what I had learnt earlier in the module.	4.25	4.31	3440.50	.56
I learnt new things when revising.	3.89	3.64	3048.00	.08
The TMAs in the module prepared me well for the end of module exam.	3.64	3.78	3274.50	.30
There was enough time in the module set aside for revision.	3.66	3.81	3234.50	.24
I enjoyed revising the module materials.	3.52	3.77	3102.00	.13
I often felt anxious when revising for my exam.	3.64	3.48	3348.00	.43

Note: \*p < 0.05; \*\*p < 0.01

For students studying arts and social sciences, six of the seven question items showed no significant difference between the experience of revising for conventional exams and online exams. Table 5 shows the mean responses score and the p-value derived from a Mann-Whitney Test that compared the two. The only significant difference was found in relation to exam anxiety. The mean for remote exams (M = 3.05, SD = 1.27) was significantly lower than for conventional exams (M = 3.62, SD = 1.24) indicating that, on average, students felt less anxiety revising for an online remote exam.

**Table 5***FASS Students' Experience of Revising for Their Exam (n=97)*

Question	Conventional exam (n = 55)	Online remote exam (n = 42)	U-value	Sig. (p-value)
I was clear about what I should revise	4.09	4.14	1107.00	.70
Revising helped me reflect and consolidate what I had learnt earlier in the module.	4.18	4.29	1025.50	.30
I learnt new things when revising	3.67	3.64	1138.00	.89
The TMAs in the module prepared me well for the end of module exam	3.51	3.81	917.00	.07
There was enough time in the module set aside for revision.	3.84	4.07	969.50	.15
I enjoyed revising the module materials.	3.62	3.83	963.00	.14
I often felt anxious when revising for my exam	3.62	3.05	<b>863.00</b>	.029*

Note: \*p < 0.05; \*\*p < 0.01

### Experience of Taking an Exam

With respect to STEM students' experience of taking the exam itself, two of the nine question items showed a significant difference between sitting a conventional exam in an exam room and taking an online exam at home (Table 6). The first difference was that students thought taking an online remote exam was harder. The mean for online remote exams ( $M = 3.69$ ,  $SD = 1.12$ ) was significantly higher than for conventional exams ( $M = 3.12$ ,  $SD = 1.07$ ). The second difference was that students taking online exams were much more satisfied with the quality of the exam environment (physical space in which they took their exam). The mean for online exams ( $M = 4.50$ ,  $SD = .78$ ) was significantly higher than for conventional exams ( $M = 3.96$ ,  $SD = .98$ ). STEM students reported no difference in feeling prepared for the exam, question quality, enjoyment, anxiety, sense of achievement, and exam score satisfaction.

**Table 6**

*STEM Students' Experience of Taking Their Exam (n=179)*

Question	Conventional exam (n = 57)	Online remote exam (n = 118)	U-value	Sig. (p-value)
[Immediately] before starting the exam I felt well prepared.	3.52	3.62	3180.00	.47
The exam questions were clear.	3.95	3.93	3307.50	.85
The exam questions allowed me to demonstrate what I had learnt.	3.86	3.93	3193.50	.45
The exam was harder than I was expecting.	3.12	3.69	<b>2452.00</b>	<b>.003**</b>
I enjoyed the exam.	2.88	3.03	3152.00	.49
I felt anxious what doing the exam.	3.56	3.72	3080.50	.35
I was satisfied with the quality of the [space I used at home/exam room]	3.96	4.50	<b>2255.00</b>	<b>&lt;.001**</b>
Completing the exam gave me a sense of achievement.	4.11	4.19	3163.00	.50
I was satisfied with the mark I got	3.89	3.95	3193.50	.71

Note: \* $p < 0.05$ ; \*\* $p < 0.01$

Arts and social sciences students (FASS faculty) also report a significant difference in satisfaction with the quality of the exam environment between conventional and online remote exams (Table 7). The mean for remote exams ( $M = 4.57$ ,  $SD = 1.11$ ) was significantly higher than for conventional exams ( $M = 3.92$ ,  $SD = .93$ ). These means are very similar to that of the STEM students (Table 6). Arts and social science students reported no difference in feeling prepared for the exam, question quality, enjoyment, anxiety, sense of achievement, and exam score satisfaction.

**Table 7**  
*FASS Students' Experience of Taking Their Exam (n=94)*

Question	Conventional exam (n = 52)	Online remote exam (n = 42)	U-value	Sig. (p-value)
[Immediately] before starting the exam I felt well prepared.	3.63	3.66	1082.50	.94
The exam questions were clear.	4.17	4.07	1073.50	.88
The exam questions allowed me to demonstrate what I had learnt.	4.10	4.05	1082.50	.94
The exam was harder than I was expecting.	2.83	3.21	930.00	.19
I enjoyed the exam.	2.94	3.26	963.50	.30
I felt anxious what doing the exam.	3.52	3.33	978.00	.37
I was satisfied with the quality of the [space I used at home/exam room].	3.92	4.57	<b>638.50</b>	<b>&lt;.001**</b>
Completing the exam gave me a sense of achievement.	4.17	4.12	1044.00	.86
I was satisfied with the mark I got.	3.79	4.10	952.00	.27

Note: \*p < 0.05; \*\*p < 0.01

### Contrasting Younger and Older Student Exam Experiences

Our third research question sought to explore potential differences between younger and older distance learners by focusing on the themes of anxiety and grade satisfaction with online and conventional exams. To facilitate analysis, given we had identified little difference between the responses of STEM and FASS students, we divided all valid responses (from across all four subject Faculties listed in Table 3) into two groups: 35 years and under, and 36 years and older. Table 8 shows that significantly fewer younger students reported often feeling anxious when revising for online remote exams (54%) than when revising for conventional exams (76%) ( $\chi^2(2) = 9.600$ ,  $p = .008$ ). This trend was not observed for older students ( $\chi^2(2) = 1.679$ ,  $p = .432$ ).

**Table 8**  
*Number of Younger and Older Student Responses to the Statement: "I often felt anxious when revising for my exam."*

Group	Exam type	Disagree	Neither agree nor disagree	Agree	$\chi^2$	p
Younger students (35 or under)	Conventional	3	9	37 (76%)	9.600	.008**
	Online remote	20	12	38 (54%)		
Older students (36 and over)	Conventional	24	20	49 (53%)	1.679	.432

Online remote      19                      27                      56 (55%)

Note: \*p < 0.05; \*\*p < 0.01

Additional analysis found that a greater proportion of younger students also reported enjoying the process of revising for online exams (67%) than when revising for conventional exams (45%). A higher proportion of younger students reported enjoying taking the online exam (34%) than the conventional exams (27%). This finding is reversed for older students. Slightly more older students enjoyed taking the conventional exam (32%) than sitting a conventional exam (28%). These differences, however, are not significant.

Younger students report a significant difference between their experience of conventional and online remote exams in relation to satisfaction with the exam score (mark) they achieved ( $\chi^2(2) = 6.630$ ,  $p = .036$ ). More were satisfied with exam score achieved from online exams (74%) compared to those taking conventional exams (55%) (Table 9). This trend was not observed for older students ( $\chi^2(2) = 0.843$ ,  $p = .656$ ). For this group, exam score satisfaction from online exams was similar to conventional exams and similar to younger student mark satisfaction with online remote exams.

**Table 9**

*Number of Younger and Older Student Responses to the Statement: "I was Satisfied with the Mark I Got."*

Group	Exam type	Disagree	Neither agree nor disagree	Agree	$\chi^2$	p
Younger students (35 or under)	Conventional	9	11	24 (55%)	6.630	.036*
	Online remote	12	6	52 (74%)		
Older students (36 and over)	Conventional	14	9	67 (53%)	0.843	.656
	Online remote	14	15	80 (55%)		

Note: \*p < 0.05; \*\*p < 0.01

### Male and Female Experience of Exams

Our final research question asked whether male and female students differ in their anxiety preparing for exams and satisfaction with the exam score received. These are the same two exam-related items reported in the previous section.

Fewer male students felt anxious while revising for their online exam (45%) than conventional exams (54%) (Table 10). A similar pattern is observed for female students, with the survey showing that 67% often felt anxious when revising for a conventional exam while 59% reported anxiety when revising for online exams. Neither difference is significant ( $\chi^2(2) = 2.148$ ,  $p = .342$  and  $\chi^2(2) = 0.889$ ,  $p = .641$  respectively). There was no significant difference between the male and female experience of conventional exams ( $\chi^2(2) = 2.48$ ,  $p = .289$ ) or online remote exams ( $\chi^2(2) = 4.576$ ,  $p = .102$ ).

**Table 10**

*Number of Male and Female Student Responses to the Statement: "I Often Felt Anxious When Revising for My Exam."*

Group	Exam type	Disagree	Neither agree nor disagree	Agree	$\chi^2$	p
Male	Conventional	15	16	36 (54%)	2.148	.342
	Online remote	32	22	44 (45%)		
Female	Conventional	12	13	50 (67%)	.889	.641
	Online remote	17	17	50 (59%)		

Note: \*p < 0.05; \*\*p < 0.01

Table 11 shows that while a similar percentage of male and female students were satisfied with the exam score achieved (67% and 69% respectively), a greater proportion of male students reported score satisfaction with online exams (81%) than female students (65%). Male students show a significant difference in exam score satisfaction between conventional and online exams while satisfaction for female students is similar.

**Table 11**

*Number of Male and Female Student Responses to the Statement: "I Was Satisfied with the Mark I Got."*

Group	Exam type	Disagree	Neither agree nor disagree	Agree	$\chi^2$	p
Male	Conventional	14	7	43 (67%)	4.643	.098
	Online remote	10	8	78 (81%)		
Female	Conventional	9	13	48 (69%)	1.217	.544
	Online remote	16	13	54 (65%)		

Note: \*p < 0.05; \*\*p < 0.01

## Discussion

Our analysis shows that across most measures, there is no evidence of students reporting differences between revising for a conventional exam and revising for an online remote exam (RQ1) and no difference between taking a conventional and taking an online remote exam (RQ2). While it would have been expected that many measures—such as question clarity or ability to demonstrate what had been learned—would not have been affected by a move from conventional to online exam, it is reassuring to see this confirmed in our data. However, our analysis identified one area of potential concern relating to the perception of online exams as

harder. This was flagged by STEM students but not by FASS students and it remains unclear why this would be the case.

The only other major difference when comparing conventional and online remote exams satisfaction is with the quality of the exam room. Many students reported that exam rooms can be noisy, disruptive, and unsettling environments which can have an adverse impact on their ability to perform. Our analysis suggests that the use of a more familiar, usually home-located, space might improve the satisfaction with the exam environment. However, the online exam assessments experienced by learners in this research did not include remote proctoring or other forms of surveillance (Okada et al., 2018; Lee & Fanguy, 2022) which could potentially offset positive perceptions associated with the use of private home space.

The data did not indicate that greater satisfaction with the assessment space leads to greater enjoyment of the exam, lower anxiety, or an increase in student perception of performance or preparedness. One reason for this observation could be that distance learners tend to study mostly at home, meaning that they will likely be using an established, familiar study space for their exam. The lack of discernible change in the student assessment experience when moving to online exams could be because, alongside the familiarity of space, there is already a familiarity with using technology for learning. Students at the distance learning university used in this study will certainly have been familiar with using technology in a home setting to participate in online tutorials, communicate with other students, and submit assignments. This is perhaps likely also to be true in emerging hybrid campus-based teaching models.

Prior research suggests that some uncertainty remains as to whether online exams reduce stress (Elmehdi, 2019) or increase it (Ilgaz & Afacan Adanir, 2019). In our study we surveyed adult learners of all ages, and this enabled us to compare the experience of younger and older distance learners (RQ3). Students aged 35 years old or under found revising for online remote exams less stressful than conventional exams, yet older students report no difference in revision anxiety between online and conventional exams. These findings appear to contrast with Ilgaz and Afacan Adanir's (2019) study that found no difference in perceptions with age or gender but to be broadly consistent with Stowell and Bennett's (2010) finding that students with higher test anxiety show a preference for online assessment. Younger students also appear to have enjoyed revising for and taking online exams more than conventional in-person exams. While a link between enjoyment and anxiety cannot be assumed, the dimensions and interaction between could be investigated further. We also found that more younger students were satisfied with the exam score they achieved in their online exams when compared to their experience of conventional exams. Ahmad et al. (2022) observed that students felt online exams supported their ability to perform well and our findings indicate that this may be the case for younger students in our study.

With respect to RQ4, we observed some difference in male and female experiences with an indication that male students were more satisfied with the exam score (grade) they achieved from their online exams. These tentative results indicate that measures of age and gender (expanded to include additional gender identifications) along perhaps with other diversity measures would benefit from further investigation.

In a study on the impact of the COVID-19 pandemic on distance learners' study habits, Aristeidou and Cross (2021) found that 50% of students spent less time than usual revising for assessment and 14% spent more. While there are undoubtedly many reasons for this observation, such findings raise important questions about whether learning activities such as reflection,



consolidation of learning, and new learning are affected by a move to remote exams. We found evidence to indicate that differences between the revision experience of distance learning students taking conventional and remote exams may exist. Further work will be required to unpack these and determine whether the correlations that Cross et al. (2016) found between revision and exam experiences are the same for online remote exams.

One limitation of our analysis is that the remote exams we report on were conducted during a period of major societal disruption. Consequently, student expectations for their exam experience may have been lower during this period or they may have just been grateful to have still had the opportunity to take them. Potentially this could result in a more generous rating of satisfaction scores for remote exams. However, we see no evidence in our findings to support this. Second, student perceptions of assessment may be shaped by the quality and nature of communication and support and, while it is possible that more effort was made in this regard during the pandemic, we do not believe the difference to be substantial. Finally, our research focused on self-reported data and therefore made no comparisons with other measures of performance, such as grades.

## Conclusion

This paper has compared the experience of students taking online and conventional exams. It offers a unique perspective from a large distance learning provider by contrasting survey data about conventional exams collected before major assessment changes were made in response to the COVID-19 pandemic with data from a second survey about online remote exams that took place as a response to the pandemic.

Our results show that the quality of the distance learner's experience of revising for and taking online exams does not differ significantly from that of conventional exams for almost all measures considered. We found no significant difference in the revision experience across measures including learning whilst revising, assessment design, and enjoyment. However, one significant finding was that arts and social science students appear to have felt less anxious revising for online exams.

The quality of the exam experience itself also did not differ significantly between online and conventional exams for seven of the nine measures examined. No difference was found with respect to question clarity, question relevance, satisfaction with exam score received, enjoyment, exam anxiety, and sense of achievement on completion. The most significant difference was with student satisfaction with the exam environment. Students were much more satisfied with the quality of their home space when taking an exam remotely online than with the conventional exam room. Compared to those taking in-person conventional exams, we also found that STEM students felt the online exam was harder than expected.

Finally, we found indications that student age may influence perceptions of the revision and assessment experience. More younger learners (35 years and under) reported often feeling anxious when revising for conventional exams while this difference was not observed for older students (over 35 years). Younger students were also more satisfied with the exam score they achieved for online exams than for conventional exams.

Our findings underscore the importance of implementing ongoing monitoring and evaluation of the quality of assessment experiences. In this instance, doing so has enabled us to compare the experience of online remote exams implemented in response to the COVID-19 pandemic with the exam experience before it started. Our findings will be of interest to existing

distance learning providers and campus-based universities as they move to adopt more hybrid teaching approaches (Universities UK, 2022).

### Declarations

The authors declare no conflict of interests for this study.

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The authors received approval from the Human Research Ethics Committee of The Open University for this study.

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# Refugees and Online Engagement in Higher Education: A Capabilitarian Model

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## Abstract

There are almost 90 million forced migrants around the world, many of whom could benefit from online higher education, and yet there is evidence that displaced people face challenges in online learning environments. This paper reports on a study in the context of a UK university's master's-level distance learning program that offers Sanctuary Scholarships to forced migrants. The study's aims were: (1) to identify practical ways in which higher education institutions can support displaced learners to engage in online learning, and (2) to add to our theoretical understanding of refugees' and asylum seekers' engagement in online degree programs. The methodology included a theoretical and an empirical component. In the theoretical analysis, the indicators from Redmond et al.'s (2018) Online Engagement Framework were mapped onto capability lists drawn from the literature on the Capability Approach, generating a set of proposed underpinning capabilities for online engagement. The empirical analysis, which was carried out in parallel, was based on semi-structured interviews with ten online Sanctuary Scholars. Thematic analysis of the empirical data showed how the research participants had enacted behavioral, emotional, cognitive, social, and collaborative engagement and revealed some of the ways in which engagement fueled further engagement, alongside the mediating role of personal agency. When combined with the theoretical analysis, the findings enabled the creation of a capabilitarian online engagement model. The paper concludes with a discussion of the implications for institutional policies and practices around learning design and delivery to support online engagement among displaced learners, and potentially also among other underrepresented students.

*Keywords:* Capability Approach, online engagement, higher education, refugees and asylum seekers, forced migrants, Sanctuary Scholars, distance education, conceptual model

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In this paper, the terms “refugees,” “forced migrants,” and “displaced people” are used interchangeably to refer to all refugees, asylum seekers, and internally displaced people, reflecting the ways in which they tend to be used elsewhere in the literature. This paper is part of a larger study investigating online engagement among displaced learners in higher education (HE) (Witthaus, 2022). This first section gives a brief background to the study and outlines the research aims. Section 2 introduces some of the central concepts in the literature on online engagement and explores how these concepts are addressed in the literature on displaced learners in online HE; it also introduces the Capability Approach as a social-justice-oriented conceptual framework. Section 3 describes the methodology used in the study. Section 4 presents the findings, while Section 5 provides a discussion of the findings and presents a proposed capabilitarian model for understanding online engagement. The paper concludes with implications for practice, policy and further research.

## **Displaced Learners in Online Higher Education**

There are currently almost 90 million displaced people around the world (United Nations High Commissioner for Refugees [UNHCR], 2022). Article 22 of the 1951 Refugee Convention requires that a host state treats a refugee the same as its own citizens in terms of accessing educational opportunities (UNHCR, 2020). In practice, however, forced migrants face numerous barriers when attempting to exercise this right, and it is estimated that just 6% of young adults amongst displaced people are enrolled in HE, compared to the global average of 40% (UNHCR, 2023). Even where refugees do gain access, they often face significant challenges in terms of social, political and economic constraints. Forced migrants are “super-disadvantaged,” in that the different barriers they experience interrelate, compounding and exacerbating each other (Lambrechts, 2020; Martin & Stulgaitis, 2022). Despite the small percentage of refugees enrolled in HE, the number has grown considerably in recent years, and the UNHCR has attributed this increase to the new opportunities provided by “connected HE, where digital programs are combined with teaching and mentoring” (UNHCR, 2019, p. 39). However, literature in this area is limited (S. Reinhardt, 2018). For example, Ramsay and Baker’s (2019) meta-scoping study of the literature on refugee-background students in HE does not discuss online education, and in Streitwieser et al.’s (2019) literature review of HE interventions for refugees based in, or directed from, Europe and North America, there is no category for formal distance programs.

Providing effective online education for displaced learners can be challenging for higher education institutions (HEIs), partly because refugees are characterized by extreme heterogeneity (Baker et al., 2022; Castaño-Muñoz et al., 2018; Crea & Sparnon, 2017; F. Reinhardt et al., 2021; Unangst & Crea, 2020). Displaced learners also tend to be digitally disadvantaged: those based in refugee camps are unlikely to have access to the necessary digital infrastructure, particularly internet connectivity (Crea & Sparnon, 2017; Taftaf & Williams, 2020), and this has led to a call for more research into the role that mobile phone technology can play in enabling online learning in such circumstances (Dahya & Dryden-Peterson, 2017; Witthaus & Ryan, 2021). Even refugees in urban settings may be disproportionately affected by the “digital divide” (Mupenzi et al., 2020). The literature reveals many other barriers for displaced learners, such as difficulties in navigating HE, both online and offline (Cin & Doğan, 2021; Halkic & Arnold, 2019), cultural and linguistic barriers (Moser-Mercer, 2021), and social isolation (Witthaus, 2018). Distance education generally has notoriously low rates of student retention (Seery et al., 2021), and as Lee points out, “adopting online education does not naturally or automatically increase the accessibility of university education” (2017, p. 16). McClusky’s concept of

“lifeload” is salient here: as explained by Kahu, lifeload is “the sum of all the pressures a student has in their life, including university” (2013, p. 767). There is evidence to show that students prioritize lifeload over learning load (Hews et al., 2022), and as forced migrants face wide-ranging lifeload pressures, studies have unsurprisingly found that only a small percentage of refugee students complete their online courses (Halkic and Arnold, 2019; Zlatkin-Troitschanskaia et al., 2021).

## Research Purpose and Aims

Since student retention is often viewed as being correlated with engagement (Seery et al., 2021), the purpose of this study is to shed light on how displaced learners engage in online HE, drawing on Bond et al.’s (2020) definition of student engagement:

Student engagement is the energy and effort that students employ within their learning community, observable via any number of behavioral, cognitive or affective indicators across a continuum. It is shaped by a range of structural and internal influences, including the complex interplay of relationships, learning activities and the learning environment. The more students are engaged and empowered within their learning community, the more likely they are to channel that energy back into their learning, leading to a range of short and long term outcomes, that can likewise further fuel engagement. (p. 3)

This definition includes the key dimensions of engagement that are typically discussed in the literature—behavioral, cognitive, emotional, and social. It also alludes to the influence of social structures and “internal” (personal) influences, both of which are important to consider in the context of forced migrants from a social justice perspective. Finally, the definition points to the possibility of engagement “fueling” further engagement, which could have important implications for the retention of refugee students in online programs.

Considering the global context and the concept of student engagement discussed above, this study had two aims. Practically, it aimed to identify ways in which HEIs can support displaced learners in online learning. Theoretically, it aimed to generate a social justice-oriented conceptual model for online engagement in the context of displaced learners, drawing on Bond et al.’s (2020) definition of student engagement, Redmond et al.’s (2018) Online Engagement Framework, and concepts from the Capability Approach (Nussbaum, 2003; 2011; Sen, 1999; Walker, 2006). To address these aims, the following research questions (RQs) were explored in the context of a UK university that offers Sanctuary Scholarships to forced migrants for an online master’s program:

RQ1: What factors enable and constrain the Sanctuary Scholars’ progression through the online program?

RQ2: How do the Sanctuary Scholars’ descriptions of their online learning indicate and illustrate their online engagement?

RQ3: What capabilities underpin the Sanctuary Scholars’ enactments of online engagement?

RQ4: In what ways does engagement fuel further engagement in this context?

The study combined theoretical analysis with qualitative, ethnographic research methods and adopted an interpretivist epistemology for understanding the perceptions and experiences of individual learners.



## Literature Review

As there is little overlap between the literature on online engagement and that on forced migrants learning online, this section sets the scene by drawing some links between these bodies of literature.

### Online Engagement and Refugees in Online Higher Education

Redmond et al. (2018) developed an Online Engagement Framework for HE, after observing that quality guidelines for learning and teaching in HE in the literature tended to be focused entirely on campus-based education. Their framework, which was informed by a literature review, comprises the following five engagement elements: behavioral, emotional, social, collaborative, and cognitive engagement. The indicators for these elements are discussed below and are considered in relation to the literature on forced migrants learning online.

### Behavioral Engagement

In Redmond et al.'s model, indicators of behavioral engagement include “developing academic skills, identifying opportunities and challenges, developing multidisciplinary skills, developing agency, upholding online learning norms, and supporting and encouraging peers” (2018, p. 190). Redmond et al. suggest that at the heart of these indicators are positive conduct and positive attitudes towards learning, suggesting an overlap with emotional engagement and highlighting some degree of interdependence between the elements. The refugee literature touches on these themes by noting that motivation to study is generally high amongst displaced learners (Mkwananzi & Mukwambo, 2019; F. Reinhardt et al., 2021), although fulfilling essential course requirements is often challenging due to lack of flexibility in time frames for assignment submissions, for example (Baker et al., 2020).

### Emotional Engagement

Emotional engagement is seen in the online engagement literature as helping students to “manage expectations, articulate assumptions, recognize motivations, and commit to learning” (Redmond et al., 2018, p. 190). Much of the recent COVID-era literature finds that feelings of isolation can lead to stress and anxiety, negatively affecting emotional engagement (e.g., Hews et al., 2022). For displaced learners, these experiences can be magnified by bureaucratic obstacles, loneliness, and feelings of uncertainty about the future (Farrell et al. 2020; Witthaus, 2018). Furthermore, previous traumatic life experiences may be exacerbated by racism, xenophobia, and other forms of prejudice within the HE system (Maringe et al., 2017; Molla, 2019). Importantly, however, HE has also been found to contribute to displaced students' emotional well-being, with university acting as a safe and hospitable space for refugees (Cin & Doğan, 2018; Kontowski & Leitsberger, 2018; Mkwananzi, 2019). These examples highlight the overlap between emotional and social engagement.

### Social and Collaborative Engagement

Redmond et al. (2018) describe social engagement in terms of “building community; creating a sense of belonging; developing relationships; establishing trust” (p. 191), and collaborative engagement as “learning with peers; relating to faculty members; connecting to institutional opportunities; developing professional networks” (p. 194). I have combined these elements into a single dimension because these indicators tend to be discussed together in distance education literature, often under the umbrella of “social presence” (e.g., Garrison et al., 2000). Displaced learners value having opportunities to communicate with other learners online,

although it has been noted that some feel “nervous, exposed and ... disinclined to post on the discussion forums” (Farrell & Brunton, 2020, p. 15), and many refugee students express a strong desire to connect with other students in their local area in person rather than online (Halkic & Arnold, 2019).

### **Cognitive Engagement**

Cognitive engagement involves “thinking critically, activating metacognition, integrating ideas, justifying decisions, developing deep discipline understandings, and distributing expertise” (Redmond et al., 2018, p. 192). Since these activities are so dependent on language, the literature on forced migrants in online HE focuses substantially on the need to overcome the linguistic and associated cultural barriers that inhibit or prevent engagement with course content (e.g., Farrell et al., 2020; Streitwieser et al., 2019; Zlatkin-Troitschanskaia et al., 2018).

### **Online Engagement, Teaching Presence, and “Care”**

A common theme in the online engagement literature is “teaching presence” (Garrison et al., 2000), which is the students’ experience of receiving teaching online, whether emanating from their teacher, the course materials, or other students. There is growing evidence from the recent literature that student perceptions of teaching presence are strongly associated with enactments of care (e.g., Burke et al., 2021; Gourlay et al., 2021; Hews et al., 2022; Stone & O’Shea, 2019). The importance of care at the center of online pedagogy has also been recognized in the context of refugees (e.g., Baker et al., 2020; Baker et al., 2022).

### **The Capability Approach**

The Capability Approach is a conceptual framework for evaluating social justice by focusing on the opportunities individuals have to experience well-being and the ways in which social arrangements and policies influence people’s well-being (Robeyns, 2017). The core principle is that the well-being of all humans can best be achieved by considering people’s “capabilities” and “functionings.” Capabilities are the freedom to do and be what one has reason to value doing and being, while functionings are people’s achievement of these “beings” and “doings” (Sen, 1999). Sen argues that capabilities denote freedoms that are genuinely attainable if the person chooses to pursue them, unlike rights, which a person may not always be free to exercise. Nussbaum (2003, 2011) argues that a list of core capabilities, or “fundamental entitlements,” is needed to embed basic human rights in social welfare policies in democratic societies. Her list contained ten points, including such fundamental freedoms as life, bodily health, and control over one’s environment. In 2006, Walker produced an “ideal theoretical” list of “higher education capabilities for rationality and freedom” (p. 110), drawing on Nussbaum’s core capabilities. Walker’s list includes capabilities not only in the sense of freedoms or opportunities, but also in the sense of “skills and capacities that can be fostered” (2006, p. 128). Empirical research in South Africa has shown that certain “basic capabilities,” such as the capabilities for shelter, food, and financial resources for survival, need to be in place before individuals can even aspire toward HE (Mkwanzani, 2019, p. 187). Sen (1999) referred to such survival-level capabilities as “elementary” (p. 36). In this regard, Nussbaum’s core capabilities for life, health, bodily integrity, and control over one’s environment could be considered elementary, and may be particularly pertinent in the context of displaced learners, whose lives are often characterized by precarity.

Another central concept in the Capability Approach is that of “conversion factors,” which are the factors that enable individuals to “convert” resources into capabilities, or that prevent them from doing so. A typical research question addressed by capability scholars in HE is: “Given the structural constraints [...], how do students convert available pedagogical and institutional arrangements and resources into participation?” (Calitz, 2019, p. 15). Positive and negative conversion factors can be thought of in terms of enablers and constraints respectively. In summary, there is a rich literature on the application of the Capability Approach to HE contexts, which, because it focuses on enhancing the agency and well-being of students from diverse groups and understanding the need for equitable policies and practices, could add new insights to our understanding of refugees’ engagement in online HE.

## Method

### Research Setting and Sample

The setting for this study was an online master’s program run by the Department of History, Politics and International Relations (HyPIR) at the University of Leicester, which has been offering Sanctuary Scholarships for distance learning since 2018. This was the first offer of online Sanctuary Scholarships in the UK. My research participants were identified through a convenience sampling process: ten of the Sanctuary Scholars volunteered to join the study. Demographic information is given in Table 1.

**Table 1**

#### *Participant Demographics*

<b>ID (pseudo-nyms)</b>	<b>Gender identification</b>	<b>Age on 10/30/21</b>	<b>Location when interviewed</b>	<b>Program start date</b>	<b>Program status, 10/30/22</b>
Zain	M	34	Germany	March 2019	Graduated with MA (July ‘21)
Maryam	F	51	UK	March 2019	Graduated with MA (July ‘21)
Mohsin	M	42	UK	Sept. 2018	Graduated with MA (July ‘21)
Nadia	F	26	UK	March 2020	Graduated with MA (July ‘22)
Kareem	M	31	UK	Sept. 2019	Graduated with MA (July ‘22)
Sami	M	36	Malaysia	March 2019	Graduated with PG Cert (Dec ‘21)
Theresa	F	40	USA	March 2020	Withdrawn during first module
Sol	M	32	Netherlands	March 2019	Withdrawn; reapplied.
Lili	F	45	Australia	March 2019	Midway
Julian	M	36	Malawi	Sept. 2018	Midway

### Empirical Data Gathering and Analysis

I carried out two semi-structured interviews with each participant between July 2019 and October 2021. The interview prompts focused on the Sanctuary Scholars’ motivation for doing the program, their prior experience of online study (if any) and previous HE, important things they had learned in the course, highlights and challenges, and their sources of support. I coded the interview transcripts in two stages, using a flexible deductive approach. First, I looked for examples in my data of the indicators of online engagement, with reference to Redmond et al.’s (2018) framework. Next, I examined my data for examples of the capabilities in Nussbaum’s (2003; 2011) and Walker’s (2006) capability lists. I then reviewed my coding for patterns and cross-checked my findings against the theoretical model I was developing.

### **Theoretical Analysis**

The theoretical analysis, which was done in parallel with the empirical research, involved an exploratory mapping exercise, in which the indicators from Redmond et al.'s (2018) Online Engagement Framework were mapped onto Nussbaum's (2003; 2011) and Walker's (2006) capability lists. I looked for relationships between the capabilities and the engagement indicators, based on the understanding that any form of engagement must represent a "functioning" (as acts of engagement are, in Sen's terms, "doings"), and therefore must be underpinned by associated capabilities. Based on the theoretical and empirical analyses, I then developed an integrated capability-based online learning engagement model, showing the patterns that I had found.

### **Ethics and Open Science**

Ethical approval was obtained from both the University of Leicester and my PhD supervising institution, Lancaster University. I gained informed consent from all research participants. As forced migrants may be considered vulnerable participants, I followed guidelines for conducting research in contexts of forced migration (Clark-Kazak, 2017), for example, by avoiding asking questions about traumatic experiences. I also offered "study buddy" support to all the Sanctuary Scholars to provide reciprocal benefits to the community. This mainly involved giving linguistic feedback on draft assignments. Five of the participants accepted this offer. To raise awareness within wider society of the opportunities provided by online HE for displaced people and enable others to build on my work, I used an "open science" approach (Witthaus, 2022).

## **Results**

### **RQ1: What Factors Enable and Constrain the Sanctuary Scholars' Progression through the Online Program?**

This section summarizes four of the Sanctuary Scholars' journeys through the HyPIR MA, giving examples of the conversion factors associated with their different outcomes.

#### **Zain—Graduated with the HyPIR MA**

Zain is one of five Sanctuary Scholars who have graduated with the HyPIR MA. An asylum seeker in Germany, he was learning German while working full-time, which left him little time for studying. Constraints for Zain included difficulty in navigating the virtual learning environment (VLE) and the deep emotional pain he suffered at being separated from his family. The most severe challenge, however, was his experience of being homeless for three months during winter, along with difficulties in navigating the bureaucratic asylum system in Germany, both of which had a serious impact on his well-being and his studies. Nevertheless, he continued studying by accessing free Wi-Fi from a train station and successfully completed his online MA. Enablers for Zain included his previous experience of a university bridging program, the fact that he was able to use the time on his daily commute for reading, his enjoyment of learning, and his perseverance. His mantra was: "I survived, and I did not give up." Zain's story illustrates the complex interplay between personal agency and structural factors that was typical of the research participants' journeys through the program.

#### **Sami—Graduated with Postgraduate Certificate**

Sami exited the program halfway and achieved a Postgraduate Certificate (PG Cert). Sami grew up in an East African country, where his childhood was deeply affected by a bloody

civil war and was forced to flee his home country in 2002. He is now part of a community of forced migrants in Malaysia living in financially precarious circumstances. He works long hours at a school for refugee children that he co-founded. Sami was deeply interested in the subject of human rights and highly motivated to learn, and he had access to Wi-Fi; however, he was challenged by the linguistic demands of the program. Unfortunately, he did not have the required level of academic English to be admitted to the dissertation module and had to leave the program early, echoing the experiences of thousands of other refugees for whom language barriers are a major constraint.

### **Theresa—Forced to Withdraw**

Theresa was not able to complete her first module and was forced to withdraw, despite intense engagement in the first three months. Coming from a socially conservative East African country and identifying as LGBTQI, she had experienced persecution and torture that left her physically disabled and emotionally scarred. Theresa applied for a Sanctuary Scholarship because she wants to become “a voice for the voiceless.” This motivation was an important enabler for Theresa, but during her first module, she was resettled to North America, which, although enabling her to finally feel “safe at home,” disrupted her study routine. She also suffered two bereavements and she had an accident that further reduced her mobility. During this time, Theresa lost her password for her university account. Despite several attempts to liaise with the university’s technical support staff, she was unable to restore this access. Eventually, her time allowed by the university rules for enrollment ran out, and she had to be unenrolled, echoing Baker et al.’s (2020) analysis of the dysfunctional timescapes experienced by displaced learners.

### **Julian—Midway**

Julian is currently midway through the program. He has taken several rounds of voluntary suspension from his studies under mitigating circumstances. Julian’s story illustrates the sense of volatility that was typical for most of the research participants. Born in central Africa, he worked for an organization that promoted human rights in a war-torn region of the country; eventually, the dangers of this work forced him to become a refugee himself. He has been living in a refugee camp in Malawi for over a decade. The key enablers for Julian have been his commitment to learning, the good relationships he has built with the staff on the program, and his ability to apply his new skills and knowledge in conflict resolution in the refugee camp. A significant constraint is his lack of access to the essential digital infrastructure he needs: he has no electricity or Wi-Fi at home and so he uses the local community center to study. Furthermore, precarious circumstances in the refugee camp have led him to take up farming, which has reduced the time available for his studies.

All the above stories reflect the tension between the negative and positive conversion factors that were present for each of the Sanctuary Scholars. In summary, the constraints included trauma and associated mental health challenges, homelessness, lack of certainty about the future, time pressures and anxiety caused by survival needs, lack of digital infrastructure and connectivity, and lack of opportunity to develop the required academic English skills. The enablers included personal motivation and perseverance, good relationships with program staff, prior experience of a university bridging program, strong time management skills, and finding opportunities to apply new knowledge in daily life.

## **RQ2: How do the Sanctuary Scholars' descriptions of their online learning indicate and illustrate their online engagement?**

This section considers the data in light of the engagement elements and indicators in Redmond et al.'s (2018) framework.

### **Behavioral Engagement**

Redmond et al. (2018, p. 193) use Fredricks, Blumenfeld, and Paris's definition of behavioral engagement, "doing the work and following the rules." I found many examples in my data of all the illustrative indicators for behavioral engagement listed in a previous section. One additional behavioral indicator that I identified in my data was *applying knowledge in real life*. Julian shared this example:

What I enjoyed a lot on the course, Art of Negotiation, was how you learn to be a negotiator... In the [refugee] camp, there is conflict every day all the time, so ... I may also assist some people... For example, a couple were fighting in their homes. They came to me, so that I may hear from them and see how I can resolve their conflict. Two, whenever there are churches that are fighting, or members of one church who are fighting, they also ask me to go there. Whenever they ask for meetings with the leaders, even myself, I'm also invited to see how we can help the members of that church.

Another prevalent indicator of behavioral engagement that I identified was that of *managing studies around lifeload*. This often involved managing time and scarce resources in contexts of precarity or extreme fragility. Mohsin said:

I came to the UK in late 2015. My new life wasn't easy at all - mainly because my wife was [unwell with PTSD]... We have three kids and it's not easy for me. I commute every day, and it's really hectic. When I finish my work, I have to make sure that my wife and the kids are OK... For me also, it's very stressful.

Lili commented that "self-scheduling" was her greatest challenge:

Because I'm very busy and my other commitments also [involve being] in front of a laptop and reading something, writing something, and it was really hard for me to make a balance between my commitments and my studies. [...] I myself could not write anything in [the discussion forum] last module because it wasn't a very easy time for me. I can just go to the study or reading mindset and find the sources that are more attractive for me or those where I think I'm going to find out some of my questions answered.

In these cases, the Sanctuary Scholars found even the most essential behavioral requirements of their programs challenging to meet at times. Julian's limited access to Wi-Fi and electricity restricted the time he could spend studying online, but through applying his knowledge in real life, he was able to deepen his learning. Mohsin and Lili talked about how they stayed on track with their studies by sometimes doing the bare minimum, in the knowledge that, without behavioral engagement, no other engagement would be possible.

### **Emotional Engagement**

Redmond et al. (2018) characterize emotional engagement in terms of managing expectations, articulating assumptions, recognizing motivations, and committing to learning. An example of *committing to learning* comes from Maryam:

I started to write my first assignment on the paradox of political violence.... I had to write a critical review about this article [which had] a lot of academic terms and political terms... Even sometimes I asked some English friends, what does this word mean? And they said to

me, oh, this is quite difficult—you need to have a political dictionary... [My tutor] said to me, this is a difficult article, leave it and choose another easier one. I said to her no, I don't want to give up, because I spent a lot of time translating and reading and highlighting some points... I managed in the end to write the assignment. And [my tutor] was surprised. She said, you demonstrated some critical points, and [added] some new comments... When she said this to me, I felt more confident.

Maryam shared this anecdote in the context of a discussion about her struggles with mental health as a result of her prior trauma, which was compounded by having spent many years as an asylum seeker in a state of uncertainty about her future. She often described her learning in emotional terms and commented that reading and writing provided her with an enjoyable distraction from the stresses of her daily life. This resonated with a comment by Sol, who said that “learning can be healing.”

### **Social and Collaborative Engagement**

An example of social and collaborative engagement from Nadia illustrates the presence of the following cluster of indicators: *building community, creating a sense of belonging, developing relationships, establishing trust, and learning with peers.*

You ask a question, your lecturer or other students get their point forward, and then you have to go back and reply back. It's all in the duration of a week [...] It's interesting, because in the online platform you get the opportunity to take more information or give more information, whereas in the classroom environment the contribution was minimal from certain people. ... Here [online] you get different viewpoints, and you can learn, you can go back to it anytime you want. It helped me a lot when I was writing my assignment.

Social and collaborative engagement was not always described in such positive terms by the Sanctuary Scholars, several of whom found the online format frustrating and longed for more personal interaction with their peers and tutors. Nevertheless, over time, most began to appreciate the value of the discussion forum.

### **Cognitive Engagement**

Several of the Sanctuary Scholars commented on the development of their *critical thinking skills*, a key indicator of cognitive engagement. Kareem said:

I think it's a great learning experience for me, which is why it will definitely make me a better security professional. I'm improving already and I can see this myself; everyone around me can see this because I think in academia the way you debate, the way you argue, the way you present the facts, it really all becomes part of your DNA. ... You don't actually make a claim without actually presenting why you believe this is the case.

This example was typical of several of the participants, who felt they had been stretched to reflect on and recognize their own biases and had learned to argue in a more evidence-based way, pointing to the transformational role that a university education can play in students' lives through engagement with knowledge and ideas (Ashwin & McVitty, 2015).

### **RQ3: What Capabilities Underpin the Scholars' Enactment of Online Engagement?**

RQ3 is based on the premise that each observable enactment of an engagement indicator represents a functioning, and therefore must be underpinned by associated capabilities.

Conversely, where these indicators are exemplified in a negative or frustrated sense, this must point to the lack of the necessary capability (opportunity, freedom, or skills) required for that

dimension of engagement. To the extent that RQ3 could be answered theoretically, I conducted an exploratory exercise mapping the indicators associated with the four dimensions of online engagement onto Nussbaum's (2003; 2011) list of fundamental entitlements and Walker's (2006) HE-focused capabilities list. This exercise led to the identification of four capabilities that are likely to underpin each engagement dimension, as shown in Table 2.

**Table 2**

*The Engagement Dimensions and Proposed Underpinning Capabilities*

<b>Engagement dimension (functionings)</b>	<b>Proposed underlying capability</b>	<b>Capability definition</b>
Behavioral engagement	Educational resilience	Able to navigate study, work and life, to negotiate risk and to persevere academically; able to be responsive to educational opportunities and adaptive to constraints (adapted from Walker, 2006).
Emotional engagement	Emotional health	Able to experience emotions that contribute positively to learning; not being subject to anxiety or fear which diminishes learning (adapted from Nussbaum, 2003; Walker, 2006).
Social and collaborative engagement	Affiliation and recognition	Able to be treated with dignity and to enter into relationships of mutual respect, recognition and trust; able to interact with others to learn new knowledge and solve problems (adapted from Nussbaum, 2003; Walker, 2006).
Cognitive engagement	Knowledge and imagination	Able to use imagination and thought to experience and produce academic and professional works of value to oneself and others; able to be an active inquirer without fear of reprisal or censorship (adapted from Nussbaum, 2003; Walker, 2006).

Table 2 was developed theoretically and then applied to the analysis of the empirical data. According to this analysis, underpinning Julian's, Mohsin's and Lili's accounts of behavioral engagement was the capability for educational resilience; Maryam's emotional engagement was premised on the capability for emotional health; Nadia's social and collaborative engagement relied on the capability for affiliation and recognition; and Kareem's cognitive engagement was underpinned by the capability for knowledge and imagination.

Similarly, there were examples where the absence of an engagement functioning could potentially be explained by the lack of the relevant underpinning capability; for example, Theresa's inability to maintain behavioral engagement was linked to her constrained capability for educational resilience—noting that resilience is not used in the sense of individual determination or “grit” here—rather it is a “socially located response to adverse conditions, combined with a capabilities informed analysis of factors that enable and constrain educational resilience” (Wilson-Strydom, 2017, p. 387). The theoretical relationships between capabilities



and functionings proposed in Table 2 provided reasonable explanations for both the presence and the absence of engagement indicators throughout the data.

#### **RQ4: In What Ways does Engagement Fuel Further Engagement in this Context?**

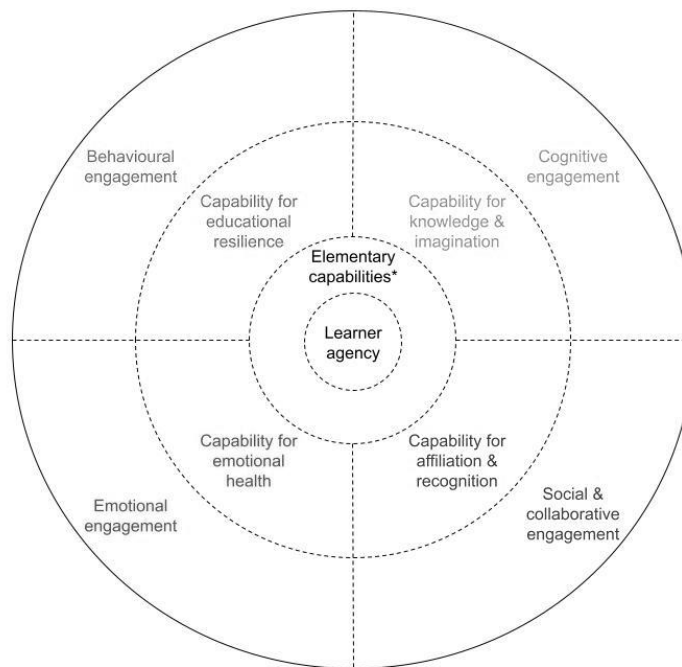
To answer RQ4, I briefly review four of the above vignettes. In Julian's story, behavioral engagement can be seen to fuel other kinds of engagement: by applying his new knowledge to daily life in the camp, he increased his personal status in the community and his emotional well-being; he was also more predisposed to engage cognitively with his course content, and he engaged socially with his local community while putting his learning into practice. Maryam's account of how she persisted with her assignment illustrates how emotional engagement can fuel cognitive engagement (e.g., translating and highlighting the text), behavioral engagement (completing the assignment), and social and collaborative engagement (talking to friends and her tutor about her learning). Nadia's story illustrates how social and collaborative engagement can fuel other kinds of engagement: as a result of participating in the discussion forum, she felt more emotionally engaged; she continued engaging behaviorally by returning to the forum; and her cognitive engagement was enhanced as she discussed the course content with peers and tutors. Kareem's example shows how cognitive engagement can fuel other kinds of engagement: he felt more emotionally engaged by seeing his critical thinking skills develop; there was some social and collaborative engagement through debate with peers and discussion with tutors; and he continued to engage behaviorally with his learning in the online learning environment and beyond.

## **Discussion**

### **Discussion and Presentation of a Capabilitarian Online Engagement Model**

Above, I have laid the foundation to argue that the Capability Approach and the Online Engagement Framework can together provide a powerful way of understanding the lived experiences of displaced learners in online HE. In this section, I present the capabilitarian online engagement model derived from the combined empirical and theoretical analysis (see Figure 1). The model is described below, starting from the outer ring.

**Figure 1**  
*Capabiltarian Online Engagement Model*



\* Elementary capabilities: life, health, bodily integrity, control over one's environment

### **The Functions of Engagement**

The outer ring contains the four engagement dimensions: behavioral, emotional, social and collaborative, and cognitive engagement, which can be observed when students enact the respective indicators. In capability terms, these are functionings. As noted, there is some overlap between the different engagement dimensions here; this is represented by the dotted lines between the dimensions.

### **The Capabilities for Engagement**

The next ring contains the four capabilities that, based on the theoretical analysis and the findings discussed above, are required to make the four dimensions of engagement possible: educational resilience for behavioral engagement; knowledge and imagination for cognitive engagement; recognition and affiliation for social and collaborative engagement; and emotional health for emotional engagement. Dotted lines show the permeability between the four online engagement capabilities, and between the online engagement capabilities and their associated functionings, implying firstly, that all the capabilities can fuel their associated engagement functionings, and secondly, that enactment of any one engagement type can fuel the capabilities for the other engagement dimensions.

## The Elementary Capabilities

In the next concentric circle are the elementary, survival-level capabilities discussed earlier: the capabilities for life, health, bodily integrity, and control over one's environment. My empirical data has confirmed that all these capabilities need to be sufficiently in place at all times for the engagement-related capabilities to be present, although the dotted line between learner agency and elementary capabilities symbolizes the powerful role that personal agency can play in cases where the elementary capabilities are threatened (for example in the case of Zain, who continued his studies using public Wi-Fi at a train station while he was homeless and had little control over his environment).

## Learner Agency

While “developing agency” is one of the indicators for behavioral engagement in Redmond et al.'s (2018) framework, I would suggest that the concept of agency plays a more fundamental role in learning. Sen defines an agent as “someone who acts and brings about change and whose achievements can be judged in terms of her own values and objectives” (1999, p. 19). While Nussbaum does not explicitly include agency in her theory, her capability for “practical reason” (“being able to form a conception of the good and to engage in critical reflection about the planning of one's life” [Nussbaum, 2003, p. 41]) can be seen to reflect agency achievement (Robeyns, 2017). Enactments of agency were pervasive throughout my data, for example, in Julian's ongoing engagement despite having limited access to the internet and managing his studies around learning to farm for survival, and Maryam's determination to complete a difficult assignment. Some Sanctuary Scholars completed a module while facing enormous barriers, in a sense using their agency to “override” the negative conversion factors they faced. (Hypothetically, they could also have used their agency to *not* pursue their online degree even if no significant barriers were in place, although no-one in my study did so.) I have therefore placed learner agency at the heart of the model.

## Implications for Practice and Policy

Practically, the Capabilitarian Online Engagement Model provides a heuristic to guide academics in the design and delivery of online education, by showing that engagement along all four dimensions is underpinned by specific capabilities that incorporate both skills and capacities that can be fostered, and social freedoms that are afforded (or not) by social structures. Thus, course teams could design social and collaborative tasks that promote the values associated with the capability for *recognition and affiliation* by considering questions such as “How can our course environment and activities create a culture of recognition and affiliation?” with reference to the definition of affiliation and recognition in Table 2. Such a conversation would lead to a greater emphasis on equity in the learning activities than starting from the more commonly used prompt, “How can we encourage social and collaborative engagement in the course?” Similarly, when designing learning activities aimed at developing critical thinking for cognitive engagement, course teams could consider how the overall course environment and tone of communication supports the capability for *knowledge and imagination*. A question to be considered here would be: “To what extent are students able to share their emerging understanding without fear of censorship (including self-censorship) or reprisal (from both peers and teachers)?” This would be especially important in the social sciences, where students from diverse backgrounds might bring knowledge or beliefs that are at odds with the knowledge being discussed in the course.

The model could also inform institutional policies and strategies. For example, course delivery could be enhanced by the provision of “warm” support (Baker et al., 2018) in the form of mentors or study-buddies acting as socio-cultural brokers for refugee students, which would support displaced learners’ capability for *emotional health*. Policies for flexible pathways through HE, for example via stackable micro-credentials, could help to mitigate constraints relating to refugee students’ elementary capabilities and would support the capability for *educational resilience*, thereby strengthening behavioral engagement. Furthermore, since each engagement dimension can fuel the capability for engagement in all the others, it is clear that any institutional effort aimed at providing students with opportunities for developing any one of the capabilities that underpin the online engagement dimensions could have a beneficial impact on students’ engagement overall.

## Limitations

The chief limitation of the study was the small scale of the empirical component, which involved only ten students in one master’s program. However, in qualitative research, it is generally recognized that readers will be able to determine the extent to which the findings are transferable to other given contexts, given sufficient descriptive information about the research setting, the participants, and the methodology (Strunk & Locke, 2019); for this reason, this study aimed to provide “thick” descriptive information regarding these elements. The findings from this study may have broader potential significance. Because the Capabiltarian Online Engagement Model is based on established frameworks (Redmond et al.’s (2018) Online Engagement Framework and tools from the Capability Approach) it is likely to have explanatory power in other contexts beyond the case study context. Also, since forced migrants share many characteristics with the general student population, the model may be relevant to other contexts of online HE; for example although forced migrants are characterized by extreme diversity, heterogeneity is also a characteristic of the demographics of online learners in the general student population (Lee, 2017), and so it is reasonable to assume that efforts towards more inclusive practice aimed at forced migrants will also be beneficial to a wider cohort.

## Conclusion

This study set out to achieve a theoretical and a practical aim, both of which I suggest are served by the capabiltarian online engagement model in Figure 1. From a theoretical perspective, the integration of Redmond et al.’s (2018) Online Engagement Framework with the Capability Approach furthers our understanding of online engagement by identifying the capabilities underpinning engagement, which reflect not only students’ individual skills and dispositions but also social structures that may be enabling for some students and constraining for others. The model highlights the interrelationships between personal agency, capabilities, and the functionings of engagement across four dimensions, and shows how engagement in one dimension can fuel the capability for engagement in the other dimensions. Identifying the characteristics of a pedagogy of care in the context of displaced learners and other underrepresented groups in online HE is an important area for future research, since such a pedagogy could help to foster the capabilities for all the engagement dimensions.

I hope that this study has shed light on online engagement in the context of displaced learners and potentially other underrepresented groups in HE. There is work to be done to test

the model in other settings and to further develop it for the purposes of guiding practice and policy, and I warmly invite others to build upon this research.

### Declarations

The author declares no conflicts of interest associated with this article.

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# Massive Omission of Consent (MOOC): Ethical Research in Educational Big Data Studies

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## Abstract

Ethical reviews of research plans function as a cornerstone of good research practice in order that no harm should come to participants. Ethical concerns have taken on a new salience in a digital world where data can be generated at scale. Big data research has grown rapidly, raising increased ethical concerns. Several intersecting areas of big data research exist within educational research, such as learning analytics, artificial intelligence (AI), and Massive Open Online Courses (MOOCs). In the current study, an investigation was made of peer-reviewed papers on MOOC teaching and learning to determine if they explicitly refer to (a) ethical considerations in their studies, and (b) obtaining formal ethical approval for their research. This investigation was accomplished through a review of MOOC-related, English-language papers available in Scopus database, over the course of a year. The review produced a total of 1,249 articles, of which, 826 articles related to empirical studies involving human participants where full text of the articles could be obtained. The string “ethic” was searched for within these articles, and resulting articles analyzed, which found that a small fraction, 42 articles (5.08%), mention ethics in relation to the study presented in the article, and only 13 articles (1.57%) explicitly mention obtaining formal ethical approval for the research. The findings show a lack of transparency in reporting on and/or engagement with ethical considerations in MOOC teaching and learning research. These findings indicate the need for further stakeholder engagement and sectoral dialogue in relation to ethics education and training for researchers; consideration of ethics in big data studies in education; and norms/policies in academic publishing for authors to report how ethical issues have been considered.

*Keywords:* Massive Open Online Courses (MOOCs), research ethics, informed consent, big data

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In academia and industry contexts, big data research has grown steadily. With that growth has come increased ethical concerns around this type of research and the gap that can exist between researcher training and experience and the big data research in which they are engaged (Zook et al., 2017). There are several intersecting areas of big data research within educational research such as learning analytics, artificial intelligence (AI), and Massive Open Online Courses (MOOCs), which are the focus in this paper. MOOCs continue to play an important role in education, with the COVID-19 pandemic causing a surge in enrollments (Impey & Formanek, 2021). However, although MOOCs are posited as platforms for learners and to expand education, MOOC providers' data practices have been described as undermining "the values and ends of an educational context [...] through the chilling, conforming, and credentialing effects of constant surveillance, data maximization, embedded assessment, and record retention" (Zeide & Nissenbaum, 2018, p. 301). The critique of these data practices raises questions about possible ethical issues in MOOC teaching and learning research.

The current study has the reporting of ethical practices in research on MOOC teaching and learning as its focus, due to the ongoing importance of this type of research to the field of education. To examine the degree to which those conducting this research engaged in consideration of ethical issues or obtained formal ethical approval, we can use published, peer-reviewed, scholarly papers as the site of our investigation. The current study takes inspiration from studies of research on learning analytics (Ferguson & Chow, 2017; Lane & Costello, 2019) and AI in Education (AIED), which highlight lack of discussion of ethics in published papers and applies this question to MOOC research where a gap exists around what researchers are saying about the ethics of their research in their published work.

In this article, we first present a review of the related literature before discussing the theoretical framework for the study. The article will then present the study's methodology in sufficient detail for others to interrogate and replicate our work. The methodology section is followed by the results section and a discussion of our findings. Finally, we detail our recommendations and conclusions, which include a warm invitation to sectoral colleagues to engage in dialogue around our findings in order that we might collaboratively establish as a community how to design and report on ethics in research on MOOCs.

## **Review of the Literature**

Ethical research practice guidelines and protocols have been developed since the Nuremberg 1947 Code (Shuster, 1997), which provided a framework of new written principles for research on people that focused on the rights of the human participant. Other, key research ethics codes of conduct followed, such as the Belmont report (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research., n.d.), which outlines the key requirements of respect for persons, beneficence, and justice. The World Medical Association's Declaration of Helsinki, first adopted in 1964, (World Medical Association, 2013) and the Singapore Statement on Research Integrity (Resnik & Shamoo, 2011) built on these earlier codes of conduct, such that ethical codes now legally underpin contemporary scientific research. For example, the European Code of Conduct for Research Integrity (ALLEA, 2017) is recognized as the reference document for research integrity for all EU-funded research projects, and as a model for organizations and researchers across Europe by the European Commission.

As guidelines have evolved there has been a recognition of the challenges to working in the digital arena, particularly, as we will later see, in big data applications such as MOOCs. However, there are also many key aspects throughout all of these codes that have remained

unchanged (Favaretto et al., 2020), such as ethical approval of studies by a body that is separate to and independent of the research team and securing the informed consent of research participants. This ethical approval for research is necessary as it allows for oversight of potentially unethical practices. Norms around seeking and obtaining such formal ethical approval, and reporting of same in associated publications, differ by discipline. For example, one study found 35% of forensic science papers analyzed mentioned obtaining ethical approval (Bonsu et al., 2021) whereas this figure was 93.7% in a study of clinical nursing papers (Wu et al., 2019).

This institutional review board/committee approval is often a mandated requirement of funded research (Resnik & Shamoo, 2011; Grady, 2015). It allows professional standards to be applied, supports researchers in knowing what is ethical and what is not, and gives researchers unbiased advice and support. Ethical approval should be thought of as being part of the support mechanisms and research infrastructure available to researchers (Barrow et al., 2021). It protects them from doing harm and potentially breaking the law in addition to protecting participants. Moreover, ethical approval allows for audits of research. If a breach of ethical principles is perceived to have occurred, a participant or a whistle-blower can contact an ethics approval board or committee to ascertain if either the researchers did not do what they promised they would, or alternatively if they were allowed to engage in research that involved a level of risk to participants. Moreover, the ethical approval mechanism or process should examine a range of issues such as securing informed consent of research participants, and handling of their data including data anonymization and de-identification. That is, ethical approval is an umbrella that can encompass, or be indirect evidence for, other good ethical practices. For these reasons, we consider ethical approval to be fundamental to research and as such there is an onus and shared responsibility on a research team, research funders—and as we highlight in this paper, research publishers—to ensure that ethical approval is sought and obtained for research.

We next turn our attention to these ethical principles in large online learning environments. MOOCs remain attractive to researchers as innovation platforms that can expand what is possible and realize new opportunities because of their scale and their less formal nature (Impey & Formanek, 2021; Schuwer et al., 2015). However, such environments may “fashion themselves as education providers while shaking off the normative and regulatory constraints of traditional educational institutions” (Zeide & Nissenbaum, 2018, p. 280). The maxim, “if you are not paying you are the product,” may be relevant (Hirsch, 2013). Ethical norms for students taking multi-year programs and paying large fees may seem less relevant with more casual learners in MOOCs (Costello et al., 2019). Studies of attitudes to consent, and the benefits they feel may accrue from allowing their data to be used, indicate that students have concerns about privacy and surveillance but in large part they place trust in their university to use their data ethically and appropriately (Slade et al., 2019; Tsai et al., 2021). However, in the case of MOOCs, researchers have pointed out the complexities of the long and legalistic terms and conditions to which participants sign up (Khalil et al., 2018). Learning analytics and MOOC researchers have developed various checklists, frameworks, and evaluation methodologies for engaging in trusted and ethical research and development, but how these are adhered to by practitioners is unclear (Kitto & Knight, 2019). For example, a recent review of 11 learning analytics data ecology frameworks found that only 3 moved beyond student “data as resource” and used student data to modify aspects of learning design and facilitation. Most did not emphasize ways in which the data interests of students could be considered and protected and

instead portrayed students more as data subjects who it should be assumed would automatically benefit from the analyses of their data (Prinsloo et al., 2023, p. 6).

The research on AI and Education (AIED)—which has many intersections with MOOC research—indicates that research from computer scientists may have given more space to the development and evaluation of technologies (Zook et al., 2017; Holmes & Tuomi, 2022) than care for participants (Prinsloo & Slade, 2017). One AIED in Higher Education review found ethics to be conspicuous by its absence, as only 2 of 146 studies (1.4%) contained any ethical consideration, prompting the authors to reflect that “a stunning result of this review is the dramatic lack of critical reflection of the pedagogical and ethical implications as well as risks of implementing AI applications in higher education” (Zawacki-Richter et al., 2017, p. 11).

The ethical gaps in the overlapping areas of MOOCs, learning analytics, and AI in Education is concerning, as the potential for harm of learners can be great but is also not always clear or obvious. For example, research has shown that de-identification of data is complex and that bad actors can potentially reverse engineer and combine data to reveal the identity of participants despite anonymization or privacy efforts (El Emam et al., 2011; Zheleva & Getoor, 2009). This has also been shown in learning analytics datasets, where researchers showed how data that identifies student data can be revealed (Yacobson et al., 2021). This gives different impetus to the notion of informed consent—that is, it should cause researchers to be careful in assuming they do not need consent just because participants' data appears anonymous. One significant review that highlighted the dangers of downstream data linkage to individual identification recommended expanding the role and involvement of ethical review boards/committees and their composition to add big data expertise (Ienca et al., 2018).

Despite the centrality of ethical approval, as a requirement, for example, of almost all funded research with participants, there is very little research on the inclusion of declarations of ethical approval in published research studies on MOOCs. One related notable, small-scale study searched for ethical treatment in learning analytics research (Ferguson & Chow, 2017). Using the search stem “ethic-” this study analyzed 22 articles from the Higher Education section of the LACE Evidence Hub finding that only 3 had explicitly mentioned ethics. Lane & Costello (2019) followed a similar methodology by conducting a literature review on 104 papers over two years that reported on empirical studies in learning analytics across a range of journals and conference proceedings in the field. They sought to determine if published studies reported on receiving ethical review board approval, anonymization of data, and whether they had received informed consent from the learners who were being studied. They reported low levels of reporting on ethics in the published studies around approval, consent, and data handling.

In this study we drew inspiration from this line of research in ethics and learning analytics and applied it to MOOCs where such research is lacking. Our overarching research objective was to determine what information, if any, is given about ethical approaches taken by research teams, in a selection of empirical, published research on MOOCs. Specifically, we sought to determine if identified empirical studies contained any references to research ethics in the context of the research conducted. Within this overarching aim our research questions were:

RQ1: Did studies report having received approval from an identified, formal ethical review board/committee?

RQ2: Did studies explicitly describe obtaining informed consent from those whose data is analyzed?

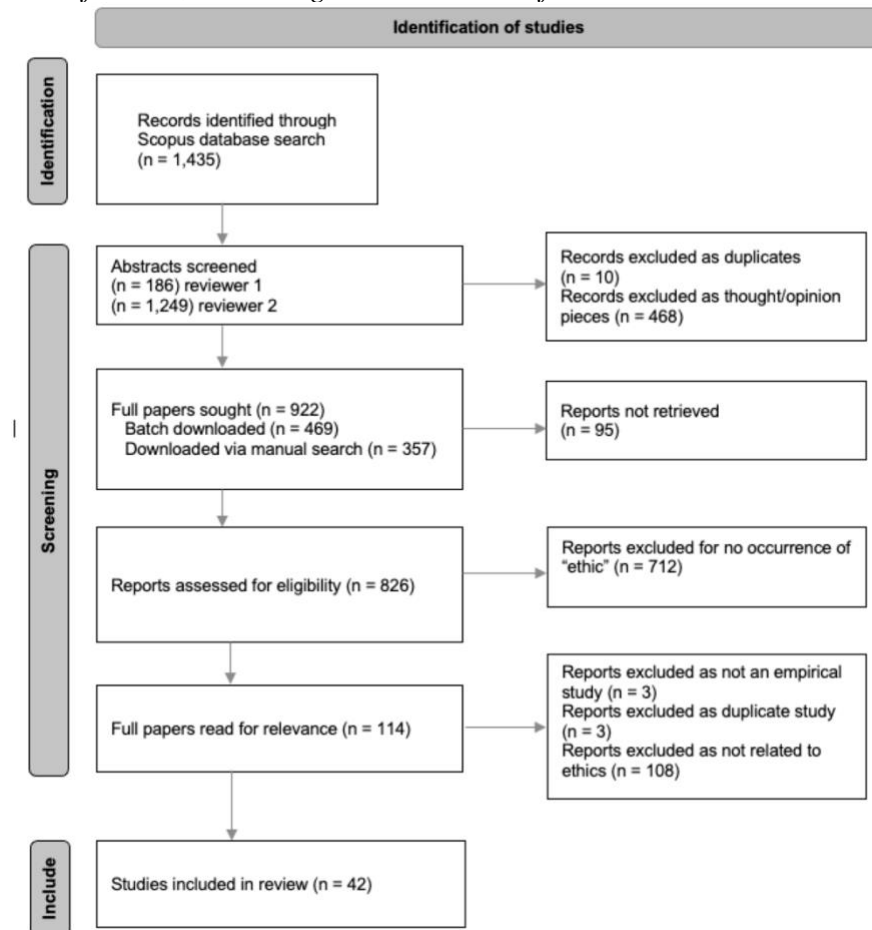
RQ3: Did studies explicitly discuss how they treated data of participants with regard to de-identification and anonymization?

RQ4: Did studies reference utilizing any other ethical guidelines or frameworks other than ethical review board/committee approval?

## Methods

We adopted a scoping review for this research, which is appropriate as do not wish to use our results to answer a question of significance about a specific educational intervention or practice but are more interested in “identification of certain characteristics/concepts in papers or studies, and in the mapping, reporting or discussion of these characteristics/concepts” (Munn et al., 2019, p.3). We followed general guidelines in educational technology research on reviews (Bedenlier et al., 2020) but also specific reviews of ethics in publications (Coates, 2019; Wu et al., 2019; Bonsu et al., 2021; Astaneh & Khani, 2019). Following the approach utilized by Ferguson & Chow (2017) and Lane and Costello (2019) discussed above, this study utilized a defined literature search strategy within an identified database (Scopus) using defined inclusion and exclusion criteria. We next discuss our search strategy which is detailed in Figure 1 below.

**Figure 1**  
*Identification, Screening, and Inclusion of Studies*



We selected the Scopus bibliometric database as the main search tool, as members of the research team have an institutional subscription to both it and a very large proportion of the sources that it indexes. Scopus returns better metadata, in a more structured format, than scholarly search engines such as Google Scholar and is selective in its coverage, as indexed journals and publications must meet several research quality criteria for inclusion (Colledge et al., 2010). It indexes IEEE, ACM, Springer Notes in Computer Science proceedings and the main journals in the field, hence providing good coverage of the main publication outputs of MOOC research.

First, we conducted a search on Scopus for articles which had the string “MOOC” in either the title, abstract or meta data keywords.

We used the following inclusion criteria:

- A. The papers had to be written in English
- B. The papers had to be published in journals or peer-reviewed conference proceedings
- C. The papers had to be published between January 2016 and January 2017, inclusive
- D. The papers had to be electronically available in Scopus.

The full search-string used was:

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TITLE-ABS-KEY ( "MOOC" ) AND ( DOCTYPE ( cp ) OR DOCTYPE ( ar ) OR PUBSTAGE ( aip ) ) AND ( LIMIT-TO ( pub-date AFT 20160131 ) AND LIMIT-TO ( pub-date BEF 20170131 ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )
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This returned a total of 1,435 papers. Following Bujang and Baharum (Bujang & Baharum, 2017), we sought to determine a sample size suitable to conduct inter-rater reliability of two evaluators for a subset of the articles. The N.cohen.kappa function of the R irr package (alpha of 0.05, power of 95). returned a value of 186. Next, two researchers read 186 article abstracts from the dataset independently recording which studies they believed to be collecting data from human participants. The results of these evaluations made in separate spreadsheets were then compared via Cohen’s Kappa, which gave a value of 0.89 indicating “almost perfect” inter-rater reliability i.e  $> 0.81$ . At this point, the evaluators discussed discordant items before reaching consensus on them. Finally, one researcher then proceeded to evaluate the next 1,249 article abstracts from the dataset.

A close reading of the abstracts of these 1,249 papers was made. At this stage, some duplicates were also discovered and eliminated (10). 922 papers reported on empirical studies involving human participants. An attempt was made to retrieve the full available texts of those 922 papers from sources legally available to the research team. Via the batch download feature, 469 were automatically retrieved from Scopus, which allows retrieval of 50 articles at a time. A manual search was then made for available copies of the remaining articles; a further 357 were found. This resulted in a final corpus of 826 articles in PDF form (see Figure 1). Further scientometric analysis of this dataset was made at this point to determine the most cited literature and the main themes via machine learning techniques including topic modelling. This research is beyond the scope of the current study and is reported elsewhere (Costello et al., 2022).



We used an open-source tool called “pdfgrep” to perform searches within the corpus of PDF files for the string “ethic” (case insensitive). At this stage of full paper screening, duplicates and studies that were not empirical were excluded that were missed at abstract screening. Lastly, an analysis was then conducted by close reading of the remaining full papers for the treatment of consent, which we next detail in our results.

## Results

One hundred and fourteen results were returned from the search for the stem term “ethic”. These results were analyzed through reading the relevant sections from the 114 articles and most (108) were revealed to be false positives (i.e., not concerned with ethics in the research). There were also three duplicates and three studies that were not empirical. Forty-two papers, 5.08% of the dataset, were thus selected for inclusion in the full analysis, as they contained evidence of some reported consideration of ethics in the study design and implementation. Of these 42 papers that mentioned ethics, we categorized what was discussed into five dimensions. These are summarized in Table 1 below.

**Table 1**

*Results of Close Reading of the 42 Papers that Mentioned Ethics*

<b>Ethics Evidence Dimensions</b>	<b>Number</b>	<b>Percent</b>
Treatment of ethics in relation to the associated study	42	5.08%
Ethical approval for the study	13	1.57%
Learner consent sought	17	2.06%
Learner de-identified from data collected	10	1.21%
Learner fully anonymized in data	11	1.33%
Other ethical consideration mentioned	29	3.51%
<i>Number of studies</i>	<b>826</b>	<b>100%</b>

We can see that only 13 studies (1.57%) included that they had received ethical approval from an independent committee or institutional review board to conduct their research (Annear et al., 2016; Berman et al., 2017; Frank et al., 2016; Jansen et al., 2017; Kim et al., 2016; Loizzo & Ertmer, 2016; Longstaff, 2017; Rieber, 2017; Salmon et al., 2017; Shapiro et al., 2017; Swinnerton et al., 2017a; Swinnerton et al., 2017b; Wewer et al., 2017). For example, in Frank et al. (2016, p. 122) under the heading “Ethical Approval” the following is stated: “This study obtained ethical approval from the Behavioral Research Ethics Board at the University of British Columbia, UBC BREB number H12-01071, and was executed according to our approved protocols.” An example of a claim of ethical approval without a reference number is given in

Rieber (2017, p. 4) "The current study was conducted upon approval from the institutional review board at the author's university."

Seventeen studies (2.06%) discussed seeking the consent of the learner (Flores et al., 2016; Henderikx et al., 2017; Loizzo et al., 2017; Milligan & Littlejohn, 2017; Mishra et al., 2017; Wang et al., 2017; Zhang et al., 2017; Annear et al., 2016; Berman et al., 2017; Jansen et al., 2017; Loizzo & Ertmer, 2016; Swinnerton et al., 2017b). An example of this is given by (Henderikx et al., 2017, p. 4): "Participation was voluntary, and informed consent was obtained from participants following ethical guidelines of the providing institution."

Ten studies (1.21%) mentioned de-identification of the learner data (Falkner et al. 2016; Frick & Dagli, 2016; Mishra et al., 2017; Veletsianos, 2017; Annear et al., 2016; Berman et al., 2017; Frank et al., 2016; Rieber, 2017; Salmon et al., 2017; Swinnerton et al., 2017b). The Rieber (2017, p. 5) study gives an example of de-identification in a study: "The primary mechanism for protecting participants in the study was the coding and removing of any direct identifiers from their data. Additionally, results are presented across groups of participants. Combined, these measures protect participants from having their individual identities revealed in any manner." Another more detailed example is given in Salmon et al. (2017, p. 6): "All data used in this study was de-identified to ensure the confidentiality and privacy of participants. Interview participants are referred to by pseudonyms throughout this paper. To access the de-identified data used in this study, please email the corresponding author and provide a statement regarding the purposes of your request."

Eleven studies (1.33%) mentioned fully anonymizing the learner data (Filimowicz & Tzankova 2017; Luaces et al., 2017; Mishra et al., 2017; Frank et al., 2016; Loizzo & Ertmer, 2016; Rieber, 2017; Salmon et al., 2017; Swinnerton et al., 2017b; Wewer et al., 2017). An example of authors who reported collecting data anonymously is given in Filimowicz and Tzankova (2017, p. 5): "Student feedback was collected anonymously using SFU's web-survey system. The online survey was made available towards the end of the course. Ethics approval regarding the collection of information from students was obtained."

Twenty-nine studies (3.5%) discussed following some other ethical guidelines or having taken some other approach to the consideration of ethical issues (Flores et al., 2016; Henderikx et al., 2017; Mishra et al., 2017; Morgan et al., 2017; Riofrío-Calderón et al., 2016; Wang et al., 2017; Zhang et al., 2017; Berman et al., 2017; Swinnerton et al., 2017; Wewer et al., 2017). Examples here include three studies having approval from the MOOC platform provider itself (Swinnerton et al., 2017b; Zhang et al., 2017; Mishra et al., 2017), "we have an agreement with FutureLearn that we can use anonymous data for research purposes" (Mishra et al., 2017, p. 5). Some papers reported being exempt according to ethical board/committee guidelines, for example: "this study was exempt from review under The University of Adelaide Human Research Ethics Committee guidelines, as the study has no foreseeable risk or harm to participants and as it involved the use of existing collections of data that contain non identifiable data; including the artworks and pre- and post-survey data" (Falkner et al., p. 5 2016); "the research reported here falls outside of the vetting process of research in accordance with the Swedish Ethical review" (Berman et al., 2017, p. 635). This last quote from Berman et al. (2017, p. 635) also mentioned that the study was carried out according to Swedish ethical guidelines. Other papers also reported that the study was carried out in accordance with some national or regional guidelines, for example, "according to guidelines of the British Educational Research Association" (Annabi et al., p. 7, 2016).

## Discussion

The findings of this study highlight a fundamentally important gap in published research about teaching and learning in MOOCs. This gap relates to the inclusion, or more specifically the lack thereof, of explicit discussion of ethical considerations, and/or the reporting of ethical approval processes in research publications. This has important implications for researchers, institutional leaders, funding bodies, ethical approval boards/committees, those teaching on topics related to big data and/or data ethics, and for those involved in the publication of empirical research papers, such as journal editors, conference chairs, peer reviewers, etc.

The first key finding is that only 1.6% of studies (18 papers) made explicit reference to obtaining ethical approval for the research related to the published article from an ethics approval board/committee. This finding contrasts with research in other settings. For example, Bonsu et al. (2021) found 35% rates of ethical approval declaration in forensic science papers. Differences are starker when the finding from this study is compared to similar research about medicine; for example, in one review of 1,284 studies over a two-year period in clinical nursing, 93.7% included that such ethical approval had been granted (Wu et al., 2019). Related to this first key finding, 29 studies (3.5%) reported following a set of ethical guidelines or that they had approval to carry out the study from a body other than a formal ethical approval board/committee. Some researchers referred to following guidelines such as those from the British Educational Research Association (Annabi et al., 2016). Some researchers referenced having approval from the MOOC platform itself for research activity, for example having an agreement with FutureLearn to use anonymous data from a MOOC for research purposes (Mishra et al., 2017). It is unclear how meaningful such author statements are given that these approaches cannot be equated with a process of obtaining ethical approval from an ethics approval board/committee, which is a cornerstone of ethical research practice.

The second key findings in this study are that out of a sample of 826 published papers meeting the inclusion criteria only 42 (5%) contained any reference to ethics in the context of the associated study. This contrasts with a finding from an analysis of 500 social science papers by Coates (2019) in which 55% mentioned ethics. The current study found that 17 studies (2.06%) included discussion of obtaining learning consent, 10 studies (1.21%) mentioned de-identification of learner data, and 11 studies (1.33%) referenced fully anonymizing learner data. These findings demonstrate a low engagement with reporting on treatment of these important ethical issues in associated publications, from those researching teaching and learning in MOOCs. For those researchers who did include details of ethical considerations in their published work, this involved straightforward inclusion of details relating to informed consent, de-identification of learner data, and/or full anonymization of learner data. Other authors simply exempted themselves, or were exempted, from the need to obtain ethical approval due to the use of big data in the study (for example, Falkner et al., 2016; Berman et al., 2017). This approach potentially clashes with identified ethical concerns raised in the literature around big data research (Zook et al., 2017).

The question that these findings raise is whether this lack of reporting is due to norms around the requirements to include consideration of ethical issues in publications, i.e., are ethical considerations being made in the research but not elucidated in the associated publications, or has there been an absence of consideration of ethical issues in the research? If it is more the case that ethical considerations are being made but not reported, one can point to the fact that paper authors, journal editors, and paper reviewers are clearly standing over the publication of such papers without the inclusion of details on related ethical considerations. Some journals, for

example those in the SpringerOpen portfolio, have author requirements about declaring that ethical approval has been obtained from an institutional review board or committee (Springer Nature, 2023). Other journals, for example Research in Learning Technology, include guidance to authors on conducting research in line with institutional ethics guidelines and that ethical approval should be obtained from the relevant committee before submitting to the journal, but there is no requirement to confirm compliance with these points in a submitted manuscript (Association for Learning Technology, 2023). If it is the case that papers are published without mention of ethical considerations because there was none, there is a need for researcher education and training in both ethics generally (Atenas et al., 2023) and big data ethics specifically (Metcalf et al., 2023). In this context, the fact that peer-reviewed journal articles are being published without consideration of the ethical issues inherent in big data research, and of the ethical rights of the learners involved, would be concerning. Overall, these findings indicate that there is a need for more dialogue in the sector on: ethics education and training for researchers; consideration of ethics in big data studies in education; and norms/policies in academic publishing for authors to report how ethical issues have been considered.

Based on the findings in the current study, it would seem clear that researchers working in the area of teaching and learning in MOOCs need to be more cognizant of ethical pitfalls, specifically those around informed consent and data handling (anonymization, de-identification, etc.) (Favaretto et al., 2020). Researchers should be working within systems that require ethical education and training, ethical oversight, and ethical approval by an appropriate body (Metcalf et al., 2023; Resnik & Shamoo, 2011; Grady, 2015; Atenas et al., 2023). Where researchers do not properly take ethical considerations into account, participants are being put at undue risk (Barrow et al., 2021).

Researchers should “recognize that they have an ethical obligation to weigh societal benefits against risks inherent in their work” (Resnik & Shamoo, 2011, p. 74). However, we do not know the reasons why the majority of papers reviewed in this study did not include mention of ethics. Absence of evidence is not evidence of absence. Therefore, we would like to warmly invite dialogue from colleagues in the sector on the issues highlighted in this paper, such that we can collaboratively explore, as a community, what lies behind the current lack of reporting on ethics in empirical MOOC teaching and learning papers. If there are identifiable deficits in MOOC teaching and learning research, then we, as a community of researchers, must identify ways in which to tackle these issues for the common good. This call for dialogue acknowledges the complexities that exist in the area of big educational data studies, in particular where research teams may be large, interdisciplinary, and working in areas for which protocols, governance, or even laws may not seem responsive to practices:

Rather than a bug, the lack of clear-cut solutions and governance protocols should be more appropriately understood as a feature that researchers should embrace within their own work. Discussion and debate of ethical issues is an essential part of professional development. (Zook et al., 2017, p. 5)

## **Recommendations**

Based on the findings of the current study, a set of recommendations is presented below relating to the consideration of ethical issues in empirical MOOC teaching and learning studies, and educational big data studies more broadly, as well as the role of ethical review boards/committees in research and academic publishing:

1. *Increased sectoral dialogue*

There is a large community of researchers in the sector with interests in MOOC teaching and learning, and other educational big data topics. Given the questions raised by this study, and elsewhere in the literature, the first recommendation is for more dialogue in the sector around ethics, big data research, and academic publishing such that identified issues can be collaboratively addressed as a community.

2. *Transparency around ethics in educational big data research*

The second recommendation is that there should be appropriate, explicit treatment of ethical considerations in MOOC teaching and learning research, and other educational big data research, and that researchers should make this information available to others. The information made available should cover, at a minimum, how learner consent has been obtained and how participant data has been handled in terms of de-identification and anonymization. Provision of this information supports transparency of whether and to what degree ethics has been a feature of the research study, as well as allowing for study replication. Transparency can be achieved through including sufficient detail in traditional academic publishing and/or by engaging in open science practices that make information about the treatment of ethics within the study available outside of publications on the study.

3. *Reporting on research ethics as a norm in academic publishing*

Connected to recommendation two above, the third recommendation relates to establishing a norm in publications on MOOC teaching and learning research, and other educational big data research, whereby detailed information on consideration of ethics issues, and the obtaining of ethical approval from an appropriate review board/committee is provided as a matter of course. It is recommended that all scholarly journal articles should have a mandatory section specifying whether the research was given ethical approval by an independent reviewing body. Such a recommendation is in line with the values and aims of bodies such as The Committee on Publication Ethics (COPE). The provision, in a publication, of an ethical review board/committee identification number would be a strong form of evidence that at least some independent oversight of the study was conducted at the design stage. The identification number could be traced back to a committee/board, who could in certain circumstances validate whether the published study had indeed received approval as claimed. This would provide accountability for researchers.

4. *Provision of education and training in ethics and big data for researchers*

The final recommendation relates to the need for a holistic approach to education and training in ethics for researchers. Approaches to ethics education and training should be: ongoing during research careers, active and interactive, grounded in group activity rather than individual work, and should focus on the ethics from a broad, societal perspective as well as the more typical focus on specific ethical practices needed to conduct scientific research. The goal is to create a research culture of engagement with ethics, within which ethics is not viewed as a compliance exercise, a complicated area that demands too much time, or an afterthought in the research design process.

What can we do as a research community to improve this situation? Although there are practical actions to pursue, as just suggested, we cannot treat the ethics of research into digital

education as a problem with a simple fix for it speaks to a set of complicated relations which are social or “ethically relational”:

Adopting relational ethics means that we view our understandings, proposed solutions, and definitions of bias, fairness, and ethics as partially open. This partial openness allows for revision and reiteration in accordance with the dynamic development of such challenges. This also means that this work is never done. (Birhane, 2021, p. 6)

Further work in this area could usefully revolve around approaches to building greater forms of research traceability (like we are used to with our food), where research committees and academic journals work together to create a chain of accountability for researchers. Investigations of stakeholder perceptions of such research traceability systems could be explored, in future work, as such proposals would require dialogue and ground-up co-creation. Otherwise, they could run the risk of becoming another part of top-down compliance culture.

## Conclusion

This paper has presented evidence on the practices of researchers around the reporting of ethics in published work. We found that mentioning ethics in research conducted with MOOC learners is a minority activity, and we call for more focus on this issue in published research. As put by the Chief Executive of the European Science Foundation (ESF), Marja Makarow, “there can be no first-class research without integrity, and integrity includes both paying attention to ethical considerations and reporting them clearly in published papers” (New Code of Conduct for Researchers, n.d.). We call on researchers to keep issues of ethical integrity in high regard. We can do this by holding each other to account with clear standards. We believe that this is necessary, but also not in itself sufficient or a simple fix. Hence, we must engage in continued dialogue to revise and develop our standards of practice and continually work towards relational ethics.

## Declarations

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# Introduction to OLJ Volume 27, Issue 1

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In addition to the conference papers, the June issue also includes 12 articles from our regular submission process. Topics include online learner engagement, instructional designers' experiences, emergency remote instruction among the deaf, data-driven decisions among online faculty, the Community of inquiry in synchronous and asynchronous settings, online credit recovery in k-12 online environments and more.

Many authors (including this one) have written about student satisfaction with online learning, dating back to the 1990s and even earlier. Recent work in this area looks at learner responses to the sudden and involuntary shift to what many of called “emergency remote instruction” to distinguish it from more mature and planned forms of online learning. Even in the early days of online learning, students who opted into online education were generally happy with it and found the convenience and flexibility (especially in asynchronous environments) to outweigh any disadvantages associated with technical difficulties, weaker social ties, or potential isolation that many critics decried. Numerous meta-analytic analyses (see e.g., Bernard et. al, 2019) have concluded that online learning outcomes can be as good as or better than classroom-based outcomes on a variety of measures (including attitudinal dimensions). In “Student Attitudes towards Distance Learning at a Large Urban Public College”, authors Peter Tuckel and Kate Pok-Carabalona of the City University of New York’s Hunter college examine student satisfaction with COVID era online instruction, which, again, might better be called emergency remote instruction given the urgency with which it was developed. As others have found (e.g., Means and Neisler, 2021), many students struggled with the hastily constructed distance education that novice online instructors managed to develop in extremely difficult circumstances. Tuckel and Pok-Carabalona investigated a relatively large sample of students at two points (Spring 2020 and Fall 2020) in a diverse setting in New York City. Because the authors had a sample of around 500 students in each of the surveys that formed the data for this study, they were able to conduct analyses of subgroups. They found, perhaps not surprisingly, that students who are more satisfied with in-person classes tend to be younger, freshmen or sophomores, those with higher stress levels, and those whose home environments were not conducive for learning. It might be helpful to consider online learning as an innovation for students who experienced it during the pandemic. The United Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et. al, 2003) would predict that a lack of “voluntariness” is a significant obstruction when potential users are forced to adopt an innovation. Younger students in residential institutions who have expectations that their college experiences will not be “remote” would be particularly sensitive to the forced nature of emergency remote instruction as predicted by UTAUT. The theory also describes “facilitating conditions” that must be met for innovations to be adopted satisfactorily, predicting that distracting homes and overly stressful lives might



also impede adoption of online learning. Authors who investigate COVID era distance learning might be advised to look to such conceptual guidance and to consider that the flexibility and convenience of online learning are aspects of the “active ingredients” of the innovation and its positive effects on some learners. In other words, volunteering to enroll in online education is not a problematic “selection bias” but rather a significant causal agent in the efficacy of successful online programs for student who choose them. Emergency remote instruction violated the premise that enrolling in online learning would be a choice (setting aside the haste with which it was designed and delivered under COVID), and thus removed the benefits that serve some, but not all students.

In “Keep Learning: Student Engagement in an Online Environment” author Akanksha Bedi of Western Washington University explores another attitudinal dimension of online students – learner engagement. In this study the author hypothesizes that motivation, defined as a student’s stable disposition to find academic activities as satisfying and worthwhile, is positively associated with both self-efficacy (an individual’s perceived ability to perform a task), and student engagement (measured by four dimensions of student engagement in an online environment: skills, emotions, participation, and performance). The study also hypothesizes that motivation is positively associated with “overall student engagement” (measured by dimensions of learner-learner, learner-instructor, and learner-content engagement). Further, Bedi hypothesizes that the two variables, self-efficacy and general student engagement, may mediate the relationship between motivation and overall student engagement. These relationships do not seem to be very controversial, i.e., it seems clear that motivated students are likely to experience a higher degree of self-efficacy and general and overall engagement. However, a positive relationship between motivation to learn and overall student engagement was not supported. Similarly, a positive relationship between self-efficacy and overall student engagement was not supported. The author explores each of these relationships and reports on results of qualitative data from students and faculty that support much of what is known about good online pedagogy – clear and regular contact between students and faculty is important; a well-organized course is helpful, and a focus on inclusivity and access is essential to support engagement. While the study is well structured, carefully argued, and convincing – it seems to omit the contextual variables initially discussed in the introduction, e.g., students and faculty were struggling to learn, develop coursework, and teach during the pandemic. One wonders if these results would be found in “normal” times.

Instructional designers are a key feature of support for faculty developing and teaching online courses in the normal times mentioned above. Their support helps assure that the quality of online courses are not left to chance or the sole efforts of faculty, especially instructors who are new to online course design. In “The Everydayness of Instructional Design and the Pursuit of Quality in Online Courses” Jason McDonald of Brigham Young University notes that while others have investigated the major instructional design activities carried out by IDs, there is value in looking into the day-to-day tasks that further support online course quality. Utilizing a case study approach and ethnographic research, the author conducts interviews and observations, engages in myriad conversations, and examines the artifacts produced in the day-to-day activities of the team of instructional designers at the research institution. The author focuses especially on some of the more mundane practices that nonetheless contribute to quality – especially the

ongoing tasks of refinement. Other instructional designers will find this paper especially relevant – as they recognize the work they undertake in striving towards ever increasing quality in online design.

In “Data-Driven Decisions of Higher Education Instructors in an Era of a Global Pandemic,” Maya Usher and Arnon HersHKovitz of Tel Aviv University suggest that educators in classrooms collect observational data on students in the process of face-to-face teaching that may get lost when instruction is forced online, as is the case with the response to the pandemic. The authors analyzed open-ended survey items from 109 faculty who taught in emergency remote instructional environments. Unlike in classroom setting, instructors teaching in emergency remote instructional contexts reported using a wider range of data sources and a wider range of data-driven decisions, from academic-related issues (e.g., adjusting the course requirements) to socio-emotional-related issues (e.g. promoting collaborations among students). While the author hypothesize that this trend to use a wider range of data and a broader set of data-informed decision is related to availability of this data in online settings, it seems likely that the actual context of the pandemic, which was extremely stressful for both students and faculty, may have also colored the decisions that faculty made. Students, suffering from anxiety induced by social isolation, new to online learning, and confronted with the results of rushed efforts to deploy online instruction, likely needed the kind of relief that faculty (probably sensitive to their own lack of expertise in online design and pedagogy) were willing to provide. The authors do acknowledge this reality noting the instructors were likely concerned about their online students’ struggles, which increased their attention to socio-emotional issues. In the end, it is challenging to untangle the uses to which learning analytic data are put in extreme circumstances, but that opportunity exists to make better use of such data going forward.

In “Were the Fathers Available? An Evaluation of Fathers’ Involvement in Emergency Remote Education of Learners Who Are Deaf/Hard of Hearing” authors Olufemi Timothy Adigun and Paseka Andrew Mosia of National University of Lesotho, join Thanduxolo Peace Mngomezulu of the University of Zululand, South Africa to explore the involvement of fathers in the education of their deaf and hard of hearing children during COVID. Without adequate support from parents, other family members, teachers, and school children who are deaf experience significantly worse outcomes than those who receive such support. Mothers play a critical role in providing support and increasingly fathers do as well. The pandemic created new stressors for the deaf/hard of hearing community. The authors of this paper investigated the role of fathers in the education of their deaf/hard of hearing children during the pandemic. They found that there was evidence of increased involvement of fathers in light of the pandemic and that specific factors enabled or inhibited greater involvement. The authors include recommendations for improved paternal support for deaf/hard of hearing children based on these factors.

The next paper in section two of this issue is “Remote Global Learning: The Role and Use of Virtual Exchange for U.S. and Irish Graduate Students” by Katherine Aquino of St. John’s University, Elizabeth Tobin and Seaneen Sloan of University College Dublin. Higher educational experiences which promote global collaboration and internationalization are considered high impact practices that contribute to the goals of colleges and universities. While typically these occur at the undergraduate level and are traditionally characterized by study

abroad opportunities, newer forms of exchange can include working virtually with collaborators from other countries involving graduate education. But there is limited research on the latter. The authors of this paper conducted a qualitative study to understand the nature and value of the collaborative online international learning experiences for participants. Focusing on six participants (from a total of 25 participants) in a virtual exchange between institutions in the US and Ireland the authors use semi structured interviews to shed light on these experiences. One key finding was perceptions of inequity in terms of commitment and contribution in the collaborations. Additionally, students enjoyed the opportunity to expand their networks and learn about a different education system. The author offers suggestions on how to minimize the challenges and expand the advantages of this unique form of online education.

Another paper featuring Irish authors is “Building a Digital Educational Escape Room Using an Online Design-Thinking Process” by Jenny Moffett and Dara Cassidy of RCSI University of Medicine and Health Sciences, Ireland. These authors review literature on the increasing value of educational games to support important processes in learning (such as motivation and engagement) and the increasing use of design thinking in developing games (and game environments such as escape rooms) in which students are co-creators as well as players. They further note that much of the research conducted in these areas relate to physical environments and that a gap exists as to the application of *online* design thinking for the creation of digital game environments such as *digital* escape rooms that involve students as collaborators and players in their development. The authors explore how an online design-thinking process can be used to design, build, and test a digital educational escape room and the experiences of learners engaged in this process. The study used design-based research and qualitative data collection and thematic analysis methods to reveal rich contextual data around the game users’ experiences. They conclude that game users were positive about key game elements, and they reported experiences of fun and enjoyment during gameplay, the goal of which was to help these students grapple with uncertainty. Findings indicate that this online design process provides an effective way of harnessing team collaboration and innovation in the development of digital educational resources.

In “A Comparison of Cognitive and Social Presence in Online Graduate Courses: Asynchronous vs. Synchronous Modalities” by Regina Presley and Denise M. Cumberland of the University of Louisville, and Kevin Rose of Indiana University Purdue University Indianapolis, the authors compare synchronous and asynchronous modes of instruction on several dimensions. Going beyond what the title suggests, the study examines performance of students in synchronous and asynchronous courses on not only the Community of Inquiry framework, but also on pre- and post-intervention tests of knowledge as well as their ratings of the instructors in these different online instructional approaches. Using a quasi-experimental research design (there was no random assignment of subjects to modes of instruction) the authors found no significant differences on pre- and post-tests of student knowledge of the subject matter or social presence suggesting that synchronous and asynchronous modes may be equivalent (with many caveats of course). It is important to note that self-selection into modality should probably not be considered a bias in this study and that students in real world settings should be able to choose the mode of instruction that they believe suits their learning needs – i.e. this freedom to choose is one of the active ingredients in digitally supported pedagogy. Finally, asynchronous course

delivery resulted in higher ratings of cognitive presence. Read the full paper for interpretations of these results.

Another study that investigates the Community of Inquiry model is “Adaptation of an Activity Theory Framework for Effective Online Learning Experiences: Bringing Cognitive Presence, Teaching Presence, and Social Presence to Online Courses” by Aytac Gogus of Istanbul Okan University, Turkey. This study presents a framework that adapts activity theory to the design, implementation, and evaluation of online courses referencing the elements of the Community of Inquiry framework - cognitive presence, teaching presence. The author provides a review of the models and attempts to develop a more complete theory for effective online learning experience by adapting the Activity Theory within the context of online learning management.

Continuing with investigations of the Community of Inquiry model is “Teaching Presence in Asynchronous Online Classes: It’s Not Just a Façade” by Sharon Watson, Daniel P. Sullivan of the University of Delaware, and Kathryn Watson of University of Colorado, Colorado Springs. Online faculty can establish their “presence” in the absence of classroom interaction in a variety of ways. The authors note that options include video overviews and lectures provided by the instructor, discussion board interactions with students, in-depth feedback, and other technological tools to increase productive contact with learners. These authors seek to understand which methods are most valuable to the students and to their learning. The study employs factor analysis to identify substantive and stylistic methods of developing teaching presence and finds the former more important than the latter. Students ascribe higher value to components of teaching presence that provide meaningful substance, such as content lectures, assignments that directly apply course material, detailed feedback on their performance, and swift response to email questions. Overall, the authors conclude that students find value in clear, organized classes that are designed to help them efficiently learn while receiving direct, timely feedback from instructors.

In the next paper “Effectiveness of the Flipped Classroom in the Teaching of Mathematics in an Online Environment: Identification of Factors Affecting the Learning Process” by Julio Ruiz-Palmero, Francisco David Guillén-Gámez, Ernesto Colomo-Magaña, and Elena Sánchez-Vega of the University of Malaga, Spain the authors investigate a specific format for flipped classrooms (FC). Recall that the FC approach has “traditionally” entailed having students access virtually materials that might have formally been associated with classroom instruction, such as lectures, notes, videos, etc. Classroom time itself under the “traditional” flipped model would be used for more active learning, whereby students work on problems either individually or in groups with assistance from the instructor – i.e., the kinds of activities students might otherwise do outside the class for homework are instead completed in the classroom. However, in the model used in this study there was no physical brick and mortar classroom – both conditions were done online due to the pandemic. The students accessed materials asynchronously for one component and worked with the instructor and other students synchronously (via videoconferencing) for the other component. The investigators implemented this online flipped classroom approach with geometry students. They used a quasi-experimental design to try to isolate the effects of the online flipped approach and found that this method has

significant impacts on student learning outcomes with a few caveats that you will find in the full paper.

The final paper in this issue is “Online Credit Recovery School-Level Enrollment: Intended and Unintended Consequences” by Samantha Viano of George Mason University. In pre-college settings, the most common use of online learning has been to assist with what was traditionally known as summer school. Using online forms of education to help student recover credits that were not awarded due to course failure may seem to be an effective use of resources. However, critics have expressed concerns that online credit recovery (OCR) is fraught with problems stemming from the population to which it is targeted, i.e., student who struggle to pass coursework may lack the skills, motivation, or self-regulation to learn and succeed in online settings that may require greater independence. The problem is exacerbated in light of higher course failure rates associated with COVID and the increased allure of using OCR to recover the associated lost credits. Using state-wide data from the North Carolina public school system the author examines the extent to which increasing OCR enrollment at the school level is associated with the intended consequences of increased passing rates of previously failed courses and high school graduation rates and the unintended consequence of lowered proficiency rates on end of course exams. The results support the potential of increasing OCR enrollment to address large increases in course failure rates during the pandemic, though this data was collected in years prior to COVID and might therefore represent a somewhat different population. On the other hand, there is little evidence that the increased credit accumulation from higher OCR enrollments translated into higher graduation rates for the students who used OCR rather than face-to-face credit recovery. Overall, there is a tipping point at which OCR results in diminishing returns and the full paper describes these conditions.

I would like to thank the many reviewers as well as our editorial team and of course, the authors of papers included in this second issue of 2023. I would also like to thank Dr. Olaf Zawacki-Richter for his efforts in organizing and overseeing the papers in the EADTU Conference Special Issue section. The *Online Learning Journal* will be back with a new issue in September including papers from OLC Accelerate and Innovate conferences.

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# Student Attitudes Towards Distance Learning at a Large Urban Public College

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## **Abstract**

Student attitudes towards distance learning can affect both the acquisition of knowledge and the motivation to learn. This study explores student attitudes towards the following four topics: (1) technological and environmental impediments towards distance learning, (2) asynchronous versus synchronous course preferences, (3) online versus in-person course preferences, and (4) attitudes towards taking online courses in the future. The findings of the study are based on two anonymous online surveys conducted in the spring and fall of 2020 among students at a large urban public college located in New York City. The study reveals that a significant number of students have unreliable internet and live in homes not conducive for online learning. By a narrow margin, students prefer an asynchronous to a synchronous approach to online learning. Along several dimensions covering different facets of the classroom experience, students prefer in-person courses to online courses. The disparities favoring in-person classes are most noticeable with respect to the ability to concentrate in class sessions, feeling motivated to learn, and developing friendship ties with classmates. Distinctive profiles exist among students who opt for these different teaching modalities. Those students who are more positively disposed towards in-person classes tend to be younger (freshmen or sophomores), those experiencing higher stress levels, and those whose physical arrangements at home are not conducive for learning. Importantly, though, a majority of students say they were inclined towards taking more online course in the future.

*Keywords:* distance learning, online learning, student attitudes, student perceptions, surveys, motivation, higher education, online surveys, asynchronous learning, synchronous learning, undergraduate students

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The advent of the coronavirus in the spring of 2020 compelled colleges and universities throughout the United States to quickly transition from in-person classes to remote learning. This abrupt transition caused massive disruptions in the higher educational system. Students at residential colleges had to suddenly vacate their residence halls and return home. Across the country, students with little or no familiarity with online classes had to learn how to use web or video conferencing platforms such as Zoom or Blackboard Collaborate, participate in online discussion boards or chats, and submit homework assignments and take exams virtually. Perhaps even more challenging, they needed to learn how to absorb the course material in a radically different learning environment from the traditional classroom setting. Faculty, too, were confronted with unprecedented challenges. Like most of their students, the vast majority of instructors lacked any previous experience with distance learning. In addition to acquiring the necessary technical tools to teach remotely, faculty needed to transform the content of their courses to be compatible with this alternative method of instruction.

Understandably, much scholarly attention has focused on the dislocations to the higher educational system caused by the pandemic (Gillis & Krull, 2020; Hamilton, Kaufman, & Diliberti, 2020). However, since the pandemic also resulted in millions of U.S. college students being exposed for the first time to a relatively new teaching methodology, it also created an opportunity to examine the views about distance learning of a broad population of students, one which heretofore may not have considered taking online courses.

The present study investigates the attitudes towards distance learning of a significant segment of this population—students attending an economically and racially diverse school in New York City. The location of the study is important because New York City was the epicenter of the coronavirus during the early stage of the COVID19 pandemic (McKinley, 2020). Thus, this study examines students' attitudes at a time when the virus first emerged in the United States and when it was exacting a devastating toll on the citizens of New York City. The study explores student attitudes towards the following four topics: (1) technological and environmental impediments towards distance learning, (2) asynchronous versus synchronous course preferences, (3) online versus in-person course preferences, and (4) attitudes towards taking online courses in the future. The findings of the study are based on two anonymous online surveys conducted in the spring and fall of 2020 among students at a large urban public college located in New York City.

Studying student perspectives about distance learning is critically important because student perceptions can affect both the acquisition of knowledge and the motivation to learn (Salisbury et al., 2002; Tanner, Noser, & Totaro, 2009; Bali & Liu, 2018). Student attitudes also can have a significant bearing on the disposition to enroll in additional online courses.

## **Review of Related Literature**

Prior to the onset of the pandemic, the academic literature about online learning focused principally on three topics: (1) student satisfaction with online courses, (2) effectiveness of online or distance learning, and (3) factors that impact online course outcomes (e.g., digital divides/inequality, organization and structure of online courses, and types of materials included in online courses). Literature concerning student satisfaction with online versus traditional classroom experiences produced mixed conclusions. Some studies reported no significant difference in student satisfaction between the two types of instruction (Allen et al., 2002; York, 2008). However, most studies indicated that students harbor lower levels of satisfaction with online classes compared to in-person classes (Johnson et al., 2000; McFarland & Hamilton,

2005; Salisbury et al., 2002; Summers, Waigandt, & Whittaker, 2005; Tratnik, Urh, & Jereb, 2019). Importantly, the much of the literature notes that regardless of how students may *feel* about online learning, there is little or no difference in knowledge acquisition (usually measured by grades, exam results, or self-report) (Johnson et al., 2000; Summers, Waigandt, & Whittaker, 2005). Maki & Maki's (2000) research was particularly notable for the fact that students' preference for traditional in-person lecture-based classes was pronounced even when researchers found that online options resulted in greater mastery of course content. Salisbury et al. (2002) made a further distinction between types of educational outcomes noting that even when distance education may not affect mastery of content, it may negatively impact the attainment of important pedagogical goals such as developing students' reasoning abilities or their desire to pursue further study of the academic discipline.

Previous research examining technological and economic barriers to online instruction observed that a slow connection or disruption of service may not only hinder participation in synchronous classes but may also impede a student's performance in asynchronous classes such as when taking an online examination (Gillis & Krull, 2020; Grether, MacDonald, & Higgins, 2020; Katz, Jordan, & Ognyanova, 2021). This technological barrier was usually associated with social class background with undergraduate students from lower-income households being more likely to experience problems stemming from unreliable internet service (Casey, 2020 as cited in Katz et al., 2021).

The number of published studies on attitudes of college students towards distance learning was relatively sparse prior to the onset of the pandemic (Allen et al., 2002; Bali & Liu, 2018; Boling et al., 2012; Driscoll et al., 2012; Lowenthal, Bauer, & Chen, 2015; McFarland & Hamilton, 2005; Summers, Waigandt, & Whittaker, 2005; Tichavsky et al., 2015; York, 2008). Since the advent of the coronavirus, the number of studies examining student attitudes towards distance learning has burgeoned (see Adnan & Anar, 2020; Armstrong-Mensah et al., 2020; Gillis & Krull, 2020; Grether, MacDonald, & Higgins, 2020; Katz, Jordan, & Ognyanova, 2021; Lazarevic & Bentz, 2021; Masalinmova et al., 2002; McClure et al., 2021; Means, Neisler, & Langer Research Associates, 2022; Nguyen et al., 2021; Unger & Meiran, 2020; Zhou & Zhang, 2021).

A particularly noteworthy addition to the literature is Van Wart et al., (2020) whose research takes a step beyond the Community of Inquiry (CoI) framework—the most prominent theoretical framework used in online learning. The CoI divides instruction into three interdependent elements—teaching, cognitive, and social presence. Van Wart et al. (2020) break down student perceptions of quality online instruction into seven factors labeling them: Basic Online Modality, Instructional Support, Teaching Presence, Cognitive Presence, Online Social Comfort, Online Interactive Modality, and Social Presence. They then analyze students' responses to generate a hierarchical ranking of their importance to students.

There is only one attitudinal study that we have been able to identify that was situated in New York City during the pandemic. The study conducted by McClure et al. (2021) was based on survey responses to 254 undergraduate and graduate students who attended a university anywhere within the New York City metropolitan area. A majority of the participants were graduate students (59.6%). The students were selected via a combination of convenience and snowball sampling methods. The major focus of the study was to explore online learning challenges encountered by students because of the COVID-19 pandemic. One key finding that emerged from the study was that from the vantage point of the students, new “pedagogies of engagement” needed to be developed for remote learning to be a successful mode of instruction.



Another important finding was that the pandemic laid bare inequalities in the lives of students that were obscured in traditional classroom settings. In addition, technological challenges such as poor internet access or private spaces to study were noted for several students.

The present study adds to the existing literature in a number of ways. First, the study surveys students who did not “voluntarily” choose to learn remotely. Thus, there was no “selection effect,” a limitation attached to the earlier studies on student attitudes towards distance learning. As Bray, Harris, & Major (2007) pointed out, “Students engaged in distance learning tend to have demographic and professional characteristics different than their traditional classroom counterparts.” Second, the study is based on two surveys with relatively large sample sizes (each numbering approximately 500 respondents). Most of the studies that have been conducted since the emergence of the pandemic rest on fairly small-sized samples, limiting the statistical precision with which inferences can be drawn from the results and precluding the carrying out of subgroup analyses. Third, the study examines attitudes of students towards distance learning both at the time of the incipient stage of the pandemic (spring 2020) and at a slightly later time (fall 2020). The surveys, therefore, were able to capture student sentiments at a formative stage and at a more mature stage as the pandemic persisted. Finally, the surveys were administered to students enrolled at a large, public, college located in New York City with an economically and racially diverse population. Thus, the findings are not limited to the perceptions of one homogeneous subset of students but pertain to a broad swath of students with differing backgrounds.

## Hypotheses

Based on the existing literature and the population sampled in our study, we posit several hypotheses that largely based on economic and age characteristics of students:

- H1) Students from lower-income households would be more in favor of in-person classes than their more affluent counterparts because of problems with internet access and lack of personal space.
- H2) Students in the paid labor force would be more in favor of online classes and prefer asynchronous versus synchronous online learning than students who are not employed.
- H3) Overall, students would evaluate in-person classes more positively than online classes.
- H4) Freshmen students and, more generally, new entrants to the college environment would be more in favor of in-person classes than more senior students.

## Methods

This study rests on two anonymous online surveys administered to students at a large public urban college in New York City. The first survey was carried out in the spring semester of 2020 from April 28 to May 6 (forthwith referred to as the Spring 2020 survey). The second survey was carried out in the fall semester of 2020 from December 3 to December 23 (forthwith referred to as the Fall 2020 survey). The surveys were administered to students enrolled in every undergraduate sociology course during either of those two semesters. Altogether, 531 students completed the Spring 2020 survey, and 483 students completed the Fall 2020 survey. The surveys were very similar in their content domain (see Appendix A for a copy of the Fall 2020 survey).

Students were recruited to take part in the surveys by faculty members of the Department of Sociology. Each faculty member sent their students online requests to participate in the surveys. The students were informed that survey participation was voluntary, that the surveys were anonymous, and that the time to complete the surveys ranged from 5 to 10 minutes.

During each semester students were furnished with a link to the corresponding survey. For students taking more than one sociology course in a given semester, they were instructed to take the survey only once. However, students enrolled in sociology courses in *both* spring 2020 *and* fall 2020 semesters were allowed to take both surveys since one of the aims of the study was to capture attitudes toward online learning at *different times*. The surveys were administered via a Google Form and no personal identifying information was collected that could link responses to a specific student.

The response rates for the surveys were calculated by dividing the number of respondents who completed each survey by the total number of course enrollment caps (excluding internships and Independent Studies) for the spring/fall semesters. Enrollment caps were used rather than actual enrollment numbers, which were unavailable. The response rate for the Spring 2020 survey was 19.9 percent and for the Fall 2020 survey the figure was 17.4 percent. These figures underestimate the survey response rates for two reasons. First, as just mentioned, the denominator in each rate consists of the enrollment caps imposed on courses which, in many instances, exceeded the actual number of students enrolled in these courses. Second, students were frequently enrolled in more than one sociology course in a given semester and, if so, would be allowed to complete the survey only once.

Although the sample frame consisted of all students enrolled in sociology courses, the sample is more diverse and representative than this frame might seem to imply. Students were queried about their major in the fall survey and almost half (44.3%) responded that they were majoring in an academic discipline other than sociology with an additional 10.3% reporting that they had not yet declared a major. Thus, the survey results clearly go beyond sociology majors and can be thought of as being applicable to a broader and more diverse student population than would be the case if the survey were confined only to sociology majors.

The surveys, employing both closed-ended and open-ended questions, tapped into student attitudes on four major topics: (1) barriers to online learning, (2) comparing synchronous versus asynchronous course preferences, (3) comparing online versus face-to-face courses, and (4) disposition towards taking online courses in the future. Students were also asked a battery of questions concerning their social-demographic characteristics. The authors selected the four topical areas enumerated above, based on two criteria. First, students enrolled in a section of Introduction to Research Methods (taught by one of the authors) in the latter part of the spring semester were assigned to construct their own original survey instruments about learning online during the beginning of the pandemic. As part of the assignment, these students were instructed to imagine that their surveys would be administered to a random sample of undergraduate students at their college and their survey questions could tap any facet of students' perceptions or experiences regarding distance learning since the arrival of the pandemic. The authors of this article then analyzed the questions in the students' surveys and culled the dominant themes or those that were salient to the students who constructed the surveys. In essence, the survey questions served as a window into the thinking of the students and guided the authors in formulating their own survey questions. Second, the authors undertook a systematic review of the literature to identify repetitive themes that emerged about student attitudes towards online learning.

## Results

### *Overall Profile of Respondents*

Both the Spring 2020 and Fall 2020 surveys yielded very similar demographic profiles of the student respondents. Since the Fall 2020 survey was more detailed, the results presented in this section are confined to this second survey. Of the 472 student respondents, 83.1% (n = 392) identified themselves as female, reflecting the predominantly female composition of the college. While a majority fell into the traditional age category of undergraduate college students of 18–22 (72.3%), a sizable number were in the age bracket of 23–28 (15.4%) or older than 28 (12.3%). Students were almost uniformly distributed among four major racial-ethnic groups: Hispanics, African Americans, and Whites each comprised roughly 20 percent of the sample with Asians comprising approximately 25 percent of the sample. The remainder (14.9%) identified themselves as belonging to another racial-ethnic group. The sample was skewed towards seniors who made up 41.5 percent of the respondents. (This figure represented the only marked departure from the Spring 2020 survey in which seniors made up 34.9 percent of the respondents.) Among the other three class standings, students were distributed as follows: freshmen (14.9%), sophomores (13%), and juniors (36.7%). Significantly, the survey revealed that a considerable number of students were employed in the paid labor market. Roughly one-tenth (9.6%) were employed full-time (40 hours a week or more) and more than a third (34.8%) were employed part-time. The survey also revealed that nearly half of the students (48.2%) responded that they were “taking care of” family members such as children or older parents.

### **Views on Distance Learning**

***Technological and Environmental Impediments to Distance Learning.*** Several items were incorporated in the surveys to measure barriers to distance learning. These included the following: (1) ownership of a computer or other electronic device to use for distance learning, (2) whether students had to share this device, (3) access to high-speed internet connection, (4) reliability of the internet connection, and (5) private space for participating in online classes and completing homework assignments.

In both surveys, the majority of students reported having access to a computer or other device necessary for online learning and having internet connectivity. Yet, a sizable proportion stated that their internet connection was not reliable. In each survey, more than a quarter stated that their internet connection was unreliable leading to frequent slowdowns or disruptions of service. In addition to this technological barrier, many students reported that their home environment was not conducive for online learning. Roughly a third of students in the spring and fall surveys said that they lacked a private space in which to participate in synchronous class sessions or a private space in which to complete homework assignments. Highlighting the difficulties many students experienced by having an inhospitable home environment in which to learn, one female respondent in the spring survey remarked:

Many of us do not have the benefit of a comfortable and private learning environment from which we can comfortably take exams, do homework, and take tests. I live with 7 other people in a 2 bedroom apartment and share my bedroom with my sister and mom. As my sister is also in college doing online learning through Zoom, it is quite difficult to concentrate ...

Another student in the spring survey pointed to the inequalities that remote learning can lay bare: ... our socio-economic backgrounds and situations have been forced into our learning environment. [In] physical classroom sessions, those barriers disappear as we are all able

to learn in the same classroom and benefit from the same available resources ... [With distance learning] some of us don't have our own rooms, WiFi, personal laptops, etc. The sentiments expressed above can help to explain why a large portion of students are ambivalent about leaving their cameras on during live online sessions. Although faculty are generally in favor of being able to view their students when teaching remotely because of the visual feedback they receive (Castelli & Sarvary, 2021; Terada, 2021), many students are reluctant to be visually exposed. In the fall survey, almost half of the students (46%) reported that they were either "somewhat unwilling" or "very unwilling" to leave their cameras on. Noteworthy is that this percentage jumps among those students who lack a personal space to study at home (62.1%). One student in the spring survey explained why she was resistant to leaving her camera on this way:

During live video conferencing classes, I do prefer to have the camera off. I prefer this only because I do have to share my room and so it becomes disruptive to have my camera on, and then for someone to walk in. I would be interrupted because my siblings do come and go.

These results support Hypothesis I that students from lower income households face greater obstacles to distance learning. In general, they are handicapped by having less reliable internet access and home environments that are not as conducive to online learning.

***Asynchronous versus Synchronous Course Preference.*** Students were asked in general whether they preferred synchronous or asynchronous courses and the underlying reasons for their preference. A larger segment of the students said they preferred asynchronous courses (i.e., no pre-specified time to access lectures and course materials) to synchronous courses (i.e., specific time to attend "live" lectures and class meetings) as a method of instruction. Overall, two-fifths of the students (40.4%) preferred asynchronous, slightly more than a third (34.8%) preferred synchronous, and the remainder (24.8%) did not indicate a preference.

One reason students prefer an asynchronous approach is that they can learn the material at times that are convenient for them. This is particularly the case so that they can schedule learning to avoid intrusions in home. As one student put it:

It is more convenient. My brother is [in] high school and often, we are taking are classes at the same time in the same room due to the timing conflicts and little space. It is just more convenient if I have classes that do not require we meet at specific times, so I can choose to watch the lectures after my brother's classes so we are both not distracted.

Not surprisingly, students with unreliable internet service favored asynchronous courses. Those having internet connectivity problems preferred this approach by a margin of twenty-five percent. One student commented as follows:

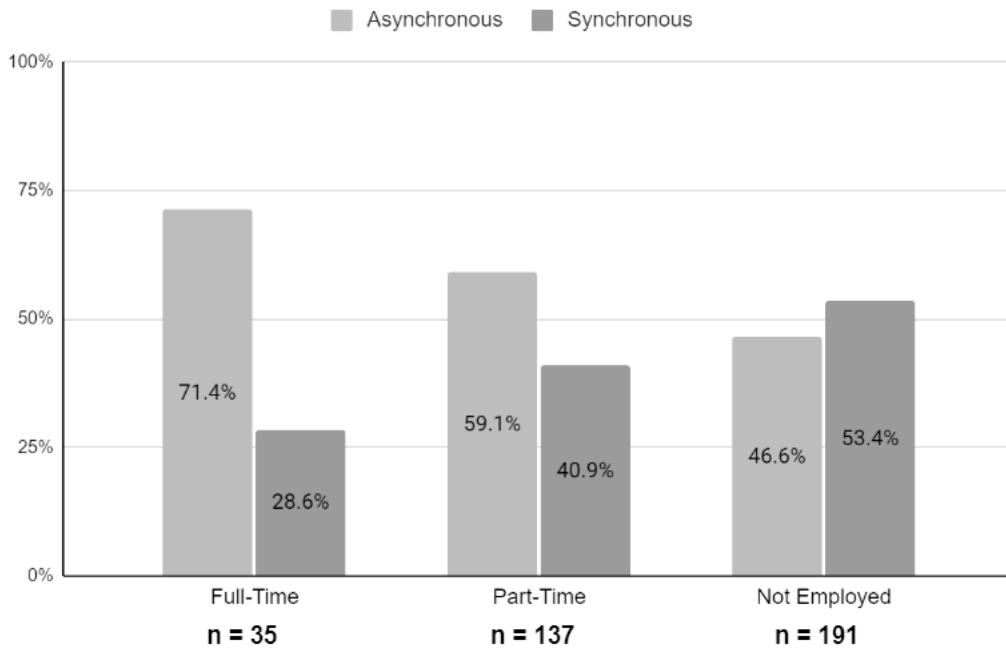
...When I have the time and space to review a course and do the associated assignments on my own time I feel as though I become far better equipped with my learning and I can work around my internet connection.

In addition, employment status and self-reported stress levels correlate with a preferred mode of online instruction. Confirming Hypothesis 2, students in the paid labor force display a preference for the asynchronous mode of instruction. Figure 1 shows that among students working forty hours or more a week, almost three-quarters of participants stated a preference for this approach versus the synchronous approach (71.4% versus 28.6%). Among students working

part-time, the margin favoring the asynchronous approach was also sizable (59.1% versus 40.9%). Only among those not employed did the preference for the asynchronous format dip below that of the synchronous format and by a relatively narrow margin (46.6% vs. 53.4%). The cross-tabulation between employment status and mode of online instruction is statistically significant  $\chi^2(2, n = 363) = 9.922, p = .007$ .

**Figure 1**

*Preference for Asynchronous/Synchronous Instruction by Employment Status*



Students’ self-reported stress level was another important characteristic that differentiated attitudes between these two approaches. Students were asked to rate their “overall level of stress” on a scale ranging from 1 (“very low stress”) to 5 (“very high stress”). More than a third (36.7%) assigned to themselves the value of 5 to describe their overall level of stress. Yet among students who stated a preference for asynchronous learning, this figure rises to 62.1 percent.

While, in general, a greater number of students preferred an asynchronous format (n = 195, 40.4%), a third of the students expressed preference for a synchronous approach (n = 168, 34.8%). A recurring theme in the qualitative data was that the synchronous approach more closely approximated the in-person learning experience. One student in the fall survey remarked:

I prefer a synchronous approach because it makes me feel like I'm getting my money's worth. In most asynchronous classes professors just post readings for us and we write a response or paper about them. That makes me feel like I'm just paying for someone to tell me what to read. Majority of students just end up skimming the readings to find an answer to the question and don't actually learn anything. At least in a synchronous class we can see and hear the professor and ask any questions about the material during class as opposed to asking through e-mail and waiting days for a response.

This same sentiment was echoed by another student in the fall survey who wrote:

I find it so important to be able to interact with professors in an engaging learning environment. That face-to-face contact is crucial, especially now when we're all isolated. I don't find watching a simple video to be productive at all as I feel it hinders analytical and

critical thinking skills that would be enhanced in synchronous learning with that connection between teacher/student, similar to the in-person learning.

Regardless of the approach students endorsed more, they were uniformly in favor of having their instructors record their lectures. Among students who preferred the synchronous approach, more than four-fifths (86.3%) wanted their instructors to record their lectures and a similar proportion (81%) of students who preferred the asynchronous approach wanted their professors to do so. The importance of having professors record their lectures was a theme that echoed throughout the responses to the open-ended questions about both teaching approaches. One student stated:

I prefer rewatching lectures on my own so I can go back and listen to things my Professor said and understand them better. Some of my professors do not record the synchronous lectures and it can be difficult for me to get everything they said perfectly into my notes.

And another student commented:

For the classes that do not host class sessions and just operate through written “blog posts” and submitting assignments by following along on the syllabus, learning is substantially hindered.

Further attesting to the importance of these videos was the number of students who accessed the recordings when they were provided. Fully 84.7% reported reviewing the video lectures. Even students enrolled in synchronous courses noted that by being able to access a recording they could make up for a class that they had missed.

**Online Learning versus In-person Learning Preference.** To gauge student attitudes towards their preferences for online learning versus in-person learning, students in the fall survey were presented with a list of nine items covering different facets of the classroom experience. These items were culled from a review of the literature that identified them as being salient criteria upon which students evaluate the classroom experience. The nine items consisted of the following: (1) ability to concentrate during class sessions, (2) amount of knowledge gained, (3) quality of instruction, (4) motivation to learn, (5) participation in class discussions/discussion forums, (6) interaction with professors, (7) collaboration with other students, (8) development of friendship ties with other students, and (9) overall level of enjoyment of the class. For each item, students were asked to indicate whether online classes were “better than,” “the same as,” or “worse than” in-person classes. A Cronbach alpha statistic was calculated on these nine items and yielded a value of 0.869, indicating a high degree of internal reliability. Table 1 displays the results of this analysis.

The data in the table show that for each of the nine items, the percentage of students who indicated online classes were “worse than” in-person classes surpassed the percentage of students who indicated online classes were “better than” in-person classes. The disparities were most noticeable with respect to the ability to concentrate in class sessions, feeling motivated to learn, and developing friendship ties with classmates. The data in the table lends strong support to Hypothesis 3.

**Table 1**

*Views on Taking Online Classes vs. In-person Classes: Fall, 2020 Survey*

Attribute	Online classes <b>better</b> (%)	Online classes <b>the same</b> (%)	Online classes <b>worse</b> (%)
1. Ability to concentrate during class sessions	10.5	22.2	67.3
2. Amount of knowledge that I am gaining	9.7	41.5	48.8
3. Quality of instruction	10.4	47.6	42
4. Feeling motivated to learn	6.6	29	64.5
5. Participating in class discussions (either in live sessions or online discussion boards)	23	32.5	44.5
6. Interacting with my professors	14.2	40.5	45.3
7. Working with other students in my classes on course assignments	14.2	29.2	56.7
8. Developing friendship ties with other students in my classes	9.5	17.5	73.0
9. Overall level of enjoyment of my classes	14.3	37.6	48.1

*Note.* Valid responses varied between 449 and 473 depending upon the specific question.

Though students, in general, were more positively disposed towards face-to-face classes than online classes, there were sizable numbers who rated the two approaches as being the same along several different facets of the classroom experience. A large share of students, for example, stated that the amount of knowledge gained, the quality of instruction, and interactions with faculty were the same, whatever the particular teaching methodology.

A principal components analysis was conducted on these nine items to reduce these items to a smaller number of dimensions or latent factors. This analysis produced two factors with eigenvalues greater than 1 (see Table 2).

**Table 2**

*Results of Principal Components Factor Analysis Comparing Views on Taking Online Classes versus In-person Classes, Fall 2020 Survey*

<b>Rotated Component Matrix</b>	Component	
	1	2
1. Amount of knowledge that I am gaining	0.814	0.109
2. Ability to concentrate during class sessions	0.777	0.146
3. Overall level of enjoyment of my classes	0.766	0.339
4. Feeling motivated to learn	0.755	0.233
5. Quality of instruction	0.724	0.077
6. Participating in class discussions (either in live sessions or online discussion boards)	0.571	0.363
7. Interacting with my professors	0.539	0.466
8. Developing friendship ties with other students in my classes	0.137	0.863
9. Working with other students in my classes on course assignments	0.177	0.838

*Note.* Rotation Method: Varimax with Kaiser Normalization

We labeled Component 1, which accounted for 40% of the variance explained, “knowledge acquisition and class enjoyment.” The variables that loaded highest on this factor were: (1) amount of knowledge gained, (2) ability to concentrate, (3) overall level of enjoyment, (4) motivation to learn, and (5) quality of instruction. We labeled Component 2, which accounted for an additional 22 percent of the variance, “student collaboration and friendship ties.” Two variables loaded high on this second factor: (1) developing friendship ties with other students and (2) working with other students on course assignments.

We next divided each of these factors into three equal-sized groups based on their factor scores—the lowest third, the middle third, and the highest third. The highest tercile comprised students who were more positively oriented towards in-person learning on each factor. Conversely, the lowest tercile consisted of students who were more positively oriented towards online learning on each factor. Finally, we cross-tabulated this three-group classification scheme on both factors with a number of demographic variables. On the “knowledge acquisition and class enjoyment” factor, students who harbored more positive attitudes towards in-person classes tended to be younger, freshmen or sophomores, those enrolled in more than four courses, those experiencing higher stress levels, students without a private space to study at home, and students with unreliable internet. On the “student collaboration and friendship ties” factor, freshmen and sophomore students were also disproportionately found among the highest third category. These results buttress Hypothesis 1 and Hypothesis 4.

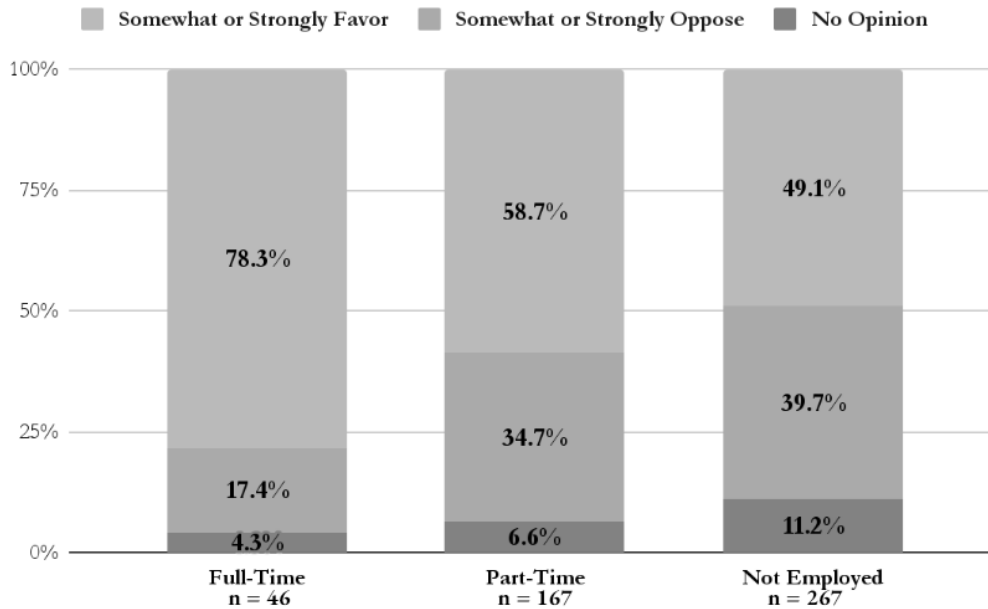
**Attitudes towards Online Learning: Now and in the Future.** While many students compared online learning unfavorably with in-person learning, on the whole, they registered a higher degree of satisfaction than dissatisfaction with their online courses. In the fall survey, over half (55.3%) said they were either “very satisfied” or “somewhat satisfied” with remote learning at the college. An additional 27 percent responded that they were “neutral” and the remainder (19.7%) reported that they were either “somewhat dissatisfied” or “very dissatisfied” with online courses. Among the reasons articulated by students for liking online courses was the flexibility remote learning offered. As one student commented, “I like that students work at their own pace and not have to worry about getting to class on time.” Another reason given by students for liking online courses was that they provided a comfortable environment for shy students. Typifying this attitude, another student remarked, “As a student who is usually anxious about participating in person, I feel very comfortable speaking through audio and messaging during class.”

Students in the fall survey registered similar sentiments about taking more online courses in the future. A majority (55.3%) were favorably inclined towards learning virtually in the future. One-fifth (20.7%) indicated that they were “somewhat opposed” and 14.9 percent indicated that they were “strongly opposed.” Slightly less than a tenth (9.1%) offered “no opinion.”

Just as employment status was closely linked to attitudes towards asynchronous versus synchronous teaching approaches, employment status is strongly related to attitudes towards taking more online classes (Figure 2). The cross-tabulation between employment status and taking more online classes in the future is statistically significant  $\chi^2(4, n = 480) = 15.842, p = .003$ .



Figure 2  
*Taking More Online Classes in the Future by Employment Status*



As students’ participation in the workforce increases, there is a monotonic increase in those who favor taking more online courses in the future. Among students who are not employed, about one-half stated they would be favorably disposed towards taking more online courses. This figure rises to 58.7 percent among those who work part-time and jumps even further to 78.3 percent among those who work full-time. These data provide strong support for Hypothesis 2 that students with greater work responsibilities would favor online learning more so than students not as burdened with work responsibilities.

Another factor associated with attitudes towards distance learning is age. Students who were 29 and older were more disposed to taking additional online courses in the future than their younger counterparts (70.4% versus 59.4%). The more positive orientation towards distance learning among those who are employed or older is consistent with previous research findings (Bray et al., 2007; Harris & Martin, 2012; Stack, 2015).

Two additional factors that were related to attitudes towards distance learning were class standing and degree to which students were worried about paying tuition. As might be expected, seniors and students who were either “very worried” or “somewhat worried” about paying tuition were more supportive of taking online courses in the future than their counterparts. The more favorable attitudes towards distance learning by seniors and those worried about tuition could be explained, in part, by their age and employment status.

### Limitations

Several limitations of this study should be pointed out. First, the students who completed the fall and spring surveys upon which our analysis rests were not randomly selected. The students voluntarily completed the surveys and thus their opinions may diverge from those students who chose not to participate in the surveys. As we have noted, though, we believe that this limitation may not be a serious one for the following reasons: (1) the surveys collected no personally identifiable information, (2) students were repeatedly encouraged to participate in the surveys by their professors, and (3) the surveys generated response rates close to 20 percent that

probably underestimate the actual completion rates. We believe these factors served to mitigate any bias which may have intruded in the sample due to self-selection. A second limitation of the study was that the sample of participants was confined to students who were enrolled in courses offered in the sociology department and thus sociology students were disproportionately represented in the sample. We queried students about their majors in the spring survey and sociology majors made up approximately the same portion as other majors (44%) with the remaining 10% percent undeclared. Therefore, while sociology majors were overrepresented in the sample, a sizable share of sampled members came from other disciplines as well. A third limitation pertains to the type of online instruction students were exposed to in the spring of 2020. As Hodges et al. (2020) noted, “Well-planned learning experiences are meaningfully different from courses offered online in response to a crisis or disaster” or what they termed, “Emergency Remote Teaching (ERT).” The type of online instruction offered in both the spring and fall semesters of 2020 due to the COVID-19 pandemic was clearly an archetypal example of ERT. Almost universally, faculty were not prepared to teach online courses and students encountered multiple challenges transitioning to remote learning. In this new instructional environment, students’ attitudes towards remote learning understandably may have been negatively affected.

It is certainly reasonable to argue that had the students in this study been enrolled in established online courses taught by professors both proficient in online teaching technology and possessing long-term experience with this medium, the attitudes of the students would have been different. For this reason, we need to exercise caution in generalizing the findings of this study to online courses that would be taught under a different set of circumstances than a pandemic or other crisis situation. With this caveat in mind, though, we believe there are a number of findings in this study which would be applicable to established online courses taught under a “normal” set of circumstances. We have documented in this study that students from lower-income households are more positively disposed towards in-person classes than their wealthier counterparts due to internet connectivity problems and lack of personal space. Similarly, freshman students and other new entrants to the college environment are more favorably disposed toward in-person classes. Secondly, this study has also demonstrated that students in the paid labor force are more favorable to online classes and particularly asynchronous courses. Finally, this study has provided ample data that students, regardless of whether they are enrolled in synchronous or asynchronous courses, want professors to provide recordings of their lectures. These findings are important to consider when designing online courses that are being taught under extraordinary or ordinary circumstances.

## **Discussion**

Several significant findings have emerged from this study. First, as a backdrop, it is important to keep in mind the socio-demographic characteristics of the survey respondents. They were predominantly female, racially-ethnically diverse (more than half identified themselves as African American or Hispanic), and many were older than the traditional college-aged students (27.7 percent over 22 years of age). Noteworthy is that more than two-fifths (44.4%) were employed in the paid labor market and a similarly large portion (48.2%) were “taking care” of other family members. It is not surprising, therefore, that a large number reported experiencing high levels of stress, having to balance their academic workload with family and work obligations. Without doubt the coronavirus exacerbated their stress level, but even without this added source of anxiety, many were burdened with non-academic responsibilities.

As noted previously, anecdotal evidence has reported that undergraduate students from lower-income households are more likely to experience problems stemming from unreliable internet service (Casey, 2020; Katz, Jordan, & Ognyanova, 2021). This study provides systematic data concerning the magnitude of this problem among college students, many of whom are from lower-income households. More than a quarter of the respondents in each of the surveys carried out in this study reported that they lacked reliable internet connectivity.

A second factor that may impede online instruction is a home environment not conducive for learning. Students without a dedicated place to study or to participate in class discussions suffer an academic disadvantage. This study found that approximately a third of the students did not have a private place to complete homework assignments or participate in classroom discussions. In open-ended remarks students called attention to the economic class inequalities which are exposed when learning shifts from the campus classroom to the home. In campus classrooms differences in the economic background of students may be obscured whereas these differences are unmasked or even magnified in the home. This inequality helps to explain why students from lower-income families are often reluctant to leave their cameras on during live online class sessions. These sentiments, although not providing a direct confirmation, tend to support Hypothesis 1 that students from lower income households would favor in-person more than online classes.

In line with other research, this study found that more students prefer asynchronous to synchronous courses (Beyth-Marom, Saporta, & Caspi, 2005; Lew & Nordquist, 2016; Marmon, Gordesky, & Vanscoder, 2013; Simonds & Brock, 2014). Students who favor the asynchronous method of instruction are more likely to be employed either full-time or part-time because of the inherent flexibility in scheduling class time offered by this approach. Other categories of students who favored the asynchronous teaching method were those with unreliable Internet and those who reported experiencing high levels of stress. In short, an asynchronous approach was favored largely for the sake of convenience to accommodate students' busy schedules and responsibilities and to alleviate problems associated with lack of private space or resources.

It's important to note that a common refrain amongst many students was that they do not want faculty who use an asynchronous teaching technique to just post readings or videos and have students respond with written papers or even discussion posts. Many students reported feeling that such methods made them feel as if they were being told to learn the materials on their own. Instead, they want instructors to adopt methods that include greater feedback so that students can ensure that they are interpreting and comprehending material correctly. Ideally, students preferred that faculty would be more available to have discussions and answer questions. If faculty were not accessible, students noted the importance of having recorded lectures available to them. Even students who participated in synchronous classes remarked that it was often difficult to take notes on all important information during online meetings. Thus, recorded lectures were invaluable, allowing students to easily access and review important information and course content.

In addition to surveying student preferences concerning asynchronous versus synchronous teaching modalities, this study examined student attitudes comparing online learning to face-to-face learning. These attitudes were measured on a broad array of different facets of the classroom experience encompassing the acquisition of knowledge, the quality of instruction, the motivation to learn, participation in class discussions, student-teacher interactions, the development of ties among fellow students, and the overall level of enjoyment

of the course. A higher percentage of students rated traditional face-to-face learning as being superior to remote learning on each of the different attributes.

Of note is that a similar percentage of students rated in-person and online classes as being comparable in terms of the acquisition of knowledge. Evaluations of the two modes of delivery, however, are starkly different when based on other dimensions of the learning experience such as the motivation to learn or developing ties with other students. Regarding these “fuzzier” dimensions of the learning experience, students evaluate face-to-face instruction far more positively than online instruction. It appears that what differentiates these two teaching methods the most during moments of crisis such as the pandemic is that in-person instruction was more likely to motivate students and imbue them with a sense of belonging than online instruction.

As was the case comparing asynchronous to synchronous instructional methods, distinctive profiles emerge of students who prefer in-person classes versus students who prefer online classes. Students who are more attracted to in-person classes tend to be traditional college aged (18–22) and freshmen or sophomores. Students more disposed to in-person classes are also those with more onerous course loads (i.e., taking 5 courses or more), and those who report high stress levels. On the other hand, students who find online courses more appealing tend to be employed part-time or full-time. Seniors, older students, and those who are more worried about paying tuition also find online courses comparatively attractive.

### **Teaching in the Post-Pandemic Era: A New Paradigm**

A dominant trend today is the blurring of traditional boundaries separating different spheres of activity or the boundaries separating different social identities. The educational arena is not exempt from this overarching trend. Up to now, many colleges and universities in the United States have offered only face-to-face instruction. As a result of the coronavirus, these institutions of higher learning have transitioned on a temporary basis to online classes. Yet the findings produced in this study support the conclusion that colleges and universities should not revert to the status quo ante. A large segment of the students interviewed in this study did not view learning in a traditional classroom setting as being pedagogically superior to distance learning, at least in terms of knowledge acquisition. Also, many students, particularly those gainfully employed in the labor market or adult students, were favorably disposed towards taking more online courses in the future. Institutions of higher education, therefore, should consider offering both traditional and online courses. Moreover, course delivery methods should not be confined to just in-person versus online modes of instruction. Rather, a variety of platforms and techniques could be implemented such as offering hybrid or blended courses combining elements of both in-person and distance learning. Educators could pay more attention to one of weaknesses in online learning articulated by students in this study which is to foster interactions amongst students and motivate them to pursue further study. Providing this multi-modal approach to students at many colleges and universities would recognize the diverse needs of an increasingly heterogeneous student population and go a long way to addressing those needs.

#### **Declarations**

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

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## Appendix A

### Survey Form Used in Fall 2020

1. What device do you primarily use to access your online courses?
  - Computer
  - Tablet
  - Smartphone (skip to #3)
2. Do you share the computer or tablet you use for online learning with others?
  - Yes
  - No

3. Please tell us whether you currently have any of the following:

	Yes	No	No Opinion
Internet access			
Private space where you can participate in live online class sessions			
Private space to work on homework			

4. How would you describe your Internet access?
  - I have reliable Internet access.
  - I have Internet access, but it is not reliable.
  - Not applicable (I do not have Internet access).
5. Before the Fall semester, did you attend any in-person classes at [the college] or at some other college or university?
  - I attended in-person classes at [the college] before the Fall semester.
  - I attended in-person classes at some other college or university before this Fall semester.
  - I did not attend any in-person classes at [the college] or at some other college or university before this Fall semester.
6. How many online classes are you taking this semester?
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6+
7. In the current semester, how many of your courses use the following teaching approaches?

	All	More than half	Half or fewer	None
Internet access				
Private space where you can participate in live online class sessions				
Private space to work on homework				

8. In general, which teaching approach do you prefer?
- Synchronous (live online course in which you must be present at the time the class is scheduled to meet) *Skip to question 9*
  - Asynchronous (online course which do not require you to login at a specified time) *Skip to questions 10*
  - I do not have a preference *Skip to question 11*
9. What would you say is the main reason that you say you generally prefer a synchronous approach?
10. What would you say is the main reason that you say you generally prefer an asynchronous approach?
11. In general, how often do you attend the live online sessions of your courses?
- Always
  - Almost always
  - Sometimes
  - Rarely
  - Never *Skip to question 16*
  - Not applicable (I had no live online class sessions) *Skip to question 16*
12. What web conferencing tool(s) are your professor(s) using now for teaching live online class sessions: (check all that apply)
- Blackboard Collaborate
  - Zoom
  - Other \_\_\_\_\_
13. Does your device have a camera for your live online classes?
- Yes
  - No *Skip to question 16*
  - I am not sure *Skip to question 16*
14. How often do you have your video camera on during live online class sessions?
- Always
  - Sometimes
  - Never
15. How willing are you to have your camera on during live online class sessions?
- Very willing
  - Somewhat willing
  - Somewhat unwilling
  - Very unwilling
16. How many of your professors who are teaching asynchronously (not live sessions) provide recordings of their lectures?
- All of them
  - More than half
  - Half or fewer
  - None of them *Skip to question 20*
  - I don't know
17. How many of your professors who are teaching synchronously (live sessions) record their live online sessions?
- All of them
  - More than half
  - Half or fewer
  - None of them *Skip to question 20*
  - I don't know

18. Do you favor or oppose having instructors record live online sessions?

- Favor having instructors record live online sessions.
- Oppose having instructors record live online sessions.
- No opinion

19.

	Yes	No	Not Applicable (instructor did not supply a recording)
I have accessed one or more recordings of a synchronous (live) session.			
I have accessed one or more recordings of an asynchronous lecture (not live session).			

20. In general, compared to in-person classes, do you feel that communication with your professors has

- Increased
- Stayed the same
- Decreased
- No opinion

21. In general, compared to in-person classes, do you feel that the amount of homework assignments has

- Increased
- Stayed the same
- Decreased
- No opinion

22. In general, compared to in-person classes, would you say that your class sizes have gotten bigger, smaller, or stayed about the same?

- Class sizes have gotten bigger
- Class sizes have gotten smaller
- Class sizes have stayed about the same

23. Below is a list of items. For each item, please indicate whether you think your experience taking online classes is better, the same, or worse compared to taking traditional, in-person classes

	Online classes BETTER than in-person classes	Online classes the SAME as in-person classes	Online classes WORSE than in-person classes	No Opinion	Not Applicable
Ability to concentrate during class sessions					
Amount of knowledge that I am gaining					
Quality of instruction					
Feeling motivated to learn					

Student Attitudes Towards Distance Learning

Participating in class discussions (either in live sessions or Online discussion boards)					
Interacting with my professor(s)					
Working with other students in my classes on course assignment					
Developing friendship ties with other students in my classes					
Overall level of enjoyment of my classes					

24. Compared to when [the college] first moved to online learning (March 2020), in general, how would you describe the change in your attitudes towards online classes?
- I did not take any online classes before this current semester at [the college] or other college
  - Like online classes more
  - Like online classes less
  - My attitudes towards online classes have stayed the same since [the college] transitioned to online classes
25. In online courses, how common do you think cheating on exams is among students at colleges and universities in the United States?
- Very common
  - Common
  - Not that common
  - No opinion
26. When in-person classes resume, to what extent would you favor or oppose taking more of your courses online?
- Strongly favor
  - Somewhat favor
  - Somewhat oppose
  - Strongly oppose
  - No opinion
27. When in-person classes resume, to what extent would you favor or oppose taking more of your courses online?
28. Please tell us any particular things that you dislike about online learning.
29. Please tell us any suggestions that might help improve your online learning experience.
30. Overall, how satisfied are you with the online courses you are taking at the college?
- Very satisfied
  - Somewhat satisfied
  - Neutral
  - Somewhat dissatisfied
  - Very dissatisfied
31. Are you majoring in sociology, majoring in a discipline other than sociology, or have you not yet declared a major?
- I am a sociology major (including if you also have another major)
  - I am majoring in some other discipline.
  - I have not yet declared a major.

Student Attitudes Towards Distance Learning

32. Are you taking any Sociology courses this semester?

- Yes
- No
- Not sure

33. What is your student status?

- Freshman
- Sophomore
- Junior
- Senior
- Non-degree seeking
- Not sure
- Other \_\_\_\_\_

34. Overall, how worried are you about not being able to pay for tuition and other school expenses?

- Very worried
- Somewhat worried
- Not that worried
- Not at all worried
- No opinion

35. Looking to the future, how likely are you to

	Very likely	Some-what likely	Some-what unlikely	Very unlikely	No opinion
take off the next spring semester from college					
drop out of college altogether					
transfer from [the college] to another college					

36. On a scale of 1-5 (where 1 means very low and 5 means very high), how would you rate your overall stress level?

	1	2	3	4	5	
Very low						Very high

37. Please indicate your employment status

- Employed part-time (less than 40hrs/week)
- Employed full-time (40 hrs. our more/week)
- Not employed in the paid labor force

38. Please indicate if you are responsible for helping to take care of any of the following family members:

	Yes	No
Children under 18		
Children over 18		
Parents		
Other relatives		

39. Which of the following best describes your race/ethnicity? Please choose only one of the following:

- African/African American
- Afro-Caribbean or Afro-Latinx
- Central or South American Latinx
- North American or Caribbean Latinx
- Native American/Alaskan Native
- Middle Eastern
- Indian/other nation in Indian subcontinent
- Pacific Islander
- East Asian (e.g. Chinese, Japanese, Korean)
- White
- Two or more races/ethnicities

40. With what gender do you identify? Please choose only one of the following

- Male
- Female
- Non-binary
- Other \_\_\_\_\_

41. What is your age?

- 18–22
- 23–28
- 29–34
- 35–44
- 45–64
- 65+

42. What is your 5-digit Zip code?

43. Please feel free in the space below to add anything you would like about the effects of the coronavirus outbreak on you as a student.

# Keep Learning: Student Engagement in an Online Environment

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## **Abstract**

Student engagement is a key factor in promoting learning and academic achievement. This study explores the factors underlying student engagement and the best practices advocated by students and faculty to engage students. Results revealed that student motivation to learn and self-efficacy are positively associated with student engagement. In addition, self-efficacy partially mediated the relationship between motivation to learn and student engagement. Finally, both faculty and students suggested diverse and inclusive techniques to engage students. Online education may become our new reality, and adjustment to this new world requires shifting to a new pedagogical paradigm.

*Keywords:* student engagement, motivation to learn, self-efficacy, online learning, and online education

Bedi, A. (2023). Keep learning: Student engagement in an on online environment. *Online Learning*, 27(2), 119-136.

Beginning in 2020, the coronavirus (COVID-19) pandemic disrupted the personal and professional lives of many, including students and faculty members. Around the globe, colleges and universities were forced to close their physical campuses and offer remote instruction to their students. Although remote/online instruction can be as effective as in-person learning (Allen et al., 2004), there are questions surrounding student engagement and motivation (Chiu, 2021; Siemens et al., 2013). In addition, scholars have observed that instructors with limited online teaching experience are less likely to deliver an effective online learning environment, which further compromises student motivation and engagement (Abid et al., 2021; Bao, 2020). Indeed, Chen et al. (2020) observed an overall decrease in online student engagement during the COVID-19 pandemic. Therefore, to enhance the online learning experience, we need to understand the factors that help promote student engagement and strategies that enhance online learning experience for students as well as their instructors.

Student engagement is a key element of effective learning and involves connecting students with the course, with their peers in the course, and with the instructor (Martin & Bolliger, 2018). Indeed, scholars have found that online learners are more active and engaged in their courses when they interact with the course content, their peers, and their instructors (Lear et al., 2010). Moreover, when students are engaged in their classes, they are less likely to feel isolated and more likely to maintain their desire to learn and feel satisfied with their academic performance (Banna et al., 2015; Fredricks et al., 2004). One factor that helps promote student engagement is student's motivation to learn (Hartnett, 2016; Knowles et al., 2011). Although motivation to learn is crucial to foster student engagement in an online environment, a more nuanced and integrative account of how motivation to learn is associated with student engagement is necessary to inform the effective implementation of best practices necessary for student engagement.

This study makes three contributions to the existing literature on online student engagement (referred to as "student engagement" from this point forward). First, it uses a comprehensive measure of online student engagement and examines the relationship between motivation to learn in an online environment (referred to as "motivation to learn" from this point forward) and student engagement. Indeed, researchers have conceptualized student engagement as an outcome of motivational processes that enhance persistence in learning (Deci & Ryan, 2008; Reeve, 2013). Second, it investigates whether self-efficacy in online courses (referred to as "self-efficacy" from this point forward) mediates the relationship between motivation to learn and student engagement. Self-efficacy refers to an individual's belief in his or her ability to accomplish a certain task (Bandura, 1986, 1991). Individuals who are motivated to learn are more likely to demonstrate persistence in their tasks and thus, exhibit higher levels of self-efficacy associated with those tasks. Scholars have argued that an individual's self-efficacy beliefs influence the type of activities they perform, their effort levels, and perseverance when faced with failures and obstacles, thereby enhancing engagement in the task (Bandura, 1991; Schunk, 1989). Finally, it uses both quantitative and qualitative methodologies to obtain a more holistic understanding of best practices of student engagement in an online learning environment.

## **Theoretical Background and Hypotheses Development**

### **Motivation to Learn and Student Engagement**



According to Brophy (1987), motivation to learn refers to a student's stable disposition to find academic activities as satisfying and worthwhile and, therefore, strive for knowledge and mastery in different learning situations. As a general trait, most individuals who display motivation to learn find learning intrinsically rewarding (Brophy, 1987). However, an individual's motivation to learn could also manifest itself as a duty-bound sense of obligation (Brophy, 1987). Social cognitive theory of human learning suggests that learning is a function of a multitude of factors such as student characteristics, behaviors, and learning environments (Bandura, 2001, 2006). Scholars have argued that individuals with a strong motivation to learn are more likely to exert the necessary effort to learn and engage with the course material than individuals with low motivation to learn (Noe, 1986; Simmering & Posey, 2009). I propose that a student's motivation to learn is positively associated with student engagement because motivated students are more likely to choose goals and activities that help enhance their classroom engagement and academic outcomes. Indeed, scholars have observed that motivated students achieve their academic goals by engaging in a variety of activities such as active class participation, class attendance, asking questions, seeking instructor's advice, and by engaging with their peers such as participating in study groups (Pajares & Schunk, 2001).

### **Self-efficacy, Motivation to Learn, and Student Engagement**

Self-efficacy refers to an individual's perceived ability to perform a task (Bandura, 1986, 1991). According to Bandura (1977, 1991), an individual's perceptions of self-efficacy influence the amount of effort they exert on a given task and how long they persist in the face of adversity. Over the last few decades, scholars have found a variety of beneficial outcomes for individuals high in self-efficacy. For instance, individuals who are high in self-efficacy are more likely to experience positive outcomes such as high levels of positive affect (Zeiss et al., 1999), adaptive coping responses (Bandura, 1982; Coleman & Karraker, 1997), higher job satisfaction and job performance (Achenreiner et al., 2019; Judge and Bono, 2001), better academic performance (Bandura, 1997; Robbins et al., 2004), and lower levels of stress (O'Leary, 1992) and anxiety (Luszczynska et al., 2005). Moreover, high self-efficacy individuals are more motivated to perform a given task because they believe that their current skills are sufficient to achieve their goals (Noe & Wilk, 1993). This research proposes that self-efficacy mediates the relationship between motivation to learn and student engagement such that students who are motivated to learn are more likely to exert effort to perform well in the class and, therefore, perceive higher levels of self-efficacy and engagement. As mentioned previously, students who are motivated to learn are more likely to exert the necessary effort to learn and engage with the course material. Students who persist longer at a given task are more likely to engage with the material and experience higher self-efficacy levels and, therefore, achieve positive academic outcomes (Doménech-Betoret et al., 2017). For instance, Gist and Mitchell (1992) found that self-efficacy has a significant impact on performance on a variety of tasks as well as emotional reactions and persistence on a task. Furthermore, previous scholars have argued that in an online environment students perceive a holistic sense of engagement when they can interact with their instructors as well as their peers and with the course content (known as overall student engagement in this study) (Martin & Bolliger, 2018; Skrypnik et al., 2015).

Accordingly, I proposed the following hypotheses (Figure 1) and tested them via structural modelling:

#### ***Hypotheses***

**Hypothesis 1:** Motivation to learn is positively associated with student engagement.

**Hypothesis 2:** Motivation to learn is positively associated with self-efficacy.

**Hypothesis 3:** Self-efficacy is positively associated with student engagement.

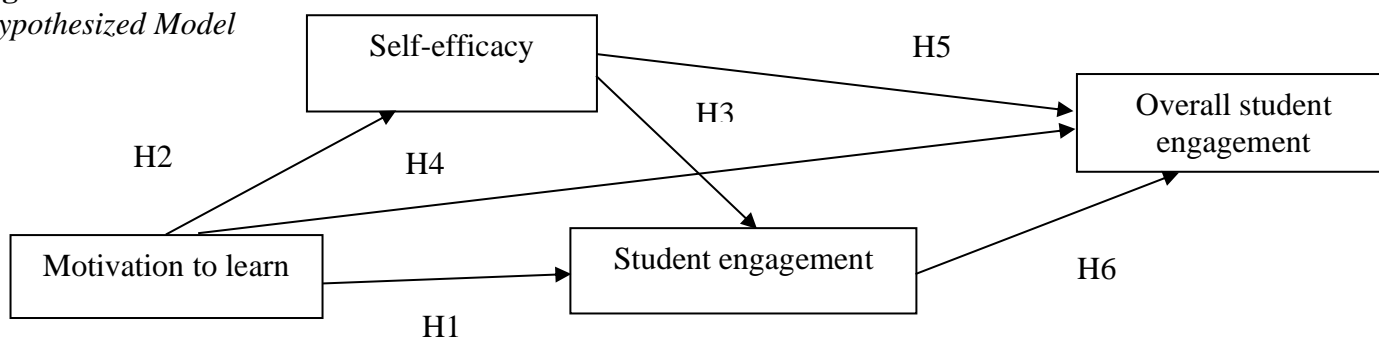
**Hypothesis 4:** Motivation to learn is positively associated with overall student engagement.

**Hypothesis 5:** Self-efficacy is positively associated with overall student engagement.

**Hypothesis 6:** Student engagement is positively associated with overall student engagement.

**Hypothesis 7:** Self-efficacy mediates the positive relationships between motivation to learn and student engagement and motivational to learn and overall student engagement.

**Figure 1.**  
*Hypothesized Model*



**Research question**

Another goal of this study was to provide a deeper understanding of student and faculty opinions on strategies that foster overall student engagement in the online learning environment. Accordingly, the following open-ended research question was presented to both students and faculty participants and tested using Braun and Clarke’s (2006) approach to thematic analysis:

**Research Question 1:** What teaching methods do students and faculty perceive as most effective and engaging in online courses?

**Method**

Data was collected in the middle of the pandemic from January 2021 to February 2021. Eighty-six faculty members (representing 9.07% response rate) and three hundred and forty-two students (indicating 2.41% response rate) at a public, midsized university in the Pacific Northwest participated in the study. Students and faculty members were invited to participate in a Qualtrics survey via a message posted on the university’s daily news bulletin, email messages sent by department managers, and posts on the university’s Reddit page. All participants were told that the research was voluntary and that the study pertained to “understanding the best practices of online learning and education during the COVID-19 pandemic.” Participants were assured of their confidentiality and told that the information they provided would be used solely for research purposes. Upon completion of the survey, student respondents received an Amazon e-gift card of \$5 each and faculty respondents received an Amazon e-gift card of \$10 each.

The student sample was relatively young, with 316 (92.4%) in the age range of 18–25. Most faculty members (67 individuals or 77% of the sample) were between the ages of 36 and 64. Among 86 faculty members, 42 (48.3%) were female and 34 (46.0%) were male. Of the 342 students, 226 (66.1%) were female and 95 (27.8%) were male. Forty-four (50.6%) of the faculty members were satisfied with online teaching and six (6.9%) were very satisfied. On the other hand, 108 (31.6%) of the students were satisfied and 17 (5%) were very satisfied with taking

online classes at their current institution. On average, students had nine months of experience taking online classes. The average GPA of students in the sample was 3.52 (out of 4.00). Finally, students indicated their intention to graduate in a variety of disciplines such as kinesiology, studio arts, geography, history, etc. Where sufficient data was available, there wasn't any significant difference in the level of engagement among students from different majors.

### ***Measures***

#### ***Motivation to learn***

Four items adapted from Noe (1986) were used to measure motivation to learn in online classes. Sample items include "I am trying to learn as much as I can from my online classes" and "I am devoting considerable amount of time to my online classes." Respondents provided ratings to each item using a five-point Likert-type scale ranging from 1 = "Strongly disagree" to 5 = "Strongly agree" with an internal consistency of  $\alpha = 0.82$ .

#### ***Self-efficacy***

Five items from the Motivated Strategies for Learning Questionnaire (MSLQ) from Pintrich and De Groot (1990) were adapted to measure self-efficacy as it relates to performance in online classes. Sample items include "I think that I will get a good grade in my online classes" and "I know that I will be able to learn the material for my online classes." The items were rated on a five-point Likert-type scale ranging from 1 = "Strongly disagree" to 5 = "Strongly agree." The internal consistency coefficient for the scale was  $\alpha = 0.89$ .

#### ***Student engagement***

Nineteen items from Dixson's (2015) measure of student engagement were used. The instrument measures four dimensions of student engagement in an online environment: skills, emotions, participation, and performance. The alpha coefficients of the respective dimensions were 0.77 for skills (e.g. "I make sure to study on a regular basis"), 0.81 for emotions (e.g. 'I find ways to make the course material relevant to my life'), 0.85 for participation (e.g. 'I like to have fun in online chats, discussions or via email with the instructor or other students'), and 0.65 for performance (e.g., 'I like to do well on the tests/quizzes'). The items were rated on a five-point Likert-type scale ranging from 1 = "Not at all characteristic of me" to 5 = "Very characteristic of me." The combined internal consistency coefficient for the scale was  $\alpha = 0.86$ .

#### ***Overall student engagement***

Overall student engagement was measured with twenty-nine items from Martin and Bolliger (2018). This scale includes three dimensions: learner to learner engagement (e.g., "Students interact with peers through student presentations [asynchronously or synchronously]") and learner to instructor engagement (e.g., "The instructor creates short videos to increase instructor presence in the course"), each of which were measured with ten items each. Finally, nine items were used for the learner to content engagement dimension (e.g., "Discussions are structured with guiding questions and/or prompts to deepen their understanding of the content"). Responses were provided on a five-point Likert scale ranging from 1 = "Very unimportant" to 5 = "Very important. Cronbach's alpha values for the three dimensions are 0.79 for learner-to-learner engagement, 0.73 for learner to instructor engagement, and 0.77 for learner to content engagement. The alpha value for the overall measure was  $\alpha = 0.86$ .

### ***Control variables***

Demographic variables such as age, gender (coded as Female = 1 and Male = 2), current GPA, and experience taking online classes were included as control variables. Past researchers have suggested controlling for these variables as they are likely to influence the study results. For instance, Gibson and Slate (2010) found that nontraditional-age first-year students (ages 25 and above) demonstrated higher levels of engagement compared with traditional-age first-year students (ages 24 and below). In another study, Ghusson (2016) found that female students and students with higher GPA demonstrated higher levels of engagement.

### **Data Analysis**

Study hypotheses were tested through structural equation modeling (SEM) using AMOS (Arbuckle, 1997). The fit of the proposed model was assessed using the Chi-square goodness of fit and other fit indices such as comparative fit index (CFI) and root mean squared error of approximation (RMSEA).

In addition, I tested for full collinearity with the variance inflation factor (VIF) scores (Kock, 2015). These scores were less than 3.33 thresholds, indicating absence of collinearity. I also performed Harman's single-factor test (Harman, 1967) where the first factor in the analysis accounted for only 14.5% of the total variance. Thus, common method bias was not likely to be a serious problem for this study (Podsakoff et al., 2003).

## **Results**

### **Results for quantitative data**

Means, standard deviations, coefficient alphas, and zero-order correlations for the study variables are presented in Table 1. With respect to control variables, self-efficacy was positively related to GPA ( $r = 0.19, p < 0.01$ ) student engagement was positively related to age ( $r = 0.11, p < 0.05$ ) and GPA ( $r = 0.14, p < 0.05$ ) and negatively related to gender ( $r = -0.12, p < 0.05$ ). Finally, overall student engagement was negatively associated with gender ( $r = -0.17, p < 0.01$ ).

**Table 1**  
*Means, Standard Deviations, Correlations, and Reliability Estimates for Study Variables*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	
1. Age	1.09	0.36	—										
2. Gender	1.41	0.64	.02	—									
3. Experience OL Classes	10.95	8.89	.22**	-.05	—								
4. GPA	3.52	0.38	.14**	-.02	.07	—							
4. Motivation to learn	4.19	0.82	.09	-.09	.04	.08	<b>.82</b>						
5. Self-efficacy	3.89	0.80	.04	.03	.07	.19**	.30**	<b>.89</b>					
6. Student engagement	3.60	0.55	.11*	-.12*	.09	.14*	.49**	.47**	<b>.86</b>				
7. Overall student engagement	3.75	0.45	-.04	-.17**	-.05	-.09	.24**	.05	.37**	<b>.86</b>			
8. L to L engagement	3.23	0.68	-.01	-.17**	-.01	-.05	.15**	.07	.29**	.84**	<b>.79</b>		
9. L to I engagement	4.19	0.47	-.10	-.17**	-.10	-.10	.21**	-.02	.24**	.72**	.36**	<b>.73</b>	
10. L to C engagement	3.84	0.55	.01	-.06	-.02	-.07	.24**	.05	.35**	.83**	.55**	.49**	<b>.77</b>

*Note.* *N* = 329. Age is coded as 1 for 18-25, 2 = 26-35, 3 = 36-50, 4 = 51 and over 51. Gender is coded as 1 = Male and 2 = Female. Experience OL Classes is the number of months experience taking online classes. Engg. = Engagement  
 \*\* *p* < .01, \**p* < .05

Before testing the hypothesized model (Figure 1), a measurement model was estimated to test for common method variance. Since online student engagement and overall student engagement scales had large number of items, item parceling approach for data analyses was utilized (Little et al., 2002). Based on Dixson’s (2015) theoretical framework, the online student engagement scale was grouped into four parcels: (a) skills, (b) emotion, (c) participation, and (d) performance. The overall student engagement scale was parceled based on the factors derived from exploratory factor analysis as indicators (Floyd & Widamen, 1995).

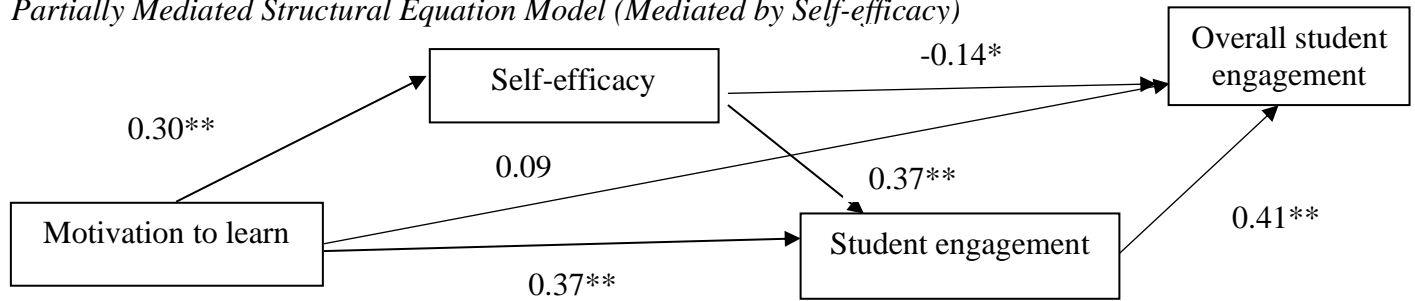
With respect to reliability, the factor loadings ranged from 0.43 to 0.70 for online student engagement, 0.55 to 0.70 for overall student engagement, 0.75 to 0.83 for self-efficacy, and 0.65 to 0.78 for motivation to learn. All indicators with loadings less than 0.7 were analyzed and the results indicated that deletion of these indicators would not increase the respective composite reliability. The assessment of the composite reliability (CR) showed that all constructs (except student engagement with CR = 0.64) had a value greater than 0.7, which indicates sufficient internal consistency reliability. With respect to validity, a reasonable convergent validity was found, as the values of average variance extracted (AVE) exceeded 50% for all the constructs (except student engagement with AVE = 0.31) (Fornell & Larcker, 1981). Discriminant validity was estimated through the heterotrait-monotrait ratio (HTMT) method (Henseler et al., 2015). The majority of the HTMT ratios were less than the threshold of 0.9. Thus, the reliability and

validity of the measures used was satisfactory. Finally, as is typical in any confirmatory factor analysis (CFA) with a large sample size (Kelloway, 1998), the Chi-square associated with the proposed model was significant, ( $\chi^2$  (df= 50) = 191.02,  $p < 0.001$ ). However, the RMSEA of 0.09 and the CFI of 0.86 indicated an acceptable fit to the data.

Individual hypotheses were tested by examining the statistical significance of the path coefficients among the latent variables (Figure 2). Hypothesis 1 was supported. That is, motivation to learn was associated with student engagement ( $\beta = 0.37$ ,  $p < 0.001$ ). Hypothesis 2 was supported, as motivation to learn was positively associated with self-efficacy ( $\beta = 0.30$ ,  $p < 0.001$ ). Hypothesis 3, that predicted a positive relationship between self-efficacy and student engagement, was supported ( $\beta = 0.37$ ,  $p < 0.001$ ). Hypothesis 4 that predicted a positive relationship between motivation to learn and overall student engagement was not supported ( $\beta = 0.09$ ). In addition, Hypothesis 5 predicted a positive relationship between self-efficacy and overall student engagement was not supported ( $\beta = -0.14$ ). Finally, Hypothesis 6 was supported, suggesting that student engagement was positively associated with the overall student engagement ( $\beta = 0.41$ ,  $p < 0.001$ ). Finally, the  $R^2$  for overall student engagement was 19% and therefore the model shows adequate predictive accuracy.

**Figure 2**

*Partially Mediated Structural Equation Model (Mediated by Self-efficacy)*



Note. Values represent standardized regression weights.

\*\*  $p < .001$

\*  $p < .05$

To test the proposed mediation model (Hypothesis 7), the direct paths from motivation to learn to student engagement and motivation to learn to overall student engagement were constrained to zero, to test if the relationship was fully mediated by self-efficacy. This model, Model 1, had poor fit  $\chi^2$  (df = 5) = 76.34,  $p < 0.00$ , RMSEA of 0.21, and CFI of 0.74. Thus, there was no support for full mediation. The proposed full mediation model was then compared with partially mediated and no mediation models. In the partial mediation model (Model 2), the direct paths between motivation to learn to student engagement and motivation to learn to overall student engagement were freely estimated. This model had a good fit with the data according to multiple indices. The chi-square associated with this partial mediation model was  $\chi^2$  (df = 3) = 11.35,  $p = 0.01$ . In addition, the RMSEA of 0.09 and the CFI of 0.97 indicated good fit to the data. Finally, I tested another version of the model with no mediation, where self-efficacy did not mediate the relationships between motivation to learn to online student engagement and motivation to learn to overall student engagement. This model, Model 3, was worse than Models 1 and 2 with  $\chi^2$  (df = 5) = 77.91,  $p < 0.00$ , RMSEA of 0.21 and CFI of 0.74. Overall, Hypothesis 7 was partially supported, as self-efficacy partially mediated the relationship between motivation

to learn and student engagement but did not mediate the relationships between motivation to learn and overall student engagement.

**Results for qualitative data**

In response to the open-ended question, “What teaching methods do students and faculty perceive as most effective in online courses?” both faculty and students suggested diverse and inclusive techniques to engage students and enhance the online educational experience. I compiled all the faculty and student responses and analyzed the respective results for emerging themes. More specifically, I used Braun and Clarke’s (2006) approach to thematic analysis. The data was coded based on the inductive thematic analysis approach. Under the inductive approach, themes are identified independently of existing theoretical frameworks or categories. These themes were effective communication, prompt feedback, organized course structure and delivery, improve inclusivity, and access (Table 2).

**Table 2**

*Best Practices of Online Teaching for Student Engagement: Student and Faculty Recommendations*

<b>Best practices</b>	<b>Student recommendations</b>	<b>Faculty recommendations</b>
Effective communication	“Communicate clearly and frequently through learning management system (LMS) (i.e., canvas, blackboard, etc.) announcements/messaging or email.”	“Communicate with students via the LMS or email, at least 48 hours before the course starts, with clear information about course modality, how to access course materials, and when/where to log in for the first session if synchronous.”
	“Keep lectures under 30 minutes if creating them for students to watch outside of class. If the instructor has a lot that they want to say they should consider creating a series of mini lectures.”	“For asynchronous courses, communicate in a predictable and consistent manner with students (e.g., weekly, or twice-weekly digests, regular opportunities for consultation). Increase communication frequency around quiz/exam and project deadlines.”
Organized course structure and delivery	“Have students use the ‘raise hand’ reaction on Zoom to give other students a chance to speak and to help others know whose turn it is to speak.”	“For asynchronous or flipped synchronous courses (i.e., any course where students watch recorded videos on their own time and then complete activities), keep videos brief where possible: 6–12 minutes for simple expository lecture, up to 20 minutes for intensive problem solving if absolutely necessary.”
	“Create a class set of norms with student input to help foster a sense of class community-especially important for synchronous classes with lots of group discussions.”	“Organize materials and due dates in the LMS in as consistent a manner as possible from week to week.”
		“Use tools to increase student interaction and engagement with audio/video content, e.g., interactive Forms in Microsoft Stream, or insertion of questions via Panopto video.”

“For all courses, engage students in a norm-setting discussion early in the course. For synchronous sessions, norms can be discussed in breakout rooms by having students add their own norms to group-specific template documents which can then be compiled by the instructor after sharing-out. For asynchronous courses, discussion boards can be organized to facilitate this discussion.”

“Use a Day 1 ‘exit slip’ / survey as an opportunity for students to reflect on their goals with the course and to optionally share a bit about themselves and their experiences with remote/online learning. This opportunity helps students know that the instructor is committed to helping them meet their personal goals, not just the instructor’s mandated content delivery.”

Improved inclusivity and access

“Provide students multiple options for completing assignments given the technology that they have, as well as access to other resources.”

“For videoconference-based meetings, discuss the variety of ways for students to contribute, e.g., chat windows, how to virtually raise their hand, etc. It is worth taking the time to walk students through the interface as some may be new to it.”

“Provide students with multiple opportunities to share their feedback throughout the academic session, to gain student insight on how to improve the online course.”

“For videoconference-based meetings, lower barriers to success for under-resourced or marginalized students by explicitly discussing why it’s okay for students in your class to have cameras off and how it is important for everyone to invest the extra effort to listen equally effectively to voices with cameras off as with cameras on.”

“Best practices for accessibility are just as important in teaching online as in person: turn on live captions (and show students how to hide subtitles if they find it distracting); provide alt-text for all digital images used in the course; correct typos in auto-captioning software (this may not be possible from a time management perspective, in which case, lobby your department/program chair for resources, e.g., student staff assistance, with captioning).”

## Discussion

The past two decades have seen a dramatic increase in research on student engagement with important implications for students, instructors, and academic institutions (D’Mello, 2021). Researchers have noted several benefits of student engagement including, delivery of high-quality learning experiences (Kuh, 2009), higher graduation rates (Price & Tovar, 2014), student retention and learning outcomes (Coates, 2005), enhancement of institutional reputation (Kuh et



al., 2006), stronger academic performance (Bono, 2011), and greater connections with peers and the institution (Masika & Jones, 2016). The primary objective of this study was to understand how motivation to learn influences student self-efficacy and engagement. It also explored student and faculty strategies to help enhance student engagement.

The findings have important implications. First, the positive relationship between motivation to learn and student engagement suggests that desire to learn is an important factor in engaging students. In other words, when students are motivated to learn, they are more likely to consider the learning process as one where they want to be involved. This suggests that motivation to learn provides the necessary fuel for various learning-oriented behaviors and psychological processes. However, it is also possible that highly engaged students are more likely to feel motivated to learn, which may further increase their level of engagement. Future research should, therefore, conduct longitudinal studies to examine the causal and non-recursive relationships between motivation to learn and engagement.

Second, the result that motivation to learn was positively associated with self-efficacy is not surprising and suggests that motivation can serve as an important supporting factor in enhancing a student's belief in their capabilities. It is possible that motivation to learn encourages students to work hard by showing them that their efforts are worthwhile and, therefore, increases their levels of self-efficacy. Researchers should explore the mediating role of effort and task significance on self-efficacy.

Third, the positive association between self-efficacy and student engagement suggests that students with high self-efficacy are more likely to feel engaged. This finding is consistent with previous scholars who have argued that students high in self-efficacy are more likely to invest emotionally and cognitively in their work and to participate actively in their course assignments (Azila-Gbetor et al., 2021; Singh & Abdullah, 2020). Taken together, this finding suggests that cultivating students' self-efficacy may serve as an important step to engagement in academic activities and tasks. Researchers should further investigate the specific process by which self-efficacy influences student engagement.

Fourth, this study further extends the literature on student engagement by examining self-efficacy as a mediator in the relationship between motivation to learn and engagement. I found that self-efficacy partially mediated the relationship between motivation to learn and student engagement. Overall, this finding is significant as it suggests that self-efficacy leverages the effect of motivation to learn on engagement. Given that engagement is a demanding process, self-efficacy serves as a valuable resource in channeling motivation to learn into engagement and its desired benefits. Future scholarship should continue to investigate other possible mediators and outcomes of these relationships.

Finally, the qualitative results highlight diverse and inclusive techniques to engage students and to enhance the online educational experience, both for the faculty and for the students. Examples include thoughtful and inclusive course design and structure, content variety, prompt instructor feedback, and communication. This finding agrees with previous research on online learning and indicates that instructional activities that involve interaction between students, between students and the content, and between students and the instructors, are more likely to be appraised as engaging by the students (Laili & Nashir, 2021). Overall, these results suggest that instructors can successfully use online tools and technology to encourage high levels of engagement (Soffer & Nachmias, 2018) and discussion (Chen et al., 2018) as well as promote deeper and richer forms of learning (Manning-Ouellette & Black, 2017).

## Practical Implications

Taken together, the findings raise practical implications and suggest that equipping students with steps to enhance their self-efficacy and motivation to learn is key to better engagement. These results have significant implications for instructors, academic institutions, and stakeholders, who should recognize students' motivation to learn and self-efficacy as vital resources. Instructors and academic institutions can, therefore, benefit from developing and implementing educational policies that help cultivate students' motivation to learn and self-efficacy. Results from the qualitative data suggest that one size doesn't fit all, and instructors and academic institutions should focus on a learner-centric approach to education. This approach calls for instructors to take student engagement into consideration when designing their course structure and content. Moreover, instructors and their institutions can benefit from investing in resources that promote content accessibility and inclusivity to enhance student engagement.

## Limitations

This study is not without its limitations. The first limitation of the study was its cross-sectional design and use of self-report data that raise the issue of common method bias and social desirability responding. I tried to address these issues by running collinearity tests and controlling for several variables that may have an influence on my outcome variable, student engagement. In addition, I used anonymous surveys that may have helped reduce any social desirability bias. Nevertheless, future researchers should consider using other research designs and multi-source data. For instance, in a multi-source study, self-reports of student motivation to learn and self-efficacy could be matched with instructors reports of student engagement. Another limitation of this study was the convenient nature of a university-wide data-collection method, because of which the gender distribution of the final sample (66% female) was not entirely representative of the overall university environment (with 57% female).

Although this distribution is consistent with other research on student engagement (e.g., Stark, 2019), future research should employ other approaches such as stratified sampling approach across all gender identities and groups. A third limitation of this research is that it did not collect information on the type, subject, and level of online courses taken by the students. Prior research on online learning and education suggests that these factors may have an impact on a student's motivation to learn, self-efficacy, and engagement (Glick et al., 2019; Stark, 2019; Zilka et al., 2019). Future research should examine these and other possible individual and contextual level variables. A final limitation of this study is that it examines one linear direction in my model. Specifically, it models motivation to learn as a predictor of self-efficacy and engagement. However, it is possible that engaged students may become more motivated to learn over time. Moreover, it examines self-efficacy as a possible mediating mechanism through which motivation to learn influences engagement. It is possible that neither motivation nor self-efficacy beliefs operate in a single linear path but fluctuate over time or based on the course content and instructional style. Future scholars should examine the engagement process through multiple perspectives and theoretical rationales.

## Conclusion

This study extends the literature on student engagement by providing an overview of the processes by which motivation to learn may influence student engagement. The results indicate that motivation to learn influences student engagement both directly as well as indirectly through enhanced self-efficacy. In addition, it identifies several effective strategies for engaging students

in an online environment. Examples include prompt instructor feedback and communication, diversified means of content delivery, and the provision of a learning environment that fosters inclusivity and participation. The results from this study can be used to enhance the online education experience in the post COVID-19 era.

**Declarations**

The author declares that there is no conflict of interest in this study.

The author received approval from the institutional review board of the Western Washington University, USA for this study.

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# The Everydayness of Instructional Design and the Pursuit of Quality in Online Courses

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## **Abstract**

This article reports research into the everydayness of instructional design (meaning designers' daily routines, run-of-the-mill interactions with colleagues, and other, prosaic forms of social contact), and how everydayness relates to their pursuit of quality in online course design. These issues were investigated through an ethnographic case study, centered on a team of instructional designers at a university in the United States, and using the dimensions of everydayness articulated by Troubé (2021) as an interpretive framework. Designers were observed spending significant amounts of time engaged in repetitive practices of course refinement, meaning mundane, workaday tasks like revising, updating, fine-tuning, or fixing the courses to which they were assigned. Refining practices were interrelated with, but also experienced as distinct from, the specialized processes of instructional design or innovation that the designers also applied, largely because of their adjustable nature and the background of neutrality they provided (or the way they faded out of designers' explicit awareness and attention). Refinement also contributed towards the normative structures of meaning designers shared around their work (both positive and negative). Refining played a meaningful role in designers' pursuit of course quality, both to help them achieve quality, as well as to understand what the ideal of quality meant in specific instances. The article concludes by exploring what implications these findings have for the study and practice of pursuing quality in the context of online course development.

*Keywords:* Instructional design; online course design; higher education; everydayness; qualitative research; ethnography; case study

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How do instructional designers pursue quality in online course design? Typically, prior research has investigated this from the perspective of the specialized processes and course design strategies that designers employ. Zimmerman et al. (2020) represented this body of research when they asserted that, “the impact of faculty practice, intentional online course design, and the relationship of institutionally supported quality processes are vital to explore” (p. 148). However, in their review of the literature related to instructional designers’ roles, Pollard and Kumar (2022) reminded that “instructional designers do more than engaging [*sic*] in systematic processes to design instruction.” By implication, therefore, understanding other practices in which designer engage, along with how those practices connect with their pursuit of quality, are also important issues.

There is value in better understanding the “everydayness” of instructional design, or “the day-to-day affairs of life” (Yanchar & South, 2008, p. 93) that can significantly occupy designers’ time—their daily routines, run-of-the-mill interactions with colleagues, and other, prosaic forms of social contact. Studies of performance in other fields (Arndt, 1992; Wacquant, 2004)—including design (Boudeau, 2013), and teaching (Mælan et al., 2020)—have demonstrated that the ordinary details that make up the day-to-day realities of people’s practical experience are a crucial aspect of how they pursue excellence in a craft. Hyysalo and Hyysalo (2018) expressed this in their study of what they called the “mundane work” of design:

By mundane work . . . we refer to the variety of actions that range from coordinating space for workshops, to seeking participants, to sorting output, to guesstimating what the participants can get done in a given time-frame. Such actions might be seen as low-level design activities or as part of “silent design” by non-designers in organizations, but some actions could just as validly be seen as janitorial work, recruiting, secretarial work, or qualitative data analysis that just happen to be related to design. We draw attention to how these kinds of mundane work permeate . . . design and play an important role in its outcomes. (p 44)

While prior research in the field of instructional design has acknowledged the existence of everyday, routine tasks associated with course design (Chittur, 2018; Schwier & Wilson, 2010), it has not made such everydayness the direct object of study. This paper reports research into the everydayness of instructional design, drawn from an ethnographic study of online course design at a university in the United States and using the dimensions of everydayness articulated by Troubé (2021) as an interpretive framework, to provide insights into the relationship between such routine practices and designers’ pursuit of quality. The specific questions studied were: What kinds of everyday, routine practices do instructional designers engage in during online course design? And, how did those forms of everydayness fit into designers’ pursuit of quality in online courses?

## Literature Review

### Understanding Online Course Quality

Prior literature in the field of online learning has suggested that course quality is a multi-dimensional construct. In part, this is due to the multiple stakeholders involved, “learners, instructors, employers, and society” (Esfijani, 2018, p. 58). Each has different perspectives and concerns that affect what standards of excellence they prioritize. As one example, since students manage their learning differently than faculty manage their teaching, students tend to value techniques like “posting due date checklists” more highly than do faculty (Bolliger & Martin, 2018, p. 580). More broadly, Lenert and Janes (2017) identified a variety of differing standards that scholars have used to measure online course quality. These included students’ satisfaction, how well course designers followed the proper processes of course design, whether courses exemplified certain properties considered to be high quality, and the forms of interaction that instructors employed with their students. As a whole, existing literature indicated that course quality is a somewhat flexible construct, defined in a variety of ways depending on the interests of individual researchers, or the situational concerns of the contexts they studied. Interestingly, despite the seeming logic that course quality should also include some measure of how well students achieved desired learning outcomes, Esfijani (2018) found that this has not been the case in much of the existing research: “The literature showed that researchers and practitioners tend to more readily consider the easily measurable aspects, that is, inputs and resources, rather than the outputs and outcomes” of online courses (p. 64).

Prior literature has also addressed how to design for quality in online courses. A frequent theme has been collaboration, “designing a high-quality online course requires various sources of expertise not usually possessed by one person” (Chao et al., 2010, p. 107; see also Y. Chen & Carliner, 2021; Davey et al., 2019; Halupa, 2019; Zimmerman et al., 2020). Another theme has been whether designers adhere to the guidelines specified in course design rubrics (L.-L. Chen, 2016; Lenert & Janes, 2017; Martin et al., 2021; Martin & Bolliger, 2022). Providing faculty and other staff the proper training has also been identified as important to achieving quality (Regan et al., 2012; Scoppio & Luyt, 2017). Further, some researchers have highlighted the value of iterative design processes in creating quality course designs (Bawa & Watson, 2017; Bowers et al., 2021; Chartier, 2021; Moore, 2016). Iteration typically connotes either returning to a previous phase of a design process, or repeating the same phase, based on one’s monitoring of the results one achieves during a current phase (Adams, 2002; Verstegen et al., 2006). Although the value of iteration for improving quality seems logical, Verstegen et al. (2006) questioned whether this was always the case. In their experimental study of design iterations, they found that while all their subjects iterated (corroborating the conclusion that there is an “inherent nature” of iterating in instructional design, see Stefaniak & Hwang, 2021, p. 3351), “the number of iterations [did] not correlate with the quality of the results” (p. 506). There is reason to temper their assessment, however, given the nature of their experiment that placed student designers in a highly controlled, artificial situation. Empirical research in other settings has concluded iterations are often important for achieving high levels of design quality (Adams, 2002).

### Understanding Everyday Practices and Everydayness

A common assumption underlying much of the prior literature is that formal design processes, along with the related, specialized strategies that instructional designers are trained to employ, are the proper unit of analysis when studying how they pursue the creation of high-quality online courses (however so defined). Chen and Carliner (2021) summarized this in their

systematic review of literature concerning designer-faculty relationships in higher education: “Instructional designers play an essential role in ensuring the quality of the online courses by effectively employing technology, designing pedagogically sound learning materials, and managing the flow of the course-design process” (p. 472). However, research in design studies more broadly provides grounds for questioning this assumption (Campbell et al., 2019; Heinemann et al., 2012; Matthews, 2009; Matthews & Heinemann, 2012; McDonald et al., 2021; Sharrock & Anderson, 1994). As Matthews (2009) concluded, “the very idea that good design work is, or can be, the straightforward outcome of the application of a method was not something ever vindicated by the results of methods-based design [research] programmes” (p. 65). This is not to say that designers’ application of formal processes is unimportant. Rather, this research has recognized that design cannot be reduced to method or strategy alone (Fleming, 1998). Researchers have found that studying design as a rule system that designers apply, or a set of strategies that translates a body of theory into practice, fails to capture the richness of exactly how designers draw “upon a range of social resources, and in a real way make design out of whatever interactions are available to them in a particular moment of a particular circumstance” (McDonald et al., 2021, p. 4). A fuller picture of design practice is provided when one also studies the everyday routines, interactions, and other forms of social contact in which designers engage (Boudeau, 2013; Hyysalo & Hyysalo, 2018).

Similar issues have been observed in other fields. Scholars from fields as diverse as athletics (Arndt, 1992; Wacquant, 2004), teaching (Mælan et al., 2020), psychiatry (Troubé, 2021), ethics (Horton, 2008), and philosophy (Lefebvre & Levich, 1987) have drawn comparable conclusions, namely that to fully understand human practices one must attend to “the (too-easily and too-often overlooked) philosophical and empirical importance of ostensibly banal, *everyday* happenings” of the participants (Horton, 2008, p. 265; emphasis in original). Often, the study of everydayness has taken an informal shape, typically cataloging the quotidian events and activities in which people participate as part of their everyday experience within a domain of practice.

However, Troubé (2021) recently developed a more formal framework of everydayness. By summarizing and codifying prior work in the area into a model of the dimensions of everydayness, her framework is meant to “guide” study of people’s experience “with the everyday,” and provide a rigorous basis to “examine the function” of discrete events and activities to assess how they actually fit into people’s immersion in the everyday (p. 20). These dimensions are:

*Repetition.* Everydayness is a composition of common, frequent, repeating, and regular activities and events.

*Adjustability.* Everyday activities are experienced in a fluid flow in which people move in and out, constantly refining or adapting their actions to fit the shape of the circumstances they encounter.

*Neutrality.* Discrete activities and events of which everydayness is composed rarely draw peoples’ explicit attention, nor do people typically deliberate about which everyday events in which to engage. Instead, everydayness forms a neutral field against which the rest of the events in which people participate stand out. So, in this context *neutral* does not mean people do not have affective responses to everyday practices (see the dimension of normativity), but that such practices themselves are usually not the object of intentional thought.

*Normativity*. People are not indifferent to the everyday. Everydayness fits into the normative structures of shared meaning people experience within a practice, and so contributes towards what they view as desirable and undesirable, better and worse, and so on.

Although Troubé (2021) brought these dimensions together into a formal framework, she did not develop them originally. Prior research supports each dimension as an aspect of what makes up everyday existence, along with the value of studying that everydayness through scholarly means. Of course, the dimension of repetition has a certain self-evidence to it. If the definition of everydayness encompasses “the day-to-day affairs of life,” as Yanchar and South stated (2008, p. 93), then one would expect it to include the recurring events that comprise so much of the day-to-day (Stern, 2000; Suchman et al., 2019). The dimension of adjustability can be found in the work of researchers like Dunne (1997), and Stanley and Williamson (2017). In particular, Stanley and Williamson discussed how the adjustability of the everyday differs from similar constructs such as iteratively cycling through the steps of a process, noting that people’s everyday adjustability is, “faster and more flexible” than process iteration, as well as evidences a greater sensitivity “to the subtleties of novel situations” that allows for more seamless adaptation (p. 719). The dimension of neutrality has been articulated in a number of research traditions, notably in philosophy by scholars such as Dreyfus (2014) and Wrathall and Londen (2019), and empirically by researchers like Garfinkel (1968) and Liberman (2013). Wrathall summarized much of the dimension of normativity by referring to Heidegger’s (1962) well-known example of hammering: “When hammering, we understand and encounter a hammer without having to have any reflective thoughts about it at all. Indeed, we hammer best when we are not deliberately trying to do so” (Wrathall, 2006, p. 35). Finally, the dimension of normativity has also been articulated by scholars such as Dreyfus (2005), and Yanchar and Slife (2017). Summarizing how normativity fits into everyday practices, Yanchar and Slife stated that

The [normative] reference points entailed within those shared practices are *part of* the publicness of practices; they are the primary means by which practices provide a basis for meaningful interaction among people, even when individual persons’ actual ways of participating in practices differ in significant respects or evince varying degrees of competence. In short, [normative] reference points are ontologically real aspects of practices that make it possible for there to be anything like adequate and coherent, or even excellent, involvement in the world. (p. 149; emphasis in original)

These dimensions of everydayness provide a foundation for the current study. Instructional designers engage in many activities that their methods and models do not encompass (Cox & Osguthorpe, 2003; Pollard & Kumar, 2022), and all of their practices should be legitimate objects of research to understand how such interactions contribute to quality design outcomes. In this study, instead of examining specialized processes that instructional designers apply, I focused on their everyday, quotidian activities—those that have typically escaped scholars’ attention in prior research—to understand the part such practices play in achieving quality in online course design. I used the dimensions of everydayness, as articulated by Troubé (2021), as an interpretive frame to both define designers’ everyday practices and explore how they fit into the overall structure of their experience of the pursuit of quality. Given the importance of everydayness in other fields, this research promises to reveal aspects of how

instructional designers pursue online course quality that are easy to overlook when one focuses on the formal design practices that have typically been investigated through prior research.

## Method

This was a single case study of the pursuit of quality in online course design. The scope of the case was a department tasked to develop online courses at a high research activity university (R2) in the United States, that I will refer to as the Online Course Office (OCO).

### Site and Participants

The OCO was established as a centralized resource to help departments and individual instructors design and maintain the online courses they offered. It provided instructional design support, media production services, academic support for teaching (e.g., student success managers, teaching assistants), and other administrative functions (e.g., copyright clearance, learning management system (LMS) support). At the time of the study, the OCO employed eight full-time instructional designers, supported by a staff of 15-20 part-time and student employees (a number that frequently fluctuated). At any given time, approximately 20 other full-time employees, and hundreds of part-time and student employees, worked in related support areas. The full research project studied the entire organization, along with some of the faculty members with whom the designers worked; however, the scope of this paper only included the full-time instructional designers (Table 1). All eight designers made themselves available for observations and informal conversations. Five made themselves available for formal interviews (for more on observations, conversations, and interviews, see the next section: Data Sources).

**Table 1**

*Summary of OCO Instructional Designer Backgrounds*

Designer (pseudonym)	Gender	Race/Ethnicity	Education level	Years of ID experience	Instructional design expertise	Other background experience	Formally interview?
Andy	Male	White	MS	3.5	Instructional design leadership; learner engagement	High school teaching	Yes
Britney	Female	White	MS	24	Cognitive apprenticeship	Hi-tech industry	No
Carrie	Female	White	PhD	3.5	Holistic educational models	Non-profit audience research	Yes
Daniel	Male	White	MS	12	Human performance improvement	K-12 teaching; Hi-tech industry	Yes
Ethan	Male	Polynesian	PhD	2	Gamification; language acquisition	College teaching	No
Frank	Male	White	MS	21	Student-student interactions	Software development	Yes

Gina	Female	Hispanic	MA, TESOL	12	Language acquisition	TESOL administration	Yes
Harris	Female	White	MA, Second Language Teaching	3	Language acquisition	College teaching	No

Scoping the research to a single case allowed for in-depth exploration of the instructional designers’ everyday practices—practices that are presumed to be so self-evident they do not rise to the level of interest of most researchers—providing insight into the pursuit of quality as the designers experienced it (Packer, 2018). However, case studies do not test a hypothesis about effective means of designing better online courses, nor can one generate generalizable guidelines for what defines quality in an online course. Therefore, this research was not designed to establish the importance of any particular instructional design method in the pursuit of course quality, nor was it a study to find evidence of particular techniques in designers’ work. Neither was this research an evaluation of the OCO designers’ effectiveness in their course design practices. The activities in which they engaged were studied as their attempts to *pursue* quality; whether they actually achieved it remained out of scope. But even without providing these types of findings, case studies are still a valuable form of scholarship. Case study researchers assume that the depths of the world are inexhaustible, and that “every existing human community must have grasped something essential about the way the world is” (Packer, 2018, p. 300), meaning cases can reveal aspects of phenomena that remain hidden when studying issues from more analytic perspectives (Flyvbjerg, 2001; Stake, 1995). These perspectives are valuable, even if they are uncommon or challenge common views, if a community of practitioners are to learn all that they can about accomplishing the outcomes they desire (cf. McDonald & Yanchar, 2020).

### Data Sources

The data for the case were drawn from an ongoing, ethnographic study of online course design in higher education. Ethnography is the study of a form of life by coming into direct contact with those who experience it, and observing and participating with them over time. It often focuses on a community’s “least known and least spectacular” practices, “the drab and obsessive routine[s]” that are frequently overlooked when research is conducted to test abstract, theoretical constructs (Wacquant, as quoted in Packer, 2018, p. 491). The full corpus of ethnographic data for this study included (a) observations of work as it happened at the OCO; (b) innumerable, short conversations with designers and others throughout the workday as course design events occurred; (c) formal interviews; (d) artifacts generated to support, or produced during, the course design process; and my own participation as I immersed myself in work at the OCO (Schensul et al., 1999). Procedures for gathering each of these data types are described below.

Observations were primarily conducted on-site in the OCO offices. However, at times instructional designers met with faculty members or other staff through video conference, and in such instances, I also joined the event remotely. Early observations were open-ended, where I gathered the types of information specified by Schensul et al. (1999): the settings where work took place; events and event sequences; counting, census-taking, and mapping the relevant environment; and noting indicators of social or other differences (cf. pp. 96-97). Later in the study I targeted specific events, such as observing course kickoff meetings, or media planning

meetings. As the study progressed, OCO employees also invited me to activities they thought were relevant, such as meetings with a faculty member about a course challenge. In these cases, the information I gathered was customized to each event, to record details pertinent to the event's purpose, or details related to the reason for which I sought out the activity (e.g., when I observed a designer setting up a course in the LMS, I gathered information on what the designer was attempting to accomplish, difficulties faced along the way, and how he explained his actions to the faculty member with whom he was working). When an invitation to an event was extended at the last minute, I relied on Emerson et al.'s (2011) protocol for what to record: descriptions, dialogue, and characterization (cf. pp. 58-73).

During most weeks of the study, I was at the OCO offices for either two or three days. The organization provided me with a workstation, allowing me to be present for spontaneous events that arose, as well as planned activities. Observations ranged from less than an hour to a full workday. All observations were documented through jottings in-the-moment, expanded out to full field notes as soon as possible after events were complete (Emerson et al, 2011). Early in the study, select observations were also video-recorded and transcribed for analysis to gather sample transcripts of common event types (e.g., an administrative meeting, or a course kickoff meeting).

Short, informal conversations with OCO employees were usually associated with each observation. Some conversations happened during the observation, where I would ask a question to clarify what I was observing, ask how common that activity was in the OCO's work, or to gather other information related to my purpose in the observation. These conversations were rarely based on pre-written questions; my purpose for the observation served to guide me in what topics to discuss. At other times, the people I was with initiated conversations in which I engaged as long as they were interested. If the event itself did not allow for conversation, as it concluded I asked those from whom I was interested in gathering information if they could talk for a few minutes. In some cases, I also emailed individuals to ask follow-up questions if they were not available for further conversation. Follow-up conversations or emails were intentionally brief to avoid interfering with my informants' work. All informal conversations were jotted in the moment and transcribed later, as described above. Emails were included in the project record verbatim.

Formal interviews were carried out beginning at the study's half-way point and continued until it concluded. Five of the eight instructional designers made themselves available for interviews. I also interviewed five faculty member the OCO worked with, purposefully sampled to gather a range of backgrounds, experience, and employment status at the university (e.g., both full-time and adjunct faculty). Each person was interviewed twice. First interviews started with a standard, semi-structured protocol, asking about prior experience with course design, the person's personal definition of quality, and notable instances where they both achieved and failed to achieve quality. Follow-up questions were then asked to clarify or solicit more information. Interviews were structured so that people were allowed to fully recount their stories even if that meant not all questions in the interview protocol could be asked (Brinkmann, 2013). Based on interviewees' responses in the first interview, as well as events in which I observed them participating, a custom interview protocol was crafted for each person and a second interview was conducted between three and six weeks after the first. Interviews ranged from 40 – 60 minutes. All interviews were recorded and transcribed for analysis. I conducted all first interviews alone, with a colleague joining me during all second interviews.



The OCO also made numerous artifacts available to me throughout the study. I was given unrestricted access to their training materials, administrative documents such as organization charts, instructional design models, and course standard rubrics. On a case-by-case request I was given access to institutional data, such as student evaluations of online courses, enrollment rates by semester, and course budgets. At times, OCO employees included me in email conversations with their colleagues. If everyone in the email had consented to be part of the study, I also included these as part of the project record.

Finally, my own participation in work at the OCO formed a part of the project record. As a researcher-practitioner, I have over 20 years of experience with online course design. Based on this, OCO administrators allowed me to engage in certain activities specified in their course design process, such as regularly scheduled course evaluations, to experience first-hand some of the factors involved in how the organization assessed course quality. As individual instructional designers gained confidence in me, they also allowed me to participate with them in selected design activities, such as advising faculty members on course design options, or completing reviews of faculty-submitted course materials. I recorded my own participation through in-the-moment jottings, later expanded out to field notes, as described above. While I did not base any conclusions on data solely gathered through my own participation, such events were nevertheless valuable as part of the study methodology. Participation sensitized me towards issues to discuss with employees as I observed them throughout the day or informed the development of future observation guidelines. My own participation also built credibility with those I interacted with, which, in turn, tended to lead to more openness on their part when I approached them for information.

From this full corpus, the specific data used in this article were observations that took place during the first quarter of 2022, supplemented by formal interviews and informal conversations with instructional designers during the same period.

The ethnographic fieldwork, and later data analysis, were conducted from a perspective that viewed people and their involvement in a world of practice as found in writings of scholars such as Dreyfus (2014), Packer (2018), and Wrathall (2006). Central to this was the assumption that people's "practical activities constitute [both] mind and world" (Packer, 2018, p. 315). These scholars have persuasively argued that "humans are fully embodied, engaged agents . . . situated in a lived world of significance," which means that study of human activity does not need to rely on "a more fundamental reality of causal forces assumed to control . . . human participation" (Yanchar & Slife, 2017, pp. 147–148). This contrasts with other views common in social science, that either abstract cultural forces outside of people's control determine how they experience the world, or that their subjective perceptions construct their views of reality. Therefore, issues related to this study such as what counted as course quality, or what counted as the pursuit of quality, were taken to be best revealed through study of the local, practical work of specific instructional designers, without appeal to either systems of social rules or internal mental states.

### **Data Analysis**

My data analysis was guided by the dimensions of everydayness as articulated by Troubé (2021) and described earlier. The model served as an *interpretive* framework, meaning that rather than attempting to prove that the OCO's practices aligned with the model, or, alternatively, studying the model itself using the OCO as a convenient site, it instead helped me elucidate and clarify aspects of the core phenomenon under study—the practices that

instructional designers used to pursue online course quality. As Liberman (2018) observed, research models are too blunt an instrument to fully express the reality of a social situation, but they can still be useful to the extent that they help researchers pay attention to aspects of a group's "local work of . . . coordinating their actions" that might otherwise be missed. Similarly, Horton (2008) emphasized that when studying the more messy and ephemeral aspects of human existence, like everydayness, attempting to reduce them to a model or formal set of principles could in large measure conceal the very aspects of them that make them interesting and important objects of study in the first place. He said that by its very nature, everydayness exists "in excess of most extant Social Scientific assumptions, accounts and understandings and – relatedly – [is] significantly *messier* than the kinds of assumptions, accounts and understandings which are predominant in Social Scientific disciplines" (p. 366; emphasis in original). Therefore, in my analysis I sought to use the everydayness framework to draw my attention to dimensions of the phenomena under study that I might otherwise miss, instead of attempting to reduce everydayness to a simple expression of the four dimensions.

Data analysis proceeded using principles described by Packer (2018). The goal was not to summarize designers' experience into a set of codes or otherwise abstract expressions, but to develop a composite account of the structure of their experiences, built from analysis of their lived activities. This consisted of (a) detailed readings of all interview and observation transcripts, and observation field notes from the specified period; (b) identifying instances where designers' pursuit of quality in course design became explicit; this often occurred when participants experienced a breakdown in an activity that allowed for direct examination and questioning about what, functionally, was occurring. This included myself as a researcher, where my own assumptions about designers' pursuit of quality were challenged, and so I directly questioned them about events when, or shortly after, they occurred; (c) crafting an initial thematic structure of salient topics related to designers' pursuit of quality consisting of short statements that summarized aspects of their experiences; (d) refining this structure using part-whole analysis (Vagle, 2018), where themes were compared against the whole of the original data, as well as comparing the whole to the details of the thematic structure; this resulted in clarifying, combining, eliminating, or adding themes; (e) writing a narrative account of the thematic structure to address my research questions.

Creating a narrative report of the thematic structure allowed me to craft a coherent account that highlighted situational details most relevant to my research questions (Newkirk, 1992). Yet drawing attention to these factors meant that other important issues were, of necessity, placed into the background. The lack of discussion about other matters should not be taken as evidence of their absence, but rather that they were out of scope of this paper's research questions. Further, the narrative reports a composite account developed both from participants' quotes as well as summaries and paraphrases out of my field notes. Such a rich narrative allowed me to highlight how everyday practices fit into designers' pursuit of quality, without translating their experiences into abstract concepts that artificially harmonized their character (Packer, 2018). I refer to individual designers using pseudonyms in extended examples or when directly quoting them, where tying an account to specific designers' backgrounds may be useful in interpreting their actions. But in other cases, typically those where a certain action or activity was observed multiple times in the work of multiple designers, I refrained from naming individuals to avoid a misperception that the event under discussion was isolated to one person only. I have also made minor adjustments to quoted comments to eliminate phrases that could

compromise anonymity, or to ensure they can be understood when excerpted from the full transcript.

### **Study Limitations**

While this method allowed for detailed study of how instructional designers experienced the pursuit of quality, it did come with some limitations. The OCO was formed to address specific concerns in a particular context at a single university. The OCO's practices were not static; the OCO was an ever-evolving organization, and this research was only a snapshot of their practices at a specific time. While it is reasonable to conclude their practice of instructional design resembled that of designers elsewhere, they also customized their approach for their situational needs. It could be that instructional designers in other organizations experience the pursuit of quality in a different manner. Consequently, the details reported through this research may not generalize to every situation. Yet as Packer (2001) argued, "while big generalizations may appear more powerful, details are more informative, especially in the long run" (p. 9). Therefore, the purpose of this article is to provide numerous details, hoping to encourage readers' reflection on how they experience everydayness in the pursuit of quality themselves. Further, given the richness of practice at the OCO, this report can only provide a partial view of designers' pursuit of quality. So rather than aiming for a comprehensive account, I aspired to one that could sensitize readers to the forms of instructional design that the designers at the OCO experienced. By this I mean an account where readers are given a view into how the participating designers "see and feel" issues related to the pursuit of quality, in the hope that similar issues will "become more see-able and feel-able to [readers] on their own" (McDonald, 2022).

### **Findings**

I present my findings in three parts (Table 2). First, to provide background and context for my core findings I briefly discuss how online course quality was defined at the OCO. Second, I offer an account of the everyday practices in which designers engaged during online course design, that I will refer to as practices of refinement. This includes describing how refinement was both associated with, but distinct from, the formal, specialized processes that are often considered definitive of online course design. As part of this analysis, I used the framework of everydayness as articulated by Troubé (2021)—repetition, adjustment, neutrality, and normativity—to help define refinement and distinguish it from the formal processes with which it contrasts. Third, I explore how everyday practices of refinement fit into designers' pursuit of quality in online course design at the OCO. This part of the analysis drew again on the everydayness dimensions to help highlight the fit.

**Table 2**

*Summary of Everydayness at the OCO*

Issue	Description
Instructional designers' definitions of quality	<ul style="list-style-type: none"> <li>• Explicit definitions were broad and interconnected, and consistent with prior research.</li> <li>• In practice, however, designers tended to operationalize quality standards that were most easily definable and quantifiable.</li> </ul>
The structure of everydayness	<ul style="list-style-type: none"> <li>• Everydayness was characterized by the frequent and repetitive practices of refinement.</li> <li>• Refinement practices were interrelated with specialized practices of creativity as well as processes of instructional design.</li> <li>• Designers experienced refinement differently than they did the processes they applied; refining was more adjustable than their use of design processes, and during much of their day-to-day work they did not look to design procedures for instructions on what they should do to achieve their goals (e.g., refining was neutral).</li> <li>• Designers' positive and negative responses to refinement (both of which influenced their style of participation in course design) revealed some of the normativity associated with the sense of meaning designers shared about their work.</li> </ul>
Course refinement and the pursuit of quality	<ul style="list-style-type: none"> <li>• The frequency (repetition) of refinement practices meant they often became a primary mechanism through which designers' pursued course quality.</li> <li>• At times, instructional designers employed refinement practices to align emerging work with a known vision, fluidly adjusting the activities they deployed as necessary to achieve the goal they were pursuing.</li> <li>• Sometimes, designers did not have an articulated vision of quality, in which cases refinement practices helped them both explore what quality meant in that instance, at the same time they attempted to pursue it.</li> <li>• Pursuing quality through refinement also reflected a dimension of neutrality; designers usually refined ideas that occurred to them in-the-moment, taking little, if any, time for reflection before making changes, and rarely employing formal problem-solving methods to align a course with measures of quality.</li> <li>• Some evidence suggested that for at least some designers, refinement was desirable (it played a different normative role) because it opened possibilities for pursuing novel course innovations, where routine requests drew attention to opportunities for inventive, creative designs.</li> </ul>

## **Defining Online Course Quality at the OCO**

When the topic of course quality arose in settings such as OCO staff meetings, it was common for instructional designers to offer multiple definitions (consistent with what was found in prior literature). A sampling of how they described a quality course included indicators like: (a) promoting high levels of engagement between students and instructors; (b) its ability to engage students' attention; (c) how well it promoted experiential learning; (d) how well it adhered to the OCO's style guide; (e) if it was free of typos or other production mistakes; or (f) whether it was well organized and simple for students to navigate. Further, in these discussions the designers typically assumed that forms of quality were mutually reinforcing. For example, they thought it was easier for students to meaningfully engage with instructors in a course that was well organized than in one that was poorly structured.

In practice, however, designers' operationalization of course quality was more complex. A complete description of how is beyond the scope of this paper, so for my purposes I only note that in contrast to the interconnected character of their explicit definitions of quality, in concrete cases designers tended to prioritize some measures of quality over others. Often, what counted as quality was a factor of how well a course complied with the university's myriad, detailed policies and standards, or other criteria that could be definitively and quantitatively measured. Yet for purposes of interpreting the research that follows, it is sufficient to recognize that while designers may have meant any of several kinds of measures when they referred to quality, their practices in the pursuit of that quality were similar regardless of their aim in any instance.

## **Everydayness at the OCO**

### ***The Repetitive Practices of Course Refinement***

Exploring instructional designers' experiences of everydayness at the OCO began by identifying the most frequent, routine, and regular activities in which they engaged (the dimension of repetition). These were what I will call the instructional designers' practices of course refinement. Refinement practices did not exist in isolation, however. They were found in an interrelated structure with designers' application of specialized methods of creativity and innovation, along with formal processes of instructional design. Therefore, practices of refinement are best understood by articulating their relationship to the other, more formal, activities to which they were related.

**Formal Practices of Creativity, Innovation, and Instructional Design.** Least frequently seen in designers' work were activities commonly associated with creativity and innovation: framing design challenges, employing ideation processes (such as brainstorming) to generate large numbers of ideas, formal cycles of prototyping, and so on. With one exception (to be discussed in a later section), instructional designers reported these kinds of activities as occupying the smallest percentage of their course design work, depending on the designer between 1% and 20%. And the OCO program administrator estimated that across the organization such events comprised no more than 10–15% of designers' course-related workload, overall.

More common, but still in the minority, were activities identified in instructional design processes, such as writing learning outcomes, selecting instructional strategies, or generating requirements for course assets. Also included were production activities where course components were initially fashioned, like developing an interactive unit in eLearning authoring software, filming an instructional video, or even jotting down a quick draft of assignment instructions. Much of the OCO's instructional design work was templated. Designers

completed a standard course design document, consisting of prompts that guided them through the major phases of their instructional design process. And they followed a style guide and course template for their LMS that governed the look and feel of elements like course navigation, branding, and the display of learning materials. Designers' estimates of how often they participated in formal instructional design practices varied widely; depending on where their courses were in the product lifecycle, in any given month they may have engaged in nearly no instructional design activities, or up to 60% of course-related work could have been spent so occupied. However, the program administrator estimated on average, conventional instructional design practices made up approximately 30% of designers' workload.

**Everyday Practices of Course Refinement.** Designers' most frequent course-related activities were mundane, workaday tasks associated with refining the courses in their portfolios: revising, updating, expanding, extending, elaborating, completing, modifying, editing, calibrating, clarifying, fine-tuning, adjusting, fixing. If designers did not perform these tasks themselves, they supervised student employees who did, which included giving instructions, showing students how to complete tasks and correcting work if necessary—all activities with an equally mundane character. While some refinement tasks were quick and easy to complete on their own, the cumulative effect of all of them was that most designers found themselves engaged in this kind of work most of the time. Except for Andy, who had unique supervisory duties, designers reported that anywhere from 40% to over 90% of a typical week could be spent refining courses they were developing or maintaining. And the program administrator estimated that across the organization, designers were regularly devoting half of their course-related worktime, or more, to such tasks.

This is not a claim that refinement was categorically distinct from designers' other practices. Instead of such practices possessing inherent properties that distinguished them from alternatives in an essential sense, it was rather that refinement fit into their experience as instructional designers differently than did their application of specialized processes. To help avoid misunderstanding, I recognize two interrelations between the varying kinds of practice I have described. First, there were obvious connections between creating an initial version of a course component—a learning activity, or a first draft of learning outcomes—and the revisions necessary to polish them (to be discussed in a later section). Second, there could be fluid boundaries when designers considered their application of a process to have ended, and their activities of refining to begin. For instance, Carrie told me about her work to design an interactive quiz. She clearly contrasted major phases of her work as being different, describing the relatively simple process of initially populating a quiz template (what she called, “just trying to get content in,”) as separate from the rounds of fine-tuning she completed later, referring to these as “clicking around in the program to look for solutions, ” or “looking for more efficient ways of doing what I originally did.” Yet she did not identify a defining moment when she unambiguously considered the “content [to be] in, ” and so her “clicking around” had begun.

### ***Distinguishing Course Refinement from Other Practices: Adjustability and Neutrality***

But even with such interrelations, considering refinement as simply being an obvious follow-up to designers' application of a process that was so insignificant as to not be worth mentioning or exploring, seemed to distort aspects of their experience as instructional designers. For instance, refinement practices tended to afford high levels of adjustability, meaning that designers fluidly and seamlessly deployed them to fit the shape of emerging needs. This was

typified by the difference between what Daniel called using a process to “start from scratch,” compared to what Frank called “tweaking.” In the first, designers tended to focus on reaching a certain milestone, or concluding a distinct event, like how they talked about being “done” with the learning outcomes phase when they had written 2-5 outcomes per module (the OCO’s standard), even though they freely acknowledged that they would continue to modify the outcomes throughout the project. Being done may have required more effort for some phases than others, implying a spectrum of completion criteria and completion effort. But designers typically could predict, at least conceptually, what it would mean for them to conclude various phases of their formal processes. But, as implied by the term “tweaking,” they typically considered refinement to be much more open-ended than their application of a formal method. Instead of focusing on a milestone’s conceptual conclusion state, they did not consider themselves done until they had achieved a certain standard of quality—which could be somewhat relative based on situational factors like an instructor’s taste—or external events prevented them from doing so (like running out of time). Designers usually did not experience these rounds of revision as backtracking, or returning to a previous process phase, except in rare cases where they completely abandoned their work and formally conceded they were starting again.

Conflating refinement with specialized practices also implies that designers consciously and straightforwardly applied steps from their formal processes when refining, which was usually not the case. Instead, refinement practices tended to reflect an element of neutrality, where what stood out to designers were the motivations for which they engaged in an activity, rather than the steps of those activities directly. This was often apparent through the language designers used when discussing their work. When engaged in tasks like revising, fixing, or updating, designers tended to talk about what they were doing at the artifact level—double-checking the overview page, or editing a rubric—rather than how such work contributed towards the macro steps of a process. This was different from when they perceived themselves as intentionally applying instructional design practices, where they often talked about their work in process-centric terminology (e.g., documenting learning outcomes). Frequently, neither the language nor logic of design processes provided designers guidance for completing tasks of refinement, or at least the connection was very indirect. For example, common refinement activities could include editing a draft lesson page (taking it from rough notes to polished prose), or updating assignment point values to better reflect the effort students were expected to invest. Both examples typified a more granular type of work, and sometimes even different skillsets than are usually articulated in the phases of instructional design models. So, describing designers’ practices of refinement as being different from instances where they perceived themselves as applying formal methods is partially meant to emphasize how much of their experience as instructional designers was not expressed, or explicitly guided, by the theoretical definitions of either innovation or instructional design practices.

Further, how designers practiced what I am calling refinement differs from how their formal processes could be considered adjustable, such as in the iterative cycles sometimes included in instructional design processes. Design iterations at the OCO usually fit into designers’ practice in the manner implied by prior research—as deliberately returning to a previous design step or phase based on a judgment that returning to that step was necessary to make progress. An example might be intentionally returning to an ideation phase to brainstorm new assignment types based on evaluative data that suggested current assignments were repetitive. But, as has been discussed, even though this type of iteration could be described as

adjustable, it was not always how designers at the OCO navigated course refinements, where a fluid, open-ended adjustability, along with the neutrality of their activities, were more of the norm. Designers could be found adding a new video to the LMS, in the process of which they might field a call from an instructor, asking for an update to one of the course's learning outcomes. So, they would immediately open the design document and adjust some wording there. As they completed this, they would straightaway return to the course and begin another task, which might have been completely different from their previous work, such as fixing a typo in a page header.

Such fast-paced, frequently changing work was common at the OCO. Designers were often found task switching (cf. Mark et al., 2005), and it took intentional effort for them to arrange their schedules to focus on a discrete process or event uninterrupted. As they so rapidly moved from activity to activity, it was rare for designers to associate what they had done with a demarcated phase of a design process, nor did they perceive themselves as recursively moving backwards or forwards through a process. Improvements occurred in a more fluid manner, where they changed individual elements of a course bit-by-bit, page-by-page, and section-by-section. It was true that they did sometimes intentionally iterate through process phases, and when this happened, practices of refinement were often aspects of their iterations. So, iteration may have been one way designers refined their courses, but it did not exhaust the possibilities. Equating them somewhat distorts designers' mode of engagement with course design.

In fact, when I observed designers refining, what phase of a process they were in was not usually of significance. What mattered was the immediate issue before them, and to address it they drew on ordinary, run-of-the-mill tasks, without concern about how, or even if, what they were doing counted as a design process step. For instance, I watched Andy calibrate settings in an LMS feature, toggling options on and off to see if he could make it behave in a way that accomplished what a professor wanted. Gina told me she would regularly read course pages and adjust "sentence length . . . [for] clarity." And it was common at the beginning of a semester to find designers performing mundane updates to course details, to reflect new assignment due dates, and changes to instructors and teaching assistants. While it is possible, from a theoretical standpoint, to fit these examples into design process phases, broadly speaking, doing so conceals at least some of the ways such activities fit into designers' experience *qua* designers. When refining, they did not ordinarily perceive themselves as deliberately applying design procedures, in the sense of looking to such procedures for instructions on what they should do to achieve their goals (neutrality). What seemed to matter more was keeping their attention on the situation itself, fluidly and flexibly navigating the terrain by using the contours of the circumstances they encountered to determine what task to complete next (adjustability). Designers addressed needs as they arose, using whatever skills were appropriate regardless of whether they were recognizable as design steps or not, and without apparent regard for whether what they did could be justified by a process.

### ***The Normativity of Instructional Designers' Practices of Refinement***

Instructional designers also experienced varying affective responses to practices of refinement, that oriented them towards different styles of participation in course design. Such responses revealed some of the "implicit normativity" (Troubé, 2021, p. 20) associated with how refinement contributed towards the sense of meaning designers shared about their work, or what they considered to be desirable and undesirable about it.



The most frequent response I heard was that refining could be tedious. Most designers told me they enjoyed the glamorous, visible aspects of their job, represented by the innovation or creative methods that actually constituted the lesser portion of their work. And so, they often perceived refining—especially pedestrian tasks like adding captions to images or checking links to ensure they went to the right source—as pulling them away from activities they preferred. Carrie described this by saying, “I like being creative in my work, and I felt like [in] most of the stuff I’ve been able to do so far I wasn’t.” By “creative,” she was referring to discrete practices of creativity that provided her a sense of professional satisfaction, as she clarified at another time by describing how much she enjoyed activities like “brainstorming . . . and putting all of our ideas on Post-It notes.” While their repetitive and routine tasks could impact designers’ personal satisfaction with their jobs (e.g., it was not uncommon to hear that such work made their jobs “boring,” or “dull,” despite designers’ simultaneous recognition of how necessary those tasks were), it also had an effect on the quality issues at the center of this study. In particular, at times designers reacted to the tedium by delaying activities of refinement, which could be somewhat detrimental to their courses. As Carrie further described, “I spent about a week procrastinating. . . . Instead [of completing my tedious assignments], I opted to look for other, simpler (and maybe less urgent?) tasks.”

At other times, however, designers seemed appreciative of the chance to engage in work they could perceive as less demanding. In these cases, tedium may have had an ironically favorable outcome. Interestingly, despite her preference for what she described as the creative work of instructional design, Carrie was also the most articulate in describing some of the advantageous conditions tedious refinements could provide. She said, “I actually appreciate having tedious things to do [sometimes] so most of my mental energy can go to learning new things.” By “new things,” Carrie seemed to mean both personal enrichment—she specifically mentioned “listening to lecture videos from other . . . courses so I can learn new ideas from fields I didn’t study”—and to the possibility that monotonous tasks left her with enough mental energy to learn new course design strategies, particularly to help her “move some of the [student experience] from passive to active.” While the OCO expected designers to remain current in their understanding of instructional design, the organization did not take into account that when designers were spending time in professional development, they would have less time for other course design activities (e.g., designers were not assigned fewer courses so they had time for on-the-job learning). This meant most designers had to find ways of remaining current by fitting professional development around their expected workload, a task that could be emotionally and mentally taxing. So, Carrie seemed to suggest that periodic tedium helped her by placing her in “a mental state where I feel up to trying something new,” as she attempted to balance both the demands of her required work, while also devoting at least some time to the professional development that would help her better pursue quality in current and future assignments.

At still other times, designers sometimes found practices of refinement to be actively satisfying, especially refinements that required them to apply mental effort. Ethan explained by saying, “balancing all the pieces, it’s a fun puzzle piece I enjoy making fit,” implying that he could find refining to be stimulating and intellectually challenging. But such a sense of satisfaction did not wholly eliminate other possible reactions that designers had to routine work. They could simultaneously experience the same refinements as both satisfying and monotonous, a possibility expressed by Carrie (which further reaction, in addition to those described earlier, serves as additional evidence of how complex designers’ responses to refinement could be). She illustrated the dichotomy by describing her multiple cycles of creating interactive hotspots when

building a learning activity, “I had to do that 40 times on each of these, so that becomes kind of tedious. . . . [but] I think it’ll be entertaining for the students, and that makes me excited.”

But despite this satisfaction that refining could bring, it was not an unambiguous good in designers’ overall experience. At times designers encountered diminishing returns, when the effort they put into refinements did not seem commensurate with the resulting improvements to course quality. Further, they also described how refining could create entanglements that affected their, or their students’, experience. For instance, they could tinker with a course so much that the cumulative effect of their changes resulted in a complicated course that students had difficulty using. Andy described a course where his and the instructor’s excitement about an idea led to “scope creep,” where they continually added features that did not contribute to the intended student experience, “there’s just too much going on, and so many methods that students are trying to do. . . . We ended up getting too much in the weeds and we made a course that’s just overly complex.” Frank described a related problem, where he noticed how designers’ disproportionate focus on refining one or two courses about which they were excited could lead to them to neglect other courses that might need just as much work, albeit work in which they were not as personally interested.

### **Course Refinement and the Pursuit of Quality**

Practices of refinement were an important factor in instructional designers’ pursuit of quality at the OCO. One reason for this was simply the amount of time they occupied (the dimension of repetition). While applying specialized processes often, but not always, provided designers with an initial shape and direction for their course designs, ultimately most of what they considered a quality course was the result of refinement in some fashion. Activities like editing, modifying, or updating were how designers shaped course components into forms that more closely approached an ideal of quality. In fact, sometimes it even seemed as if designers considered formal processes as a means of “just getting something on the page,” as Britney once suggested, meaning something concrete no matter how imperfect, knowing that they would refine it more carefully over time. In this sense, specialized creativity or design processes were sometimes seen as valuable for the starting points they provided, more than any innovative or quality solutions they directly offered.

Designers engaged in refining differently, however, depending on how they perceived the position from which they started. When they had a vision for what course quality meant in a particular instance, the adjustable and neutral practices of refinement fit into their work as the means through which they shaped a component’s concrete structure and form so that it eventually aligned with that vision. In other cases, however, designers might have perceived that an aspect of a course was of inferior quality, but they could not articulate exactly why. When this happened, refinement became both how they attempted to improve, as well as how they explored what quality should actually mean for the artifact they were in the process of revising. Often, such improvement was not the result of designers’ applying methods of problem solving to decide what refinements to make. Instead, it reflected a dimension of neutrality, where designers frequently made cycles of changes that occurred to them in-the-moment, with little, if any, reflection before they accepted an idea, until they found a configuration with which they were pleased. Further, some evidence suggested that instructional designers could sometimes use refining to pursue novel course innovations, where routine requests to update a course became more desirable (played a different normative role) because they drew attention towards inventive

possibilities for improvement, without needing to apply any specialized methods for generating creative ideas. All these possibilities are illustrated, in turn, in the report that follows.

### ***Refining to Align with a Vision of Quality***

At times, instructional designers started an assignment with a vision for what it would mean to achieve a high level of quality. This could have been at a large scale, such as a concept for an overarching course strategy, or at a smaller scale, like concepts for individual course components. Their visions of quality had a variety of sources. Sometimes, an instructor came to the project with an idea in mind, and the designer agreed it was worth developing. Occasionally, designers may have generated a possibility in a specialized ideation or brainstorming meeting. Often, their vision of quality was based on precedent, such as the guidelines provided by OCO policies, or common patterns found in existing courses.

But whatever an idea's source, at some point it had to be translated from imagination to reality. A concept remained only that until someone—if not the designer personally, then an individual or group the designer worked with closely—gave it a tangible structure and form that students could experience, whether that was an interactive element students manipulated in the course interface, or a set of instructions prompting reflection on a course topic. And because their initial iterations rarely, if ever, fully achieved their vision, designers frequently found themselves refining their work, particularly through step-by-step, fluid, adjustable routines described earlier (editing, tweaking, improvising solutions incrementally, and so on). When asked, designers could usually explicate a connection between many (though not all) of these refinements and how they were at least supposed to contribute towards the realization of a quality idea. Yet rarely was improving quality mentioned as the explicit aim when any refinement began. If a purpose was stated (which was not always the case) it was generally more targeted and tactical (as is typically expected because of the neutrality of everyday practices). For example, in a review meeting for a set of course videos I heard Harris suggest that they should modify the actors' dialogue so students will get the point quicker. Or Gina often wondered whether blocks of text in a course could be shortened.

Designers thought that the more careful they were in carrying out such refinements, the better the resulting course tended to be; as Gina told me, "It's sometimes those details that make a course shine." Regardless of how inventive or impressive were the ideas from which they started, until those ideas had been fine-tuned it was rare for designers to consider a course or an individual component as having achieved a high level of quality. So not only were many tasks associated with the pursuit of quality prosaic and undramatic in nature (as described earlier), designers often found that they also had to be meticulous, thorough, and show an exacting attention to detail, to make sure that what they were designing turned out just right.

An example was when I observed Ethan working on an educational game for students to practice language skills. His tasks included: (a) creating a flowchart of dozens of choices students could make, outlining the consequences of each on their future options; (b) working with a student employee to create in-game characters that students could encounter, and writing multiple dialogues between players and characters to advance the story; (c) designing a grocery store environment for students to explore, choosing specific foods and other goods to include on the shelves, where they would practice a language by shopping for items relevant to the game's storyline; (d) specifying a set of options (clothing, skin tone, etc.) from which students could customize their in-game avatar; and (e) directing the work of student developers who produced the actual, playable interactions, which in some cases consisted of giving detailed instructions

like, “make the music fade in at this point a little more slowly.” All this work spanned multiple hours over multiple days to refine each feature to a level with which Ethan was satisfied. And it culminated in a short, conceptual walk-through of the game, representing only a few minutes of the eventual student experience, not the entire game itself.

### ***Refining to Understand Quality***

At other times, instructional designers were dissatisfied with an existing version of a course component, but they were not sure what was needed to align it with a quality standard, or what about it was, in fact, misaligned. Such evaluations could sometimes be expressed affectively; instead of saying “I know what’s wrong here,” a response might have been, “I feel like something’s wrong.” This does not mean designers never had a basis other than their feelings upon which they made such judgments (although it was true that at times all they experienced was personal discontent with a course’s current state). For instance, they could have received feedback from students that suggested there was a problem they did not notice on their own. But even when external evidence may have drawn their attention to an issue, designers could still have been unclear on exactly what the problem was, or how to address it.

In such cases, designers’ refinement activities became mechanisms for them to both explore what quality meant *in that instance*, at the same time they attempted to improve the course itself. These types of revisions can be contrasted with those that were intended to align a course with designers’ articulated visions of quality. In the latter, designers perceived their work as bringing an already-understood idea to life. Their efforts were intended to ensure that what was produced matched what they or an instructor wanted. But in the former, all designers were aware that when they started, they thought some artifact, material, or interaction was less-than-ideal. And so, refinements allowed them to experiment with different ideas for what they wanted, at the same time they were trying to give what they wanted, or thought they wanted, a concrete structure and form. Daniel described this as, “the struggle of trying to make something work when it isn’t working shows me there’s a different thing I need to do.” He illustrated by describing a complex set of readings and interactions he was trying to refine in one of his courses, meant to help students understand a certain topic:

As I wrestled with this thing it suddenly occurred to me – all students really need to do is answer these two questions. They don’t need a complex thing to understand a bunch of stuff; all that stuff didn’t matter. Once I figured that out, it was easy to come up with a pretty simple way to get there.

### ***Practices of Refinement and Problem Solving***

Another way practices of refinement fit into instructional designers’ pursuit of quality was the role they played during problem-solving. If designers encountered a difficulty or challenge, they rarely employed rational problem-solving processes or other forms of deliberative reasoning to address the issue, such as defining a problem, identifying root causes, specifying success criteria, deliberating on alternative solutions, or selecting an option that maximized relevant outputs. While procedures like these were certainly used at times, more often I observed designers responding immediately, proposing a refinement that occurred to them in-the-moment, and taking little, if any, time for reflection. This approach further illustrated the neutrality of practices of refinement at the OCO, where designers typically did not deliberate

on the range of theoretically possible choices they could make, instead pursuing options that were most visible to their attention.

Examples help illustrate. Perhaps designers suggested a technique they recently used in another course, or a method they learned in a professional development seminar. Often, they asked for input from an instructor or another designer, accepting with little hesitation the responses they received. Sometimes, modifications were based on designers' intuitive sense; a salient feature in the environment drew their attention, and without being able to articulate why, they simply "felt" that something about it stood out as a possible solution. Designers could even be observed in what has been called "noodling," or a form of "absent-minded improvisation" where they seemed to aimlessly tinker with various ideas until something struck them as potentially useful (cf. Claxton, 2006, p. 352). If they tried an idea but thought it was not quite right, they would continue to refine by chipping away at perceived deficiencies one-by-one. Usually, designers did not abandon an idea completely unless they encountered stiff resistance from a colleague or instructor, or if, despite their efforts, they could not develop a version that they thought "worked" sufficiently well. If such false starts happened, they would backtrack, look for another plausible option, and start the process afresh. This continued until the designer, often in collaboration with the instructor, judged that they had a solution they thought was "right." The process could take minutes, or continue over days, or even weeks.

I observed this in Daniel's work as he met with a professor (who I will refer to as Rachel) during a regular review of a course that was then in its pilot semester. Early in the meeting Rachel asked a question. Her students were assigned to research a topic, then present it to the rest of the class. Was there a way she could have students post their materials to a corresponding lesson page in the LMS, in advance of their presentation, for other students to review? It seemed Daniel and Rachel had an earlier misunderstanding about this assignment; apparently he had assumed that Rachel, her TA, or he, himself, would add the material to the LMS on students' behalf. When Daniel relayed this, Rachel was obviously disappointed. Her preference was for the students to share their materials without her, or anyone else, having to be part of the process; "in the [in-person] class we can do that," she responded to Daniel's explanation of why students in the online course did not have edit rights to update the page. Immediately after she expressed her disappointment, however, an idea occurred to Daniel:

**Daniel:** You know, within the People section. Trying to think of how this could work, because in the course module project groups, each group has a site. Uhm, see you can click on the three dots and say visit Group Home Page.

**Rachel:** Yeah. Yeah

**Daniel:** And on that home page they have the ability to edit that and put stuff in there.

**Rachel:** Um hum.

**Daniel:** I don't know, I've never tried, I don't know that other students can access that group's homepage.

**Rachel:** That's a good question. Uhm, so yeah. They have, they had access, of course, to sign up for the groups. And then I see the homepage. You get to that by clicking the little dots? Right?

**Daniel:** Uhm, you know what we could do is we could create a new group in here called, like, Course Module Assignments, or something. Put everybody into one group.

**Rachel:** Yeah

**Daniel:** And then on that home page I could just put headings that say, Assignments for Course Module 1, Assignments for Course Module 3, and so forth. And you can just tell your students, “go into that homepage, edit the page, and add your stuff under the heading for your presentation.”

**Rachel:** I like that. I like that because it takes the middleman out of the process. And it’s also, you know, it’s also something that is great for the students to learn how to do.

In this example, Daniel proposed a solution based on the Rachel’s expressed desire to have students add their own material to the LMS. Throughout their discussion, he refined his proposal, figuring out how to modify his idea to fit observed constraints in the same moments the idea was actually occurring to him. As he thought of a possible obstacle, he did not give up the concept or consider whether another possibility might be more effective; instead, he proposed a slight adjustment to how he could configure the LMS to make it work. He continued to fine tune until he had articulated all the steps he thought were needed to develop his solution. Even though what took place could retrospectively be mapped to different problem-solving steps, doing so distorts the emergent quality of the conversation by recasting it in more deliberative, rational terms. Further, neither Daniel nor Rachel questioned whether this was an ideal solution or not. It was as if there were an unstated assumption that if Daniel’s proposal allowed students to add material to the LMS, then it was worth implementing and there was no need to explore other options.

For these reasons, Daniel’s approach typified the neutrality of practices of refinement. To question whether the idea was appropriate for the need, to evaluate whether he was skillful in presenting and discussing it with Rachel, or whether a different designer may have generated a more novel solution, are all issues beyond the scope of this paper. And certainly, it is possible to wonder what in the situation prompted Daniel to think of this solution. But even with such questions left unanswered, what the example illustrated was the commonality of problem-solving *through* practices of refinement, instead of disengaging from an issue to apply a discrete problem-solving or design process. Indeed, the pattern of solving problems that Daniel exemplified was not unique to this instance. Countless course refinements at the OCO were the result of similar, spontaneous approaches of making small corrections, adjustments, and modifications to solve an observed difficulty, rather than applying discrete problem-solving methods when issues arose.

### ***Course Refinements, Innovation, and the Pursuit of Quality***

Earlier I described how with one exception, creativity and innovation methods were the least frequently observed practices at the OCO. The exceptional case offers a suggestive insight into how practices of refinement could sometimes play a different normative role in designers’ pursuit of quality than was typically the case. This example also concerned Daniel, who was generally considered one of the OCO’s thought leaders, and who had some of the most well-articulated ideas about course quality, including how to use pedestrian acts of refinement as opportunities to explore novel improvements he thought would improve quality. This became evident as I talked to him about how often he engaged innovation or creativity practices. His response was, “I’m driven by that sort of thing. . . . I probably spend, like, half my time on that kind of stuff.” This was so much more than other designers I asked him to elaborate further. As

Daniel recounted his style of practice, he did not refer to distinct events where he would brainstorm imaginative ideas, nor did he otherwise describe the use of specialized creativity methods. Instead, he talked about how instructors' requests for even minor, run-of-the-mill course refinements provided him with chances to propose improvements he considered more innovative. In fact, he did not seem to consider innovation as differing from the routines of course refinement at all; in one conversation where the topic of both came up, he chuckled and called them, "the same thing." He elaborated:

If [instructors] contact me and say, "Hey, we need to clarify these instructions, or we're having an issue with this," I don't go in and just, like, go, "Okay, let's change this word and change this word." . . . I'll throw something out to them, and say, "Hey, what if we totally change this instruction to make it look more like this, instead of what you have now?" And so, I feel like it's continually moving in that higher quality direction because I don't typically go in and just say, "Oh, let's fix a few typos or whatever."

The core of Daniel's approach was to find opportunities to innovate *through* his attentiveness to routine requests for course refinements. While at times he tended to operationalize quality as policy compliance (as did all OCO designers, as described earlier), of all those observed in this study he seemed most consistently able to imagine and articulate how course quality could be connected to a better student experience. He viewed the ordinary event of updating or revising materials as an opportunity to try something new. He seemed to approach his work from the perspective that when an issue was raised, it might be a symptom of a more fundamental problem. More than some of the other OCO designers, Daniel was familiar with the affordances and capabilities of the technologies the organization provided and tended to experiment with them as part of even simple requests to find a creative solution, or, as he put it, "jumping into it and figuring [it] out."

This suggested that, at least at times, practices of refinement mattered to Daniel (or he found them desirable to engage in; they played a different normative role) for different reasons than why they mattered to his colleagues. Certainly, he also talked about them being intellectually challenging, or tedious, so recognizing their expanded value in his experience should not negate other possibilities. But in addition, he also found that refining practices allowed him to create possibilities for improvement beyond the prosaic request a faculty member may have originally approached him about. This contrasts with some of his colleagues, who seemed to distinguish their mundane tasks more sharply from events specifically dedicated to creative exploration, like Carrie, described earlier, who said she wanted to be "creative in my work," but, "most of the stuff I've been able to do so far . . . wasn't" (referring to the amount of time she spent in refining instead of being involved in activities like brainstorming). Instead, Daniel attempted to integrate the routine with the innovative, because doing so offered him a means for improving quality beyond what he was originally asked. This was suggested by a view he expressed in one conversation, "It's like, you know, as long as we're messing with this let's fix all the issues with it. Let's just make this a great experience for everybody."

## Discussion

The findings of this study offer three contributions to the field. First, by interpreting designers' practices of refinement from the perspective of the dimensions of everydayness, it becomes clear how understanding these practices is crucial for developing a holistic perspective on what is involved in the pursuit of online course quality. Second, recognizing this broadened perspective in the practices of one organization suggests that practices of refinement, along with everydayness more generally, should be studied in other organizations to gain additional insights into how everydayness might be manifest during course design. And third, the pervasiveness and importance of refinement at the OCO suggests that there is likely value in orienting instructional design students to practices of refinement, and their role in course design, during design education.

### **Practices of Refinement Provide an Enriched View of Instructional Design Practice**

As has been recognized by scholars (Gibbons & Yanchar, 2010; Schwier & Wilson, 2010; Smith & Boling, 2009), limiting one's view of the field to what is specified in the formal models that instructional designers are taught provides an impoverished view of what is involved in being a designer. Yet whereas prior research often focused on what could be called high-profile elaborations to design practice (e.g., highlighting designers' skills in diplomacy and negotiation, their application of project management techniques, or how they often provide faculty with professional development), one contribution this study provides is how tightly woven together designers' everyday routines can be with their pursuit of quality. Recognizing the roles of refinement practices in instructional designers' pursuit of quality provides an enriched perspective on online course design, compared to that provided by considering their specialized processes alone.

First, considering the amount of time designers at the OCO spent refining, along with the affective affordances refining offered (the dimension of repetition), suggested that these forms of practice played a predominate role in their experience as pursuers of course quality. Instead of the everyday tasks of revising, updating, fixing, and so on being a footnote to their design processes, my observations suggested almost the opposite. Intentional use of specialized design or innovation methods represented the lesser portion of designers' work, usually providing them a starting point for the refinements that both engaged them most of the time, and that were what they frequently credited as being what enabled them to create quality course designs. These findings are consistent with research from other fields, where the mundane routines of everyday life have been found to contribute to quality outcomes in ways often overlooked in scholarly research (Boudeau, 2013; Chambliss, 1989). As this literature has suggested, excellence in a craft is often simply a matter of being persistent—not stopping until the details are right—more than it is choosing the proper methodology.

The dimensions of adjustability and neutrality evident in designers' practices also contributes to a richer perspective on course design. Quality at the OCO was often the result of the fluidity in which designers engaged in their refining practices, in addition to the frequency. Rather than iteration through the phases of a process being how designers accounted for unexpected events and the constant flow of change, they instead attended to the shape of the circumstances directly, responding however seemed appropriate regardless of how (or if) that response could be justified by a design model. Further, designers usually did not rely on specialized techniques to address challenges that arose, but, in contrast, pursued options that were most saliently significant in the situation. A possible objection to these observations is that they represent a deficient or substandard view of design practice, and that the OCO's designers



should be critiqued for their reliance on refining practices instead of taking the effort to apply processes more intentionally. In response, I note the conclusions of other scholars who have studied similar issues (Matthews & Heinemann, 2012; McDonald et al., 2021). Given the lack of evidence that “good design work is . . . the straightforward outcome of the application of a method” (Matthews, 2009, p. 65), asserting the necessity of design processes *a priori* assumes their primacy over the everyday, and so any claim that the OCO’s designers showed a lack of skill because they relied on the everyday ends up being a circular argument. Similarly, as Lave (2019) stated, research “designed to explore evidence of ‘ideal’ [process-oriented] activity. . . . [simply] creates and confirms a conception of the inferior other and thus affirms the ideal model” (p. 23).

Finally, the normativity associated with refining practices contributes a different, but still useful, perspective on designers’ pursuit of course quality. Designers did not approach their work dispassionately, applying calculative reasoning about what actions to take in what circumstances. Sometimes, like Carrie, they put off refinements they thought they should make because they were boring. At other times, however, refining could be deeply satisfying, as we heard from Ethan. Both cases suggest the difficulty of reducing the pursuit of quality in instructional design to a process model. Pursuing quality was meaningful to the designers in this study for reasons beyond only the organizational goals of completing course projects. In addition, refinement fit into their “life story” (Yanchar, 2015, p. 119) in deeply personal ways, ways that cannot be ignored if one is to understand the pursuit of quality in a holistic sense. Yet such dimensions only become clear, along with the way they fit into the broader phenomena with which researchers are typically concerned, when considered from a perspective sensitive to such issues, as is provided by the study of everydayness.

### **Studying Other Refining Practices and Other Forms of Everydayness**

The results of this study raise the question as to the role refinement practices play in the work of instructional designers from other organizations, along with other forms of everydayness in general. While there may have been specific refining activities that were unique to the OCO, or their specific proportion of refining compared to other practices may have been distinct, it is unlikely that practices of refinement or other forms of everydayness are absent from instructional designers’ experience elsewhere. Yet other than passing mentions in prior literature (e.g., Chittur, 2018; Schwier & Wilson, 2010), how these fit into instructional design, broadly speaking, has not been addressed. This presents an opportunity for additional research to understand both refining and other, everyday practices of instructional design more comprehensively. Given the conclusion of prior research that understanding design is as much about understanding designers’ deployment of ordinary forms of social interaction, as it is about understanding their formal processes (e.g., Button & Sharrock, 2000; Fleming, 1998; Matthews & Heinemann, 2012), further study of the everydayness of instructional design—of which refinement is surely only a part—promises to provide considerable insight.

### **Orienting Instructional Design Students to Refining Practices**

Yet even with these unknowns, the findings here suggest that refining is consequential enough that instructional design educators should consider how to orient students to these important practices. As was noted earlier, refining is related to, but not the same as, iterating through a design process. This distinction can be explored with students, and it is likely that

educational time can be profitably spent teaching novice designers how to intentionally engage in meaningful forms of refinement to achieve high levels of course quality.

A suggestive example is provided by the account of Daniel's use of run-of-the-mill requests as opportunities to explore more innovative course designs. Rather than disengaging from the immediate situation to apply a distinct process for generating creative ideas, he remained deeply engaged, satisfying both the prosaic demands of the situation while also searching for more novel approaches of improving a course. The value of this for design students might be in how the example accentuates how quality can come *through* everydayness, and so if designers fully commit to whatever assignments are before them—even those that may be tedious—they are in a position to pursue forms of quality that may remain closed if they only focus on the more glamorous and alluring parts of the job. An analogy can be found in the field of nursing, that has also turned towards understanding its own everydayness. Studies of everyday practice in nursing have drawn attention to how the caring outcomes that are definitive of the field are sometimes best achieved through a nurse's ordinary routines (e.g., Arndt, 1992; Gullick et al., 2020). There need not be an either/or dichotomy between what nurses do to care and other aspects of their job, like completing routine paperwork. Similarly, the findings of this study suggest there does not need to be an either/or dichotomy between pursuing quality innovations in online course design, and the rather pedestrian work of fixing a misspelling or similar production mistake.

Emphasizing this to students can help overcome some of the challenges of strictly methodological approaches to design, where the typical procedure is to find a design process or technique to address an observed problem or need. While this may be a useful approach at times, it is needlessly limiting. Other forms of intervention, where the connection to a conventional design or innovation process could be several steps removed, or otherwise unclear, may be more useful in a given situation. If such practices are both modeled and validated through instructional designers' education, it can only expand the number of tools they have in their repertoire. Further, shifting the focus from the design process to the designers' willingness to fully engage in the mundane, sometimes tedious work of refinement, could help combat what Woudhuysen (2011) described as a near-fetishization of design, where much of the discourse in the field disproportionately focuses on design's most visible, appealing aspects (represented by the process phases found in many contemporary design models). This neglects many of the other drivers involved in an organization's pursuit of excellence in a domain, thereby misleading designers—as well as clients and other stakeholders—into assuming that the design methods themselves are the most decisive factor in achieving a quality outcome. Without discounting the importance design processes can offer, foregrounding the role of refining practices in pursuing quality can encourage designers to wholeheartedly commit to the work of online course design, even in its less-enticing forms, or even when it does not resemble what convention suggests to them is the proper form that instructional design should take.

## Conclusion

This study investigated the everydayness of online course design, specifically the questions: What kinds of everyday, routine practices do instructional designers engage in during online course design? And, how did those forms of everydayness fit into designers' pursuit of quality in online course design? By studying the work of instructional design at the OCO, I concluded that the frequency and repetition of designers' practices of refinement meant they played an important role in their pursuit of quality. In addition, designers experienced refinement

as distinct and different from their more conventional, iterative approaches to instructional design and innovation largely through the adjustability and neutrality of refining practices compared to the alternatives. Refining practices also contributed towards the normative sense of meaning designers shared about their work at the OCO. These findings have implications for understanding the pursuit of quality in online courses more broadly. Recognizing the role refining plays in designers' experience contributes to an understanding that instructional design cannot be limited to its formal processes and methods. Other forms of social interaction are also critical, and so researchers should be willing to study the full range of what they observe designers doing. Practices of refinement can also be intentionally integrated into instructional design curricula, teaching new designers that they have more tools available to them in their pursuit of quality than the specialized processes that have been traditionally the focus. Finally, foregrounding refinement practices emphasizes that designers can pursue quality *through* their mundane activities; there need not be a dichotomy between engaging in the pedestrian work of course design and the pursuit of innovative, novel forms of online course quality.

### **Declarations**

The author declared no conflicts of interest associated with this study.

The research ethics board at Brigham Young University, USA approved this study. Informed consent was obtained from all individual participants included in the study.

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# Data-driven Decisions of Higher Education Instructors in an Era of a Global Pandemic

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## Abstract

The impact of the COVID-19 pandemic on the higher education sector has been overwhelming, with emergency responses that have affected decision-making processes. Yet, our understanding of higher education instructors' perspectives regarding the process of data-driven decisions, especially in times of emergency, is still limited. We aimed at characterizing the types of data-driven decisions that higher education instructors have made in their courses. This was done while asking the instructors to reflect upon a face-to-face (F2F) course that was suddenly shifted to emergency remote teaching (ERT), due to the COVID-19 pandemic outbreak. Taking a qualitative approach, data were collected via an open-ended online questionnaire distributed among 109 higher education instructors from different countries. The findings suggest that the instructors mentioned a wider range of data sources, and a wider range of data-driven decisions while referring to the ERT mode, compared with their F2F instruction. In F2F teaching, the instructors mostly provided students with real-time educational assistance. In ERT, the instructors mostly adjusted the course requirements, promoted collaboration among students, and offered them social and emotional support.

*Keywords:* data-driven decisions, educational data, online teaching, higher education, instructor perspective

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Data-driven decision-making is the process by which instructors collect and analyze data to guide and support educational decisions (Michaeli et al., 2020; Prinsloo & Slade, 2014). In higher education face-to-face (F2F) courses, instructors are accustomed to observe educational data and respond to it, while relying on both verbal and non-verbal communication (Herodotou et al., 2019; Vanlommel et al., 2017). However, during the transition to remote teaching, as occurred during the COVID-19 outbreak, the way instructors and students interact has significantly changed, and as a result, so has the range of data to which instructors are exposed (Usher, Hershkovitz & Forkosh-Baruch, 2021). While teaching remotely, higher education instructors experience indirect interaction with students, hence they are less exposed to non-verbal data that is continuously available in the physical classroom (Barak & Usher, 2020; Barak & Usher, 2022; Herodotou et al., 2019; Kumar & Johnson, 2019). This creates a situation where some of the students' behavior and actions are harder to track (Gašević et al., 2016; Picciano, 2012), which might compromise the data-driven instructional process (Gašević et al., 2016).

Still, online environments may assist in the teaching process when applying data-driven decision-making; the instructors can benefit from access to the varied data about learners that is gathered automatically via learning analytics (LA) systems (Cerro Martínez et al., 2020; Shibani et al., 2020; Tsai et al., 2019). Studies have highlighted the role of LA systems as a means to help instructors gain actionable insights into students' learning behaviors, to support educational decisions (Fynn, 2016; Larrabee Sønderlund et al., 2019; Prinsloo & Slade, 2014).

However, mere access to educational data is not enough. It has become clear that LA systems should be made accessible to educational stakeholders in a way that is easy to understand and to act upon (Datnow & Hubbard, 2016; Michaeli et al., 2020; Usher & Hershkovitz, 2022). For instructors to embrace the data-driven instructional process there is a need to implement bottom-up approaches that include the instructors as the main stakeholders, rather than the end-users (McKee, 2017; Ndukwe & Daniel, 2020). Yet, our understanding of instructors' viewpoints regarding the process of data-driven decisions, especially with regard to remote teaching in times of emergencies, is still limited (Ndukwe & Daniel, 2020; Usher, Barak, & Haick, 2021). We aim at bridging this gap by exploring variations in instructors' perceptions of the use of educational data for decision-making in the COVID-19 era, compared with the pre-pandemic period.

## Literature Review

### *Data-driven decisions in higher education*

Higher education instructors constantly rely on a variety of learner data to gain a deeper understanding of their class and individual students, to provide learners with meaningful feedback, and to reflect upon their own teaching (Harindranathan & Folkestad, 2019; Leitner et al., 2017; Picciano, 2012). This is known as the process of data-driven decision-making. Data-driven decision-making refers to collecting, understanding, and analyzing educational data to guide and support educational decisions (Prinsloo & Slade, 2014). Such educational data address the academic, behavioral, and socio-emotional aspects of the learning process, and are collected in a variety of ways, from academic assignments, through monitoring classroom participation, to observing students' non-verbal communication during sessions (Vanlommel et al., 2017). Based on educational data, instructors constantly make decisions, such as which content to focus on, how to best engage the students, and

which students should receive targeted support (Harindranathan & Folkestad, 2019; Prinsloo & Slade, 2014; Vanlommel et al., 2017).

In many cases, such decisions are taken based on the instructor's experience and understanding of the situation, and not necessarily on empirical evidence (Michaeli et al., 2020; Vanlommel et al., 2017). This is often the case in face-to-face (F2F) teaching, where instructors are accustomed to observe educational data and respond to it (Herodotou et al., 2019; Vanlommel et al., 2017). However, while teaching online, instructors experience indirect interaction with students and they are less exposed to non-verbal data that is continuously available in the physical classroom (Herodotou et al., 2019; Kumar & Johnson, 2019; Usher & Barak, 2020). This creates a situation in which many of the learners' actions (e.g., navigating through the course pages or multiple attempts to solve a problem) might be harder to track (Gašević et al., 2016; Harindranathan & Folkestad, 2019; Picciano, 2012).

Still, while teaching online the instructors can benefit from access to various data sources including students' interactions with a given tool, contributions to a discussion forum or chat, survey responses, students' performance, demographic data, course content, and so on (Vieira et al., 2018). Such data is gathered automatically and continuously via online learning systems (Cerro Martínez et al., 2020; Tsai et al., 2019), and analyzing it can support and guide instructors' decision-making (Archer & Barnes, 2017; Gašević et al., 2016; Gutiérrez et al., 2020). Instructors may decide to make pedagogic changes in real-time, including modification of the existing instructional design to encourage productive learning behaviors (Harindranathan & Folkestad, 2019; McKee, 2017).

But the exponential growth of data provided by online learning systems can be a bit overwhelming. Instructors need to rapidly capture the ever-increasing amount of information about students' learning, interpret this diverse body of information in the light of students' progress, evaluate it in light of curricular goals, and make informed decisions about the next learning steps (Cerro Martínez et al., 2020; Vatrappu et al., 2011). Instructors typically have a difficult time processing and interpreting such a large and diverse amount of data, as they have a limited understanding of necessary data mining and processing techniques (Vatrappu et al., 2011; Vieira et al., 2018) or due to a delay in accessing critical information (Cerro Martínez et al., 2020). This is where learning analytics come into play (Larrabee Søndlerlund et al., 2019; Siemens, 2013; Tsai et al., 2019; Vieira et al., 2018).

Learning analytics (LA) refers to the measurement, collection, analysis, and reporting of data about learners and their contexts (Vieira et al., 2018). LA tools have emerged as a technology to enable instructors to engage with educational data effectively and provide insights into students' learning processes (Archer & Barnes, 2017; Harindranathan & Folkestad, 2019; Michaeli et al., 2020; Vieira et al., 2018). In the last two decades, the LA field has captured more attention from higher education researchers worldwide (Larrabee Søndlerlund et al., 2019). The bulk of empirical studies about LA in higher education have focused on using analytics systems for the prediction of student performance and drop-out and retention (Hilliger et al., 2020; Ifenthaler & Yau, 2020; Nyland, Croft, & Jung, 2021). However, what is less prominent is the voice of the instructors, who are important stakeholders in the process of adopting and implementing innovative learning technologies (McKee, 2017; Usher & Hershkovitz, 2022). We have little insight into their perspectives regarding the use of educational data to support decision-making processes (Gutiérrez et al., 2020; Guzmán-Valenzuela et al., 2021; Hilliger et al., 2020; Ndukwe & Daniel, 2020; Nyland, Croft, & Jung, 2021).

### ***Instructors' perspectives about data-driven decisions***

Successful use of educational data to inform decisions highly depends on the acceptance of the instructors (Rienties et al., 2018; Siemens, 2013). Understanding instructors' perspectives regarding the use of educational data is critical since they are the ones who access and interpret the data, draw conclusions, and make informed decisions (Guzmán-Valenzuela et al., 2021; Leitner et al., 2017). Indeed, recent publications have identified instructors' needs regarding the implementation of LA (McKee, 2017; Usher & Hershkovitz, 2022) and developed new strategies for co-designing such tools with instructors (Holstein et al., 2019). Several studies have reported that instructors often use the information generated by LA systems to identify students who are struggling or falling behind, and "reach out" by contacting them personally, usually via emails (McKee, 2017; Nyland et al., 2021; Usher & Hershkovitz, 2022).

Another line of research has reported on several major challenges faced by higher education instructors while trying to implement learning analytic systems in their classes (Usher & Hershkovitz, 2022; Vieira et al., 2018). To effectively use learners' data, instructors should develop the knowledge and skills to analyze and use data to improve instruction (Datnow & Hubbard, 2016). Yet, instructors often lack adequate data literacy skills (Hilliger et al., 2020). Instructor data literacy refers to the ability to effectively engage with data and analytics to make better pedagogical decisions (Datnow & Hubbard, 2016; Ndukwe & Daniel, 2020). The lack of such an ability might result in the poor interpretation of analytics, which in turn can lead to uneducated decisions that might harm students and create more inequalities in access to learning opportunities (Ndukwe & Daniel, 2020). Moreover, instructors reported having overwhelmingly large amounts of data from different sources, and a lack of personalized, accurate, and timely information (Hilliger et al., 2020; Ifenthaler & Yau, 2020; Rienties et al., 2018). It seems that although instructors are expected to make rapid decisions in a dynamically changing environment, they often do not get the information they need for decision-making in real-time and in an 'actionable' format (Usher & Hershkovitz, 2022; Vatrappu et al., 2011). This is problematic, especially since accurate and timely data were documented as necessary to help instructors make informed decisions regarding their teaching (Archer & Barnes, 2017; Fynn, 2016).

Most of the above-mentioned publications have focused on the perspectives of instructors who teach in face-to-face courses that use online learning management systems (Shibani et al., 2020), in hybrid courses, or massive open online courses (Ifenthaler & Yau, 2020). There is a lack of studies that explore variations in instructors' perceptions regarding the use of educational data for decision-making in their face-to-face instruction, compared with their remote teaching. It is important to understand the way new learning contexts influence instructors' intentions and how they approach their teaching (Jensen, Price, & Roxå, 2020). This is specifically critical in the current shift from face-to-face to emergency remote instruction that has become the prevalent form of learning at many universities worldwide due to the outbreak of the COVID-19 pandemic (Ezra et al., 2021; Marasi, Jones, & Parker, 2020; Ndzinisaaand & Dlamini, 2022).

### ***Emergency remote teaching***

Teaching in times of emergency differs from carefully planned learning experiences that are initially designed to be delivered online (Barrot et al., 2021; Hodges et al., 2020). The concept of emergency remote teaching (ERT) refers to a temporary pedagogical shift to an alternate

teaching mode as a result of unique circumstances, such as the spread of the COVID-19 pandemic worldwide (Hodges et al., 2020). The impact of COVID-19 on higher education worldwide has been overwhelming with a quick and unexpected shift from face-to-face to remote teaching (Marasi et al., 2020; Usher et al., 2021b; Walsh et al., 2021).

Traditionally, instructors who deliver online courses begin planning them several months in advance, receiving formal training and support from expert university staff (Walsh et al., 2021). Converting an academic course from in-class instruction to an online format requires time and effort (Hodges et al., 2020). With the sudden transition to ERT, instructors were expected to make significant changes to their courses and instruction without a reasonable level of technical and digital pedagogical support (Ndzinisa & R. Dlamini, 2022). The importance of providing online instructors with formal training and institutional support is highlighted by the results of two recent surveys that explored responses of faculty across the United States regarding the transition to ERT during the COVID-19 outbreak (Marasi et al., 2020; Walsh et al., 2021). The results indicated that faculty who received formal training in online education had a more positive ERT experience, while faculty who never received training struggled more (Walsh et al., 2021).

Providing students with proper support in times of emergencies is critical as well. Prior studies have mentioned that the unique circumstances of ERT could aggravate the already known challenges experienced by online learners, such as lack of tutor assistance and an impaired sense of community and connectedness (Ezra et al., 2021; Walsh et al., 2021). Indeed, the survey mentioned earlier demonstrated that some faculty members found themselves making deeper, and more personal connections with their students during the ERT, helping them with technological, mental, social, and health issues. This insight was also demonstrated in a study that explored the way university instructors perceive the differences between teaching F2F and online. The participating instructors reported a shift in student-teacher interaction towards more frequent one-on-one communication with their online students (Jensen, Price, & Roxå, 2020). Understanding the challenges and unique characteristics of ERT allows ongoing improvements in course design and practice as well as better decision-making about how to maintain high teaching and learning standards (Hodges et al., 2020).

In the new educational climate brought on by the COVID-19 pandemic, it is of particular importance to understand the way instructors use and act upon educational data, both in emergencies and in routine. This is based on the understanding that this period of crisis will have long-term consequences for how the higher education environment of the upcoming years will be shaped. Based on this perception, a recent publication took a quantitative approach to explore the types of educational data that drive higher education instructors to make decisions, in F2F versus ERT modes (Usher et al., 2021b). The results indicated that the instructors reported a higher intention towards making data-driven decisions in ERT, compared with F2F instruction. Moreover, while referring to the ERT mode, the instructors mostly relied on educational data about students' collaborative learning and social and emotional state. Yet, we still lack an understanding of the actual decisions made by instructors based on such educational data.

Considering this, the goal of the current study was to characterize the types of data-driven decisions that higher education instructors have made in their courses. This was done while asking the instructors to reflect upon a face-to-face (F2F) course that was shifted to emergency remote teaching (ERT), due to the COVID-19 outbreak. To meet this goal, the

following research question was explored: What characterizes the types of data-driven decisions that instructors have made in F2F vs. ERT modes?

## **Methods**

### ***Research participants***

Our participants included 109 higher education instructors, who shifted from teaching F2F to teaching online, due to the outbreak of COVID-19. Participants included 52% males and 48% females, with an average teaching experience in higher education of about 15 years. The distribution of respondents by continent included Asia (39%), North and South America (29%), Europe (22%), and Africa (10%). The distribution of respondents by faculty included Natural Sciences (36%), Humanities (29%), Social Sciences (20%), and Applied Sciences (15%). Participants were recruited using snowball sampling, starting with the authors' professional and personal networks.

To ensure the research is conducted ethically, all participants were asked to sign an informed consent form, detailing the research goal, process, and participants' rights. The participants were informed that participation is voluntary, and they were given the choice to withdraw at any time. Participants were not offered an external incentive for taking part in this study. The study was approved by Tel Aviv University's Ethics Committee.

### ***Research methods and tools***

This study applied a qualitative phenomenological research design, in which the researchers describe the lived experiences of individuals about a phenomenon as described by participants (Creswell, 2014). Using the lens of the instructors' perspective, we took a within-subject approach, where participants self-reported their perceptions in the context of a single course and regarding its two modes of teaching. Data were collected in March-June 2020 via an online questionnaire that included both closed-ended and open-ended questions. In the closed-ended questions, which were the basis for our prior study, the instructors were asked to rate their willingness to make data-driven decisions in F2F teaching and ERT. In the two open-ended questions, which were the basis for this study, the instructors were asked to elaborate on the types of data-driven decisions they would like to make, or have made, in the two settings of the course, that is, F2F and ERT. Hence, the following two questions were presented to the participants: "Could you elaborate on the kinds of decisions or actions you would take based on learners' data in the F2F mode of the course?" and "Could you elaborate on the kinds of decisions or actions you would take based on learners' data in the ERT mode of the course?"

### ***Data analysis***

The qualitative data from the questionnaire were analyzed using the directed approach to content analysis, in which the researchers use codes that are derived from an existing theory or relevant research findings (Hsieh & Shannon, 2005). When answering the first closed-ended part of the questionnaire, instructors were asked to rate their level of interest in the following seven dimensions of educational data: course resources, collaborative learning, instructor-led discourse, assignment feedback, self-reflection, social and emotional support, and independent learning. These dimensions were adapted from Picciano's integrated model (Picciano, 2017), in which seven dimensions regarding the pedagogical aspects of online education are portrayed. Hence, while analyzing instructors' responses to the open-ended part

of the questionnaire, it seemed appropriate that the seven dimensions of educational data from Picciano’s model will serve as the seven codes for analysis (see Table 1).

**Table 1**

*The Seven Dimensions of Educational Data Based on Picciano’s Integrated Model*

	<b>Dimension of educational data</b>	<b>Explanation</b>
1	Course resources	The course content that is uploaded online, such as PPTs and reading material.
2	Collaborative learning	The collaborative activities presented in the course, such as group problem-solving and wikis.
3	Instructor-led discourse	The discussions that the instructor holds during lessons.
4	Assignment feedback	The feedback and evaluation of the course’s assignments that students receive from the instructor.
5	Self-reflection	Self-reflection on their own learning process during and after the class.
6	Social and emotional support	The social and emotional support students receive from their peers and the instructor.
7	Independent learning	Self-studying outside the classroom and without direct supervision.

The authors read the transcripts and highlighted all text that on first impression appears to represent one of the seven dimensions and coded all highlighted passages using the predetermined codes. After the coding process, the authors again reviewed the transcripts according to the conventional (inductive) data analysis approach, in which the researchers immerse themselves in the data independently to allow new insights to emerge. In the next step, the two authors compared emergent themes to ensure inter-coder reliability, until full agreement was reached (Creswell, 2014). As a result of this comparative exercise, a few themes were merged to avoid overlaps.

## Results

### *Characterizing types of data-driven decisions, F2F vs. ERT*

The analysis has raised four themes for the types of data-driven decisions. Each theme was linked to one of the seven dimensions of educational data that were detailed in Table 1.

### *Providing real-time educational assistance—F2F and ERT*

The first type of data-driven decision that was repeatedly mentioned by the instructors was contacting students in real time to suggest guidance and assistance with the course content and assignments. This theme was linked to the “course resources” dimension of educational data. The main sources from which the instructors collected data to support this decision were students’ participation patterns (F2F) and students’ grades in quizzes and assignments (ERT). This decision was apparent with reference to both the F2F and the ERT modes; it was



mentioned in 25% of the responses that referred to the F2F mode and 18% of the responses that referred to the ERT mode.

While referring to the F2F mode, the main source from which the instructors collected educational data was students' participation patterns during the lectures. The main purpose of providing students with real-time educational support was to help low-performing students to successfully complete the course:

If I had a feeling that a student was having difficulties understanding the material discussed in class [...] If I noticed that a certain student did not participate or did not take part in the class activities, I approached that student after class and tried my best to explain the problematic concepts. I did my best to help each student complete the course successfully. (I6, Male)

Conversely, while referring to ERT, the main source from which instructors collected educational data was students' grades in quizzes and assignments retrieved from learning analytics systems. For instance, the next instructor contacted low-performing students who did not submit an assignment on time or failed a quiz:

I would identify underperforming students who failed the quiz or did not submit the assignment on time, and probably contact those specific students, asking whether they understood the assignment and whether they have any unanswered questions. (I11, Female)

While the previous instructor mentioned approaching specific students who need extra assistance, the next instructor stated that data about students who struggle with the course assignments would lead her to approach the whole class to suggest them additional guidance: I tried to keep track of students' performance through the Moodle learning analytics system. If I found out that several students failed the opening quiz, for example, I contacted the whole class, probably via a collective email, and suggested them some extra resources and assistance (I29, Female).

Not surprisingly, referring to their F2F teaching, instructors stated they would contact students in person, initiating "a one-on-one conversation with under-performing students" (I97, Female), while during ERT they stated they would contact students via online platforms, "preferably via synchronous technology like Zoom" (I40, Male).

### ***Adjusting course requirements for future students - only ERT***

The second type of data-driven decision that was repeatedly mentioned by the instructors was to adjust the course requirements to better suit remote teaching and learning. This theme was linked to the "course resources" dimension of educational data. The main sources from which the instructors collected data to support this decision were emails sent by students to the instructor and posts on the discussion forums. This decision was apparent only with reference to ERT; it was mentioned in 22% of the citations that referred to this mode.

While the previous theme referred to decisions to be taken in real-time, this theme refers to decisions taken in retrospect, which may help future students. For example, the next instructor revealed how students' emails led him to make changes in the course requirements for the next semester:

I will probably make some changes towards the next semester in the parts of the course that require modifications to better suit this new mode of learning online. This semester I received two or three emails from students who struggled to find partners to perform the group assignment with and also struggled to find time to meet online. These emails made me re-think about students' needs in the current period and I have made up my mind to make some

changes to this assignment so that next semester students would be able to choose whether to conduct this assignment individually or in groups. (I99, Male)

Another instructor revealed how reading students' posts on the discussion forum made her realize the need to change the final project's requirements: Since the transition to online, I try to follow up on students' correspondence on the discussion forum. Reading their posts made me realize what they are dealing with during this challenging time, and how can I assist them. Most of the correspondence was [sic] about the final project. Students complained that the project is too complicated and time-consuming. I decided to make several changes including linking the project to students' daily lives so that it would be easier for them to find a topic, and I also decided to clarify the requirements more, and reduce the number of pages and the number of references. (I28, Female)

One instructor claimed that the broader access to data while teaching online made him realize the need to adjust the course to the current educational needs of students: I think that now we have more access to students' thoughts, feedback, actions [...] During the online lecture I read some of the posts on the chat, so I have a clue about which parts of the lecture students have difficulties with. I believe this raises the level of curiosity and may lead to the will to make changes in the course requirements, assignments, and readings. (I39, Male)

Another participant explained how the transfer to ERT made instructors, who are usually "not enthusiastic about making changes in their courses," face the need to adjust their courses to the current era: [...] there is an overall understanding that the transfer to online teaching requires some major changes, and suddenly instructors are more willing to consider taking the time to adjust their courses to this new digital environment [...] In my case, I guess I plan to adjust some of the requirements to better suit students' needs, like reducing the number of quizzes or simplifying the final assignment. (I100, Male)

### ***Promoting collaborations among students—mostly ERT***

The third type of data-driven decision that was repeatedly mentioned by the instructors was designing course activities that promote collaboration among students. This theme was linked to the "collaborative learning" dimension of educational data. The main sources from which the instructors collected data were students' participation patterns and chat correspondence during the synchronous online lectures. This decision was apparent mostly with reference to the ERT mode; it was mentioned in 28% of the citations that referred to the ERT mode, and only in 9% of the citations that referred to the F2F teaching mode.

The respondents who referred to this decision with reference to the ERT mode explicitly mentioned two types of collaborative activities they have incorporated into their courses. The first collaborative activity was to offer students the opportunity to work in small groups on a joint learning outcome. One instructor revealed how she got the idea from reading students' correspondence in the public chat during the synchronous session: I got this advice from a colleague of mine to start saving the chat correspondence from my online lectures. After the lecture, I started reading all the posts and the thing that most caught my eye was that students were eager to hear what their friends are thinking, feeling, doing [...] It made me think about how these students miss the direct connection with their peers, and I

decided to allow them to work on the course assignments in small teams so they will have more opportunities to interact with each other. (I35, Female)

Another instructor also mentioned relying on students' chat correspondence to make decisions about promoting collaborative activities:

I watch how students behave during the online sessions. One thing I have noticed is that most of them ask questions on the chat during Zoom sessions. Students probably feel like they don't have enough support or connections with their classmates since there are no on-site classes. So, I started to put students into small groups, so they could benefit from direct interaction with their peers. I gave each small group a task, asked them to jointly think of a solution to a known problem, and then present their solution to the whole class. (I91, Male)

The second collaborative activity that the instructors promoted was to offer students the opportunity to provide each other with peer assessment. One instructor mentioned she decided to promote peer assessment activities as a response to students' low participation during synchronous sessions:

I have noticed that some of the students seemed completely disconnected during the online lecture, most of them did not look at the screen at all, did not participate in the discussions [...] To increase student engagement, I decided to ask them to answer two short questions before each lecture. During the lecture, I devoted time to peer learning activities, where each pair of students exchanged their answers and evaluated their peer's work. The students loved this activity. (I1, Female)

### ***Supporting students socially and emotionally—mostly ERT***

The fourth type of data-driven decision that was repeatedly mentioned by the instructors was contacting students to offer them social and emotional support. This theme was linked to the "social and emotional support" dimension of educational data. The main sources from which the instructors collected data were students' emails, posts on discussion forums, and chat correspondence. This decision was apparent mostly with reference to the ERT mode; it was mentioned in 29% of the citations that referred to the ERT mode and in only 8% of the citations that referred to the F2F teaching mode.

While referring to the ERT mode, the instructors revealed their concerns that the physical distance between learners, and between them and the teaching staff, "decreases personal interactions with students" (I45, Male), and the "sense of belonging to a learning community" (I70, Male). Accordingly, an action that was repeatedly mentioned by the instructors was contacting individual students to personally provide them with the support they need. Below are two examples:

I still find the online situation awkward and isolating. I believe students feel the same way. During the semester I read a lot of posts and chat correspondence in which students expressed their lack of motivation, their anxieties, and concerns. I realized the need to provide them with extra support, and in most cases I reached out to those students personally, via a private email, suggesting to meet them virtually for an online office hour and tried my best to help them from my own experience. (I32, Female)

Many of my students have personal/financial/emotional problems. Some of them approached me through emails and some expressed their difficulties on the course's discussion forum. In both cases, I contacted those students personally to see if there is anything I can help them with. (I2, Male)

Other instructors mentioned contacting students with the purpose to refer them to professional counseling, such as “college-offered help from the advising center or the school social workers” (I73, Female), acknowledging that “many of them [the students] do need it” (I72, Male).

Two other instructors chose to contact the entire class to provide social and emotional support. The first instructor chose to contact students via a collective email: I feel like there is not enough interaction between the students and between them and the teaching staff. This is why I make sure to contact my students with a weekly email in which I express interest in their well-being, update them on our progress, and of course invite them to offer ideas for improvement. (I68, Female)

The second instructor expressed his intention to contact all students and collect data about their mental health via surveys: They [the students] cannot learn if they are not in good mental health [sic]. Maybe [I will] send all students a pre- and a mid-course survey to check [...] what issues they would like to get help with. (I5, Male)

Several instructors linked their decisions to the unfamiliar and confusing situation that COVID-19 has brought along with it. Some referred to the pandemic openly: A few students reached out about emotional issues, following the ongoing lockdowns due to the coronavirus pandemic. (I1, Female)

While others, such as Instructor 12, referred to the pandemic covertly: In the online version of my course, I guess I make more efforts to understand [...] how they [the students] are feeling in their new daily routine. We are all confused with this new reality we are forced to be in, and we all try to deal with this new situation. (I12, Female)

To sum up, the four themes that emerged from our data are summarized in Table 2.

**Table 2**

*The Four Themes for the Types of Data-driven Decisions, in F2F and ERT*

	<b>Data-driven decisions</b>	<b>Explanation</b>	<b>Teaching mode</b>	<b>Instructional dimension</b>	<b>Data source</b>
1	Providing real-time educational assistance	Contacting students in real-time to suggest educational guidance	F2F + ERT	Course resources	Participation patterns, grades
2	Adjusting course requirements for future students	Adjusting the requirements of the course in retrospect, to better suit the ERT mode	Only ERT	Course resources	Emails, posts on discussion forums
3	Promoting collaborations	Designing course activities that promote collaboration among students	Mostly ERT	Collaborative learning	Participation patterns, chat correspondence
4	Supporting students socially and emotionally	Contacting students to suggest social and emotional support	Mostly ERT	Social and emotional support	Emails, posts, chat correspondence

## Discussion

This study was carried out during the first year of the COVID-19 pandemic outbreak when ERT was the dominant form of instruction on campuses around the globe. As our qualitative findings suggest, in F2F teaching the instructors focused mainly on decisions that relate to academic aspects, such as providing students with real-time educational guidance. Conversely, in ERT, the instructors described a wider range of data sources and a wider range of data-driven decisions, from academic-related issues (such as adjusting the course requirements) to socio-emotional-related issues (such as promoting collaborations among students).

This may be attributed to the notion that online environments provide access to a wide range of data about learners from various sources (Cerro Martínez et al., 2020; Shibani et al., 2020; Tsai et al., 2019), and that analyzing such data can support and guide instructors' decision-making (Archer & Barnes, 2017; Gašević et al., 2016; Gutiérrez et al., 2020). Hence, the access to varied educational data while teaching online might have encouraged our participants to make data-driven decisions. These results are consistent with a recent study that surveyed higher education instructors regarding their interest in learners' data and willingness to make decisions. The authors have concluded that instructors showed more interest in learners' data and an overall willingness to make decisions while teaching online, compared with F2F teaching (Usher et al., 2021b).

The analysis has raised four themes for the types of data-driven decisions the instructors have made in their courses. In F2F teaching, the instructors mostly contacted students in real-time to offer them educational guidance and assistance with the course content and assignments. In ERT, the instructors mostly adjusted the course requirements to better suit remote teaching and learning, promoted collaborations among students, and offered them social and emotional support.

The great emphasis placed on nonacademic issues (such as social and emotional aspects of learning) in times of emergency has been reflected in four recently published articles. The first two articles highlight the students' perspectives. Barrot and colleagues (2021) indicated that the most urgent challenges students encountered during the pandemic were related to their mental health; they experienced anxiety not only from the threats of COVID-19 itself, but also from social and physical restrictions, unfamiliarity with new learning platforms, and concerns about financial resources. Ezra and colleagues (2021) reported a lack of a sense of community or connectedness and social difficulties among higher education students during ERT. The last two articles highlight the instructors' perspective. Walsh and colleagues (2021) reported that faculty members found themselves making deeper, and more personal connections with their students during the ERT, helping them with mental, social, and health issues. Lastly, a quantitative study indicated that during ERT instructors showed a willingness to make decisions mostly based on data about learners' needs for social and emotional support (Usher et al., 2021b).

This inclination to make data-driven decisions regarding nonacademic issues (such as social and emotional aspects of learning) during ERT can be linked to the challenges online learners are facing, especially in times of emergency, where extreme measures, such as quarantine or lockdown, are taken (Ezra et al., 2021). These unique circumstances could aggravate the already known challenges experienced during online learning, such as a lack of support and a sense of loneliness (Kumar & Johnson, 2019; Usher et al., 2021a). Hence, the

instructors in this study may have been concerned about their online students' struggles at such times, which made them pay more attention to socio-emotional issues and make data-driven decisions that relate to these matters.

This study's findings may suggest that there is an opportunity for educational decision-makers to implement a data-driven instructional initiative. For such an initiative to be successful, the educational data should be made accessible to instructors in a way that would make it easy for them to understand the data and make informed decisions (Michaeli et al., 2020; Ndukwe & Daniel, 2020).

Instructors should be encouraged to continue using different types of educational data from different sources for educational decision-making, even with the gradual return to campus and the transition back from ERT to hybrid or F2F teaching. This is especially true for educational data based on students' social, mental, and emotional well-being, which seem to be of special interest to instructors teaching remotely. Moreover, we believe that there is a need for collaborative workshops for instructors aimed at improving their data literacy, further familiarizing them with usage patterns and with different ways to act upon data. This way, the instructors would understand the information that is accessible to them, use data in a broad and efficient context, and connect it to actions that are aimed to improve their courses, both in emergencies and in routine.

### **Limitations and Further Research**

This study has several limitations, which might be seen as a potential for future research. The first limitation of this study derives from its research tool (i.e., an online questionnaire), in which respondents were asked to self-report their perceptions in the context of a single course and regarding its two modes of teaching. Self-reporting tools might suffer from recall bias, social desirability bias, and errors in self-observation. The second limitation relates to the research population. Our qualitative findings were obtained from the perspective of 109 higher education instructors. Thus, we suggest future work on instructors' data-driven decision-making to expand the research settings to a broader, more representative research sample of the population and to examine more clearly defined populations. This is not only to evaluate the extension of the findings of this study, but also to explore further themes related to higher education instructors' data-driven decision-making.

### **Declarations**

The authors report there are no competing interests to declare.

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# **“Were the Fathers Available?”: An Evaluation of Fathers’ Involvement in Emergency Remote Education of Learners Who Are Deaf/Hard of Hearing**

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## **Abstract**

Prior to the emergence of the coronavirus disease in 2019 (COVID-19), studies revealed lower involvement of fathers in the education of learners who are Deaf and Hard of hearing (LDHH). Although research evidence reveals that work structure and other commitments may be responsible for fathers’ limited involvement in the education of their children, there is limited research evidence on the involvement of fathers of LDHH in remote education during the COVID-19 lockdowns. Based on the perceptions of mothers of LDHH, this study therefore explored fathers’ involvement in the remote education of their LDHH. Hinged on the Theory of Planned Behaviour, two research questions were raised and answered in the study. Eight mothers of LDHH from KwaZulu-Natal province in South Africa participated in this qualitative study. Data was gathered via a semi-structured telephonic interview, and the collected data was analysed thematically. The findings revealed that: (i) the involvement of fathers in the remote education of LDHH saw a fair increase during the lockdowns when compared to the pre-COVID-19 era; (ii) (ii) father-child communication approaches, technical devices needed for remote learning, and ability to intervene promptly when technical glitches arises were factors that influenced the perceptions of the fathers’ involvement in the remote education of LDHH during the lockdowns. Based on the findings, appropriate recommendations were made for policy and practice.

*Keywords:* Fathers’ involvement, remote education, learners who are deaf and hard of hearing, COVID-19, sign language

Adigun, O. T., Mosia, P.A., & Mngomezulu, T. P. (2023). “Were the fathers available?”: An evaluation of fathers’ involvement in emergency remote education of learners who are deaf/hard of hearing. *Online Learning*, 27(2), 187-207.

Learners who are deaf and/or hard of hearing (LDHH) are individuals who have difficulties responding to auditory-verbal stimuli through the organ of hearing (Adigun, 2020; Alshawabkeh et al., 2021). In other words, they have hearing disabilities which are not readily visible and only become evident when interpersonal interactions involve the exchange of verbal cues. Inopportunately, LDHH are a heterogeneous group of individuals who are slower than their hearing peers at developing age-appropriate vocabularies. In addition, they have difficulty understanding words with multiple meanings (Adigun, 2019). For example, they may have sufficient challenges to decipher words that may have several meanings such as the word *bank* which could mean a place where money is kept or the edge of a stream. According to Oyewumi et al. (2015), LDHH usually experience a partial understanding of events around them; they have limited access to incidental learning; they have unusual language and communication structures; and they exhibit difficulties maintaining social relationships.

Prior to the emergence of COVID-19, hearing impairment already had a cascading effect on these learners' psychosocial and emotional stabilities, social competence, quality of life and family concerns, learning outcomes and resilience for academic activities within and outside of the classrooms (Adigun, 2020; Akellot & Bangirana, 2019; Su et al., 2020). Earlier studies have shown that even during face-to-face teachings, the performance of LDHH in academic activities does not match up with that of their peers without hearing disabilities (Adigun & Ajayi, 2015; Akellot & Bangirana, 2019; Hrastinski & Wilbur, 2016). Unfortunately, the emergence of the coronavirus disease (COVID-19) which has necessitated a series of lockdowns as a measure to curtail the spread of the virus has aggravated the academic and learning challenges among the LDHH. Although studies have revealed that conscious use of instructional materials, the application of technology (Rice, 2015), and active involvement of parents (Adigun, 2017; Akellot & Bangirana, 2019) may foster positive academic performances and resilience among LDHH. Earlier studies (Adibsereshki et al., 2019; Johnson et al., 2018) allude that loss of the sense of hearing remains a risk factor for impaired resilience. Johnson et al. (2018) added that the lag in communication and required social skills among the LDHH may consequently result in a lower level of resilience for face-to-face or online academic activities. Based on the foregoing, Hallahan and Kauffman (2006) advocate for special educational services and academic support for learners with disabilities in order for them to reach their potential. Some studies note that the parents of learners with disabilities experience more than the average level of stress (Graig et al., 2016; Plant & Sanders, 2007; Smith et al., 2017) and Galpin et al. (2017) also state that learners with disabilities experience a heightened level of stress and may exhibit tantrums when they struggle with some learning tasks. Therefore, such learners require adequate support, particularly from their parents and siblings.

Studies have advanced the implications of family/parental involvement in fostering positive resilience for schooling and learning outcomes among learners with disabilities inclusive of those LDHH (Akellot & Bangirana, 2019; Rice, 2015; Sevinc & Senkal, 2021; Wanjiru et al. 2015; Smith et al., 2017). Specifically, a significant body of empirical evidence indicates that mothers are generally more involved in their children's and family care activities; they engage in active social play and companionship as well as academic-related activities with their children (Akellot & Bangirana, 2019; DesJardin & Eisenberg, 2007; Ortiz et al., 2021; Zaidman-Zait et al., 2018). Interestingly, research evidence over the last two decades has revealed an incremental increase in the contribution and involvement by fathers to overall child development (Asril et al., 2021; Flouri, 2005; Ingber & Most, 2012; Mavrogianni & Lampropoulou, 2018). Various factors

such as increased numbers of women entering the workforce, the parents' own developmental histories, and the children's contextual characteristics such as hearing impairment and sociocultural changes, among others, have influenced the observed increase in fathers' involvement in total childcare (Ingber & Most, 2012; Mavrogianni & Lampropoulou, 2018).

However, variations exist in the reports of fathers' involvement in their children's education in the virtual learning environment, and the researchers of this present study were of the view that the lockdowns occasioned by COVID-19 may positively influence fathers' active involvement and/or commitment towards the emergency remote education of their children. Therefore, based on mothers' perceptions, this present study was instituted to:

1. Determine if fathers were actively involved in the remote education of LDHH during the lockdowns occasioned by COVID-19.
2. Determine the factors that influenced the active involvement of fathers in the remote education of LDHH during the lockdowns occasioned by COVID-19.

## **Literature Review**

### **Issues of Fathers' Involvement in the Education of LDHH in Pre-COVID-19**

Sub-Saharan African nations were unprepared for the enormous social disaster presented by COVID-19. Prior to the emergence of COVID-19, there was an increase in the call for the infusion of information communication technologies (ICTs) and/or deployment of blended learning approaches in the education of learners with special needs, particularly for those with hearing impairment (Adigun & Nzima, 2020). Regrettably, educational approaches for learners with special needs in general were structured for face-to-face teaching and learning activities (Adigun, 2020; Alqraini & Alasim, 2021; Kritzer & Smith, 2020). In other words, all stakeholders inclusive of the teachers of LDHH were unprepared and unskilled for teaching in crisis situations such as the COVID-19 pandemic, and there were no contingency plans for teaching LDHH in this crisis.

Disappointingly, prior to the COVID-19 pandemic, there was an imbalance in the research evidence concerning the involvement of the mothers of LDHH as compared to involvement of the fathers. While studies by DesJardin and Eisenberg (2007), and Lara and Saracosti (2019) have elaborated on the contributions, involvement, and roles of mothers in the education of LDHH, the little research data available reveals less commitment and involvement of fathers in their children's education (Ricci & Hodapp, 2003; Rush, 2015). Studies during the last decade have reported an increase in the amount of time that fathers spend with their children (Crespi & Ruspini, 2015; Flouri, 2005; Pleck & Masciadrelli, 2004; Rice, 2017), but a recent study by Hernawati and Herawati (2020) notes that fathers' involvement in the education of their children is not rated very highly by mothers. Hernawati and Herawati (2020) aver that most fathers hardly have the time to interact with teachers or other students' parents, and rarely take the time to check their children's schoolwork and support them with their assignments. Lamentably, mothers aver that the involvement of fathers in the education of their children at home is less than expected (Radovanović et al., 2020).

Notably, the variations in the levels of commitment of fathers to the education of their children may be informed by various factors, which include but are not limited to how much stimulating social play has been established between fathers and their children (Akellot & Bangirana, 2019; Fischer & Anderson, 2012; Flippin & Watson, 2015; Pancsofar et al., 2013; Roggman et al., 2004); and the fathers' educational backgrounds/attainment (Conger, Conger, & Scaramella, 1997; Radovanović et al., 2020; Sarimski, 2017). As indicated by Musyoka (2015),

cognitive, linguistic, and social development in deaf children is stimulated by play. Through play, deaf children have a high potential to develop and test various aspects of the affective, cognitive, and linguistic capacities of their social world (Pataki, Metz, & Metz, 2014). According to Roggman et al. (2004), interaction of fathers with their children differs significantly from children's interaction with their mothers. Unlike mothers, fathers often react calmly to tantrum-like behaviour among children, engage in more stimulating play with their children, and may also provide soothing responses to their children's queries.

Essentially, the data available has revealed that language homogeneity within the home may foster active father-child interactions (Ricci & Hodapp, 2003; Spencer & Meadow-Orlans, 1996) and by extension active involvement in the children's academic activities. In other words, the deaf children of deaf parents may enjoy more robust academic involvement of fathers (Musyoka, 2015) as compared to the deaf children of hearing parents. Ricci and Hodapp (2003) in their study failed to indicate the contribution of the type and/or severity of a disability on the interaction between fathers and their deaf children; while other studies have indicated a correlation between the type and/or severity of a disability and the concentration of fathers' commitment to the overall development and wellbeing of their deaf children (Konstantareas & Homatidis, 1992; Radovanović et al., 2020).

Radovanović et al. (2020) argued that the development of social competencies and academic resilience among deaf children is influenced by the interaction of external and internal variables. Among the external variables are culture, educational programmes, availability of instructional resources, and robust interpersonal relationships between the children and the adults (Radovanović et al., 2020). Parental involvement in the education of children may also be motivated by some internal factors such as optimism, a positive self-concept, creativity, emotional regulation, a sense of belonging, self-confidence, an internal locus of control, independence, persistence, academic achievement, and a positive interpretation of events (Radovanović et al., 2020; Stanley, 2011). Masten (2014) alludes that a child's educational, social and language development as well as their individual qualities and resilience are developed and stimulated through positive parent-child interactions in a supportive home environment. In a like manner, provision of the academic support needed for learners at home and the involvement of fathers in the education of their children is affected by the fathers' educational attainment, exposure, and some psychological factors such as motivation, skills and self-confidence (Hernawati & Herawati, 2020; Lewis & Lamb, 2003).

### **Fathers' Involvement in the Education of LDHH During COVID-19 Lockdowns: From the Perspectives of the Mothers**

Lockdowns occasioned by COVID-19 which served as a measure to curtail the spread of the virus necessitated the closure of not only business ventures but also face-to-face schooling. According to Green, Burrow, and Carvalho (2020), the emergence of COVID-19 came with elevated social anxiety for all including LDHH, their teachers and their parents alike. Lamentably, COVID-19 raised a higher concern for the economic sustainability of the family and a myriad of unknown circumstances for the future and educational processes were elevated to an "emergency" category, with great dependence on ICTs for pedagogical approaches as essential services. While the lockdowns persisted, the need to engage learners actively and to have continued participation in teaching and learning activities motivated the urgent migration of teaching activities from physical classrooms to totally remote educational activities. Remote educational activities were not only stressful for learners with special needs; they heightened the

level of associated concerns for the quality of the education for LDHH as well as the coping and support mechanisms for parents (Adigun, 2022; Ortiz et al., 2021; Tlili et al., 2021).

Adigun (2022); Alqraini and Alasim (2021); Tlili et al. (2021) further suggested that the challenges of remote education for LDHH were not only elevated by the lack of several assistive technological devices at home but also by the limited knowledge and use of sign language by family members, especially the fathers. Thus, LDHH have had a higher risk of academic and social exclusion due to a lack of the support required for accessibility to synchronous remote education (Kritzer & Smith, 2020; Martins et al., 2015). Regrettably, the academic attention received at home has remained incomparable to the physical attention received from teachers and support staff during face-to-face educational activities. Recent studies by Ayas et al. (2020); Pacheco et al. (2020) assert that many LDHH experience difficulties with maintaining instructional attention and have lower resilience for the virtual/remote education required at home. Alqraini and Paul (2020) state categorically that due to the loss in hearing sensitivity, subtitled lessons are not enough for these students and the lessons need to be supported and guided by teachers and parents. Alqraini and Paul thus recommend active involvement of fathers and mothers in the virtual learning of LDHH.

Since the emergence of COVID-19, especially in Africa, research evidence abounds on the traumatic nature of several father-headed homes (Adebiyi et al., 2021; Mbazzi et al., 2020; Olawale et al., 2021). According to Adebiyi et al. (2021); and Mbazzi et al. (2020), due to job losses and the inability of some fathers to keep up with the financial demands of their homes (Hyland et al., 2020; Mbazzi et al., 2020) there has been an increase in the rate of mental health deficiencies, depression, anxiety, domestic violence, and many other social vices (Hyland et al., 2020). As noted by Adigun et al. (2021), Goggin and Ellis (2020), and Mbazzi et al. (2020), more worrisome has been the depressing and traumatising situations attributed to COVID-19 among the parents of children with disabilities, where the children require continual psychoeducational support, rehabilitation, and therapeutic sessions. More importantly, while the lockdown due to COVID-19 persisted, research evidences had shown active involvement of fathers at seeking early and therapeutic interventions for their children with disabilities (Cacioppo et al., 2021; Karahan et al., 2021; Sato & Araki, 2021), other studies (Adigun, 2022; Rice & Ortiz, 2021; Yazcayir & Gurgur, 2021) had investigated and presented findings on other aspects of online learning engagements among learners with disabilities including those who are DHH. However, there is currently no research evidence that explores the involvement of fathers in emergency remote education of LDHH.

While the lockdown persisted, the researchers of this current study assumed that fathers did not only have ample time to bond with their deaf children but also further understood their children's academic, communication, and social challenges and got actively involved in the emergency remote teaching with their deaf children. Therefore, to validate that assumption and to further understand the involvement of fathers in the remote education of LDHH, this present study leveraged on the perceptions of mothers of LDHH to provide answers to the following research questions:

1. Were the fathers actively involved in the remote education of their LDHH during the lockdowns occasioned by COVID-19?
2. What factors motivated the perceived involvement of these fathers in the remote education of their LDHH during the lockdowns occasioned by COVID-19?

## **Theoretical Framework**

This study was underpinned by Ajzen's (1991) Theory of Planned Behaviour (TPB). The theory (TPB) assumes that individuals (that is, the fathers of LDHH) react rationally. According to Alghazo (2013), such rational behaviour is motivated by an intention, and studies have proven that the intention to exhibit a behaviour is inclined by three factors which are: (a) attitudes, (b) subjective norms, and (c) perceived behavioural control (Adigun, 2020; Ajzen, 1991; Alghazo, 2013; Patton, 2019). Imperatively, elements of the perceived intentions (attitude, subjective norms, and perceived behavioural control) of the fathers to get actively involved in the remote teaching and learning activities of their deaf children were not considered during the process of making the decision to provide the educational support needed for their deaf children during COVID. However, these lockdowns may have unconsciously given the fathers the time to contribute, engage, and be actively involved the remote teaching and learning of their deaf children. However, unwholesome attitudes as well as issues of communication difficulties (Adigun et al., 2015) between hearing parents and deaf children remained a concern for the active involvement of the parents in the education of these LDHH. In other words, even in the presence of mothers, variations in the degree of hearing loss and the home climate, among other external factors, may have influenced the active involvement of fathers in the remote education of the LDHH during the various phases of lockdowns.

## Method and Materials

A qualitative research design was adopted in this exploratory study. The study also adopted the interpretivist paradigm to explore the fathers' involvement in the remote education of LDHH, using the mothers' views as the research lens. A random sampling procedure was used to select eight mothers of LDHH from a total of twenty-seven mothers who were on a WhatsApp platform for an inclusive high school in the province of KwaZulu-Natal, South Africa. The participants selected (coded as M1 to M8) had an intact family (a household with the father, mother and children living together) all through the lockdowns and at the time of data collection. Also, neither the fathers nor the mothers had hearing loss. The study participants were all career mothers who worked from home during the COVID-19 lockdowns. Five of the participants (mothers of LDHH) had children with post-lingual deafness (deafness that occurs after the acquisition of speech and language), while others were with learners with pre-lingual deafness (deafness that occurs prior to the acquisition of speech and language). Among their children, only four mothers had a first-born child with hearing loss. The children of the selected participants all participated in remote teaching and learning activities during the COVID-19 lockdowns.

Data was collected using a recorded telephone interview. The interview was conducted to evaluate the fathers' involvement in the online teaching and learning activities among the LDHH during the COVID-19 lockdowns, based on the perspectives of the mothers of the LDHH. The process of the interview was considered appropriate to observe the physical/social distancing policy of the government (Adigun et al., 2021). The interview schedule therefore covered the following key areas as they pertained to the period of COVID-19 lockdowns:

1. A description of the family life and care of the children who were DHH.
2. The participants' views about the online teaching and learning participation
3. The technology infrastructure and Internet accessibility for the LDHH who participated in remote teaching and learning activities
4. Evaluation of the perceived roles and involvement of the fathers of LDHH in online learning participation of the LDHH



5. Factor(s) that influenced the active involvement of fathers in the online teaching and learning participation of LDHH

The recorded interviews with the participants were played and replayed for transcription purposes. The interviews were transcribed verbatim (Creswell, 2009). The transcribed interviews were coded, and the identities of the interviewees were anonymized. The transcribed document was analysed using thematic content analysis (Cresswell, 2013). As noted by Cohen et al. (2011), the objective of using the thematic content analysis was to identify recurring themes from the set of interview reports. The interviews were organised using the repetitive themes from the transcribed interview documents. The themes generated were used to address and answer the two research questions. The iterative processing of the analysed data aided the comparison and summarization of the interviews.

### **Ethical Consideration**

Approval for this study was secured from the Ethics and Research Committee of the researchers' institution. The study adhered strictly to all the ethics of social science research, as indicated in the Helsinki Declaration. The objective of the study was clearly discussed with the participants before securing their consent and approval to participate in the study. Anonymity and confidentiality of the participants' profiles and responses were assured.

## **Findings and Discussion**

The findings presented below were derived from the interviews conducted with the mothers of the LDHH who participated in various emergency remote education plans during the various lockdowns occasioned by COVID-19 in South Africa. The participants were assigned pseudonyms of M1–M8. A fair increase in the perception of the involvement of fathers in the emergency remote education of LDHH emerged as the theme that responded to **research question one**; while father-child communicative abilities, technology and technical issues emerged as the themes that responded to **research question two**.

### **Research Question #1**

In response to research question one (Were the fathers actively involved in the remote education of their LDHH during the lockdowns occasioned by COVID-19?), the study found that the fathers of LDHH were fairly involved in the emergency remote education of their DHH children during the COVID-19 lockdowns, but the mothers seemed unsatisfied with the level of the fathers' involvement in the education of their children. While participants acknowledged a significant increase in the fathers' concern for the education of their DHH children, many believed that the lockdowns afforded these fathers an extensive opportunity to appreciate the various learning challenges and potential of their children. However, mothers of LDHH who participated in this study indicated that in addition to attending virtually to their own careers, they seemed more overwhelmed with chores and caring for the children than fathers during the pandemic. Below are some of the comments from the study participants.

M2 said that:

...while I had thought that the lockdown was a blessing off office stress, little did I know that I will have little or no time of mine while the lockdown persisted. Of course, I always have office issues to attend, chores and family matters. The virtually school took heavy

toll on my psyche (sic). Although, my husband assisted but you it can't be compared to what I faced.

M4 commented that:

Prior to the lockdowns, my husband's work schedule has not given him ample opportunity to attend to the education of our boy (referring to her deaf child). While I appreciated the fact that we were all at home, he felt belabored with providing the necessary academic support to the boy during his online academic activities.

M4 added that:

...when he (husband to M4) complained of stress he experienced when guiding Mthembu (a pseudo name for the son of M4) through his virtual classes or assignments, I (M4) will just smile because I know that what he does with the boy is little compared to my engagement with Mthembu. Although, I appreciate my husband even with the little he does with the boy.

Virtually all mothers who participated in this study admitted that very limited concern was shown by their husbands (fathers of the LDHH) regarding the education of their deaf children prior to the emergence of COVID-19, but some of the mothers noted that slight changes were observed in their husbands' attitudes towards the educational development of their children while observing the lockdowns. A mother (M6) whose deaf child was the second of her children had this to say:

It was the lockdown that made my husband to have a feel of the children's schoolwork. While I understood the complexities of his job, I have always complained about his attitude to our children's school activities. I once told him that paying their fees wasn't enough of what he could do. Although the lockdowns were frustrating, at least I was happy that my husband had opportunities to examine and assist our daughter (LDHH) with some of her assignments and online school activities.

M6 added that:

In fact, I could practically see the happiness boldly written on the face of my girl (her deaf child) when her father was with her during one of the virtual classes.

While all the mothers observed a slight increase in the involvement of fathers in the emergency remote education of their LHDD, M8, a mother with a deaf girl as her first child said:

My husband's actions and attitude towards my child were not even encouraging; not to talk of getting involved or assisting her in her online schooling activities. I would say, I see no difference from my own end. I had to do my best for my child on my own.

M1 was glad to witness father-child bonding during the lockdowns. She (M1) noted that her husband had no choice but to give some assistance to their son during his virtual classes. In her words, M1 said that:

His (husband of M1) levels of commitment and involvement in my son's online academic activities were increased and better than how they were before the lockdown.

Categorically, I would say that the lockdown was a blessing in disguise. It made both of them (father and son) have a good bonding. My son taught his father some signs as well.

Based on the above responses, it could be assumed that the lockdowns introduced as a measure to curtail the spread of COVID-19 fostered positive father-child relationships by requiring the fathers' involvement in their children's online educational activities. Although the participants of this study wished for more involvement by their husbands/partners, the findings of this current study showed that the level of the fathers' involvement in the education of their LDHH was increased during the lockdowns in comparison to their pre-COVID-19 levels.

The participants' (mothers of LDHH) perceptions of the increased involvement of the fathers could largely be attributed to the lockdowns. This was simply because of the restrictions put in place and the closure of workplaces that forced all to stay indoors. This finding was consistent with the findings of Flouri (2005), Ingber and Most (2012), Mavrogianni and Lampropoulou (2018), and Pleck and Masciadrelli (2004), who noted that since the millennium there had been a substantial increase in the rates at which the fathers of children with special educational needs got involved in the overall development of their children. However, the findings of this present study were not in agreement with those of Hernawati and Herawati (2020) and Radovanović et al. (2020) who reported a lower rating by mothers of fathers' involvement in their children's education.

While Hernawati and Herawati (2020) averred that most of the fathers in their study hardly had sufficient time to interact with teachers and/or other students' parents, rarely took the time to check their children's schoolwork and rarely helped them with their assignments, only one of this present study's participants lamented on the lack of involvement by her husband. This study thus revealed that the fathers of the LDHH had ample time for family bonding and improved on their commitment to the remote teaching and learning activities of their deaf children. Notably though, the participants attributed the increase in the fathers' involvement to the lockdowns occasioned by COVID-19.

Mavrogianni and Venetta Lampropoulou (2020) indicated that fathers' involvement in the education and overall wellbeing of their children with disabilities was invaluable in terms of the provision of the assistance and support needed (academic, emotional, and social), as well as the achievement of family cohesion. Unlike mothers who engaged in social play (Akellot & Bangirana, 2019; Zaidman-Zait et al., 2018) and had spontaneous reactions to antisocial behaviour among their children, Roggman et al. (2004); and Han and Jun (2013) theorized that fathers often reacted more calmly to the tantrums of their children, engaged in a more stimulating form of play with their children and provided soothing responses to their children's queries and academic-related activities. Interestingly, stimulating play has the potential to foster the cognitive, linguistic, and social skills needed for active academic performance among LDHH (Adigun & Itheme, 2020; Musyoka, 2015; Pataki, Metz, & Metz; 2014).

Mothers of LDHH or children with other disabilities may be overwhelmed by various contextual factors such as the degree of their child's disability, comorbidities, house chores and career schedules, among others (DesJardin & Eisenberg, 2007; Ingber & Most, 2012; Lara & Saracosti, 2019; Mavrogianni & Lampropoulou, 2018; Rice, 2015), hence they look forward to receiving substantial support, especially from their husbands. The foregoing portrayed the expectations of the mothers who participated in this current study. While they acknowledged a fair increase in the levels of the fathers' involvement in the emergency remote education of their

DHH children during the COVID-19 lockdowns, these participants looked forward to more active participation and involvement by fathers in the education and overall wellbeing of the LDHH. Interestingly, this current finding deviated from the report by Ricci and Hodapp (2003) who asserted that the research data available at the time of their study revealed less commitment and involvement of fathers in their children's education. The current trend observed in fathers' commitment and involvement in the education of their LDHH may have been influenced by the COVID-19 lockdowns when they were not distracted and occupied by work commitments; by their subsequent increased awareness of the need for them to provide their families with support and care; by their level of educational attainment (Radovanović et al., 2020; Sarimski, 2017), and/or by having gained sensitisation to the public inclusion of people with disabilities, among others.

### Research Question #2

Two themes emerged in response to **research question two** which examined the perceptions of the potential factors that motivated the active involvement of fathers in the remote education of their children, namely *father-child communicative abilities and technology and technical issues*. While this study found that fathers were involved in the remote education of their children who were LDHH, it was determined that the interactions between the fathers and their deaf child(ren) as well as these fathers' capacities for intervention were influenced by their communicative abilities. In other words, while all the participants of this study were non-deaf mothers of deaf children, the communication mode within their homes was largely oral and virtual communication was only used with their deaf children. As such there tended to be communication challenges between these fathers and their children who were LDHH prior to the lockdowns as they hardly had time to interact/communicate with their children using sign language. With respect to the foregoing, some of the study participants shared the following.

M7 said:

In our family, we have always been conversing with the oral mode. This is because we wanted Sam (son: LDHH) to acquire some level of speech. Although he lost his speech and hearing from birth, my husband is of the opinion that through lip reading he would acquire some level of understanding that could help him in the larger society. It is not that we don't know that sign language is best for him, we try to force oral communication on him at home. Unfortunately, there were lapses in communication during the lockdown, particularly when he was being assisted during various virtual classes.

It wasn't easy taking on the role of a teacher of a deaf learner and/or explaining some abstract concepts to their child (girl, deaf learner) during the COVID-19 lockdowns. This was according to M1, who said:

My husband and I had a tough time providing learning assistance to my child during the lockdowns. My husband tried his best to clarify some abstract concepts to her (girl, Deaf learner) but it was somewhat difficult. I strongly believe that her father's lack of proper understanding and inability to communicate with her through sign language created a great lacuna.

M5 disclosed that:

To be candid, inability to effectively communicate via sign language had a negative impact on my son's remote teaching and learning activities. Although, his father tried his best, I must say that his best wasn't enough. You know (referring to the interviewer) remote learning isn't like face-to-face learning for a deaf learner. My son, his father and other family members did our best to provide some explanations to him when he faces some hurdles during his remote classes.

Another participant (M2) had the following to say about father-child communication challenges during remote teaching and learning activities during the lockdowns:

It was evident to my husband that he was far from our son (LDHH). He was not able to efficiently communicate with his son through sign language. Hence, there were some lapses in the father-child instructional support. In fact, there was a time my son got angry with his father and everyone at home. This was because he was left alone while his siblings were working independently on their gadgets.

Comments by the participants with regards to communication difficulties exposed the existence of communication gaps between LDHH and their family members. As revealed during the interview, there seemed to be compelling evidence that deaf children of non-deaf parents were persuaded to respond to oral communication by using their lip-reading skills. The finding of this study was therefore that adoption of sign language within the home environment was still a challenging task for some family members. Thus, academic challenges and poor resilience for online teaching and learning among the LDHH, particularly during the various remote academic activities, may have been aggravated by the lack of efficient two-way communication through sign language.

The finding of this study with regards to two-way communication challenges at home was in line with the previous submissions by Adigun (2017; 2020); Ayas et al. (2020); Johnson et al. (2018); Oyewumi and Adigun (2013); Oyewumi et al. (2015); and Pacheco et al. (2020) who previously established some communication challenges between individuals with deafness and non-deaf members of society. When using verbal communication alone, individuals who are deaf and/or hard of hearing may understand instructions significantly and thus progress and develop age-appropriate vocabularies, albeit at a slower rate of progression. Unfortunately, they tend to get confused with (i) words having the same spelling or pronunciation but different meanings and origins (homonyms) such as site/sight; (ii) words that sound alike but are spelled differently (homophones) such as eye/I; and (iii) words that have the same spelling but different meanings (homographs) such as lean/thin; lean/rest against.

As alluded by Adigun (2020; 2022); Ayas et al. (2020); Alqraini and Alasim (2021); Oyewumi et al. (2015) and Tlili et al. (2021), LDHH experienced unusual language and communication structures and had difficulties sustaining their instructional attention and resilience for academic activities, particularly during remote teachings. Lack of capacity for incidental learning (Adigun, 2017), and uncaptioned virtual teachings (Alqraini & Paul, 2020) may have compelled the LDHH to seek more academic support and further explanations from their parents during the lockdowns. Lamentably, our findings showed that communication difficulties via sign language within the home environment, especially between fathers and their children (LDHH), were a great challenge for efficient remote education for LDHH while the

COVID-19 lockdowns persisted. This finding supported those of Martins et al. (2015); and Kritzer and Smith (2020).

*Technology and technical issues* emerged as a sub-theme which provided an answer to **research question two**. In our quest to explore the factors that influenced the perceived involvement of fathers in the remote education of their children who were LDHH, our study revealed that technology and technicalities were determinants of fathers' involvement in the remote education of LDHH. As revealed through the telephonic interviews with the mothers of LDHH, fathers provided great assistance by resolving technical issues that arose during the various remote teachings and sometimes uploaded and submitted assignments using dedicated links. Below are some of the responses to this effect provided by the participants. M3 disclosed that:

He (referring to her husband) was always there to provide necessary assistance with the laptop. He always assists our daughter with setting up the Zoom and Microsoft Teams which were used for the remote academic engagements during the lockdowns.

In a like manner, M6, whose husband worked remotely for a credit facility company stated that: My husband had a tight work schedule during the lockdowns. He was always online for several meetings and to attend to clients. Even with his busy schedule, I enjoyed the fact that I don't have to worry about loss of Internet connectivity. Because of his job (husband of M6), he makes readily available strong Internet services, and he assisted my daughter with setting up of her virtual classrooms and submissions of her assignments or classwork, as the case may be.

As disclosed by these participants (mothers of LDHH), the fathers of the LDHH were actively involved in providing the technical support required by their children who were deaf and/or hard of hearing. These reported actions of the fathers further established the fact that the fathers of the LDHH gave LDHH the educational support that they required during the lockdowns occasioned by COVID-19. This finding corroborated the earlier findings of Adigun and Ihome (2020); Akellot and Bangirana (2019); Flouri (2005); Ingber and Most (2012); and Mavrogianni and Lampropoulou (2018) who reported positive developments in fathers' involvement and commitment to the education of their children/learners with disabilities.

The current study did not support the findings of Hernawati and Herawati (2020) and Ricci and Hodapp (2003) who reported a lower level of fathers' involvement in the education of LDHH. In addition, the studies of Adigun (2017) and Akellot and Bangirana (2019) exposed the roles of parents, especially the fathers, in the adoption and use of technological devices for the education of LDHH. This current finding was in line with the submissions of Ingber and Most (2012) and Mavrogianni and Lampropoulou (2018) who listed technological characteristics as one of the contextual factors that could predict the active involvement of parents in the education of learners with special educational needs.

## **Discussion**

### **Recommendations for Programmes**

Based on the findings derived from this study through the perceptions of mothers of LDHH, there is a need for conscious efforts by the fathers of LDHH and other learners with disabilities to get involved in the remote education of their children. Fathers should desist from using their work/careers and the need to provide for their families as an excuse to remove themselves from involvement in the education of their children. Schools being attended by LDHH should develop programmes aimed at increasing the involvement of fathers in the teaching and learning activities of these learners. Such programmes should not disturb the fathers' work schedules and must be designed to accommodate virtual participation. The fathers of these learners must be informed well ahead of time to allow them time to arrange their work schedules to accommodate the schools' programmes. Such programmes can involve making the fathers guest speakers on "career days" or teachers for a short period of time. It is the belief of the authors of this study that such a concept will not only enhance father-child bonding but also provide a platform for the active involvement of fathers in their children's education.

In terms of communication, it is highly recommended that fathers of LDHH should devote more time to learning sign language. These fathers' ability to communicate using sign language can be a source of motivation for their children and foster their children's self-esteem and motivation. The fathers' ability to communicate in clear terms using sign language as a mode of communication will aid proper understanding of concepts by the LDHH. This is because these fathers' ability to communicate via sign language will match these learners' style, language ability, and level of understanding.

Strong spousal as well as professional support may foster the level of fathers' involvement needed in the remote education of their deaf and hard of hearing children. This study thus recommends that the mothers of LDHH patiently, persistently, and proactively encourage father-child bonding and the involvement of their spouses in the education of their children (either remote or face-to-face education).

### **Recommendations for Future Study**

Future researchers can examine the long-term effects of the pandemic and home-based variables on fathers' involvement in the remote educational activities of LDHH. In other words, a longitudinal study of fathers' involvement in the remote teaching and learning activities of their children who are LDHH is encouraged. The researcher in this present study intends to apply a quantitative research approach in future studies that investigates the issues of fathers' involvement in the virtual education of LDHH. Such an approach is recommended for a cross-sectional study by other researchers who have an interest in the family dynamics, home environment and education of LDHH.

### **Limitations of the Study**

This present study was not all-encompassing. Only a few mothers participated in the study, and a qualitative research design was employed, hence caution must be exercised when generalizing the findings. In this study, information was extracted regarding the fathers' involvement in the remote education of their children who were LDHH, and the factors that influenced their involvement in the remote education of their children were based on the perceptions of these children's mothers. Therefore, future research on fathers' involvement in the

remote education of their children who are LDHH should involve the fathers and the LDHH as the respondents. It is also suggested that the variables may influence virtual teaching of natural sciences to LDHH be included for investigation in future research on fathers' involvement in the education of LDHH.

## **Conclusion**

COVID-19 has not just had a significant impact on the application of technology for educational purposes; it has also impacted significantly on the various dynamics of family cohesion and the involvement of parents in the education of their children, irrespective of disabilities. There is a paucity of research evidence on the involvement of fathers in the education of their children, both prior to the emergence of COVID-19 and while the virus continues to ravage the globe, hence the need for this explorative study which assessed mothers' perceptions of fathers' involvement in the education of learners who were Deaf and Hard of hearing (LDHH) in South Africa. Based on the perceptions of mothers of LDHH, this present study concluded the following:

1. The perception of involvement of fathers in the education of their children who were LDHH increased during the remote learning associated with COVID-19.
2. Father-child communication competencies (especially with reference to sign language) as well as the fathers' ability to provide the technical devices needed for remote education and intervene promptly during technical difficulties were factors that influenced the perceived involvement of fathers in the remote education of LDHH during the lockdowns occasioned by COVID-19.

## **Declarations**

The author(s) declare no potential conflict of interest.

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# Remote Global Learning: The Role and Use of Virtual Exchange for U.S. and Irish Graduate Students

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## Abstract

The importance of internationalization and effective online collaborative learning is well established, and the recognized value of cross-cultural exchanges by higher education institutions has resulted in a diverse range of initiatives including the use of virtual exchanges. Virtual exchanges are global online learning experiences for students enrolled in postsecondary coursework. The purpose of this study was to examine a virtual exchange learning opportunity for U.S. and Irish graduate education students. Using an online collaborative learning theoretical lens, this case study found that while there were varying levels of commitment and unequal expectations and contributions of the graduate students, students described the importance and significance of the unique learning experience. Implications for research and practice are discussed for future use of virtual exchange within the postsecondary environment.

*Keywords:* virtual exchange, higher education, graduate students

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Identified as a high-impact educational practice by the Association of American Colleges and Universities (AAC&U), *global learning* allows students to “explore cultures, life experiences, and worldviews different from their own” (AAC&U, n.d., para. 9), through intercultural learning activities, global education course opportunities, and study abroad experiences. While high-impact educational practices typically focus on the undergraduate postsecondary student, significant benefits also exist for graduate students participating in study abroad opportunities (Dresen et al., 2019; Witkowsky & Mendez, 2018). However, graduate students often have numerous personal and professional responsibilities, including full-time employment, increased academic responsibilities, and caring for children (El-Ghoroury et al., 2012; Nicklin et al., 2019; Sallee, 2015). These ongoing demands for graduate students may create challenges for engaging in and completing long-term international learning opportunities. As such, it is important to explore creative approaches for graduate students to engage in global learning opportunities, while still providing flexibility to their schedules and personal and professional obligations.

One such option can occur through the use of virtual exchanges—global online learning experiences for students enrolled in postsecondary coursework. Virtual exchanges involve “the engagement of groups of learners in extended periods of online intercultural interaction and collaboration with international peers as an integrated part of their educational programs and under the guidance of educators and/or facilitators” (Garces & O’Dowd, 2020, p. 283). For graduate students unable to participate in study abroad opportunities, virtual exchanges provide the opportunity to engage and collaborate with international peers on projects and activities associated with their program coursework. Often guided by the Collaborative Online International Learning (COIL) framework, virtual exchanges provide students the ability to work together with other students from different backgrounds and cultures, engage in synchronous or asynchronous online interactions with international peers, and participate in reflective activities focused around increasing global perspectives and international initiatives (Online International Learning, n.d.). While there is great benefit for students to develop their global learning competencies and engage in more equitable global learning opportunities, limited research currently exists on graduate students engaged in virtual exchange experiences, as well as their perceptions of the virtual exchange experience.

The purpose of our study was to examine a virtual exchange learning opportunity for U.S. and Irish graduate education students. This study included a central question: What are the perceptions and experiences of an online collaboration with international peers? To expand on the central question, our research work explored questions about (1) peer collaboration within an online learning environment, (2) the role of international collaboration in graduate students’ coursework, and (3) the use of online collaborative tools for synchronous and asynchronous learning activities for graduate students participating in a virtual exchange experience. We sought to understand the student experiences, as well as the structural components of a virtual exchange occurring within the spring 2021 term.

## **Literature Review**

### **Virtual Exchanges and Internationalization of Higher Education**

Defined by the American Council on Education (n.d.) as “a strategic, coordinated process that seeks to align and integrate policies, programs, and initiatives to position colleges and universities as more globally oriented and internationally connected” (para. 1), comprehensive internationalization provides institutions of higher education to collaborate and create

opportunities for student and faculty partnerships throughout the world. The importance of internationalization (de Wit & Altbach, 2021; Mihut et al., 2017) and effective online collaborative learning (Beelen & Jones, 2018) is well established, and the recognized value of cross-cultural exchanges by higher education institutions has resulted in a diverse range of initiatives across the globe for university students to study abroad (Bruhn-Zass, 2021; Hudzik, 2014). Investments in programs such as the Erasmus Program in Europe or individual university study abroad programs are believed to help students adapt to an increasingly global world (Dresen et al., 2019). However, expense and limitations to mobility and time are potentially significant barriers for some students, leading to increased investment by higher education institutions and governments in virtual exchange programs to create more inclusive educational opportunities for all university students. Programs such as The State University of New York's (SUNY's) COIL (Collaborative Online International Learning) model, and several European projects including EVE (Erasmus+ Virtual Exchange), Evaluating and Upscaling Telecollaborative Teacher Education (EVALUATE), and Evidence-Validated Online Learning through Virtual Exchange (EVOLVE) have gained increasing support and interest due to their ability to increase opportunities for students to engage in global collaborations (Arndt et al., 2021; O'Dowd & Dooly, 2020).

The term *virtual exchange* refers to the ways educational institutions and practitioners integrate opportunities within their coursework for students to engage in “online intercultural interaction and collaboration with partners from other cultural contexts or geographical locations” (O'Dowd, 2021, p. 1). In an increasingly digitized world, internationalization within higher education no longer solely requires students to physically travel abroad. Rather, institutions can incorporate internationalization concepts at home and through their curriculum (Bruhn, 2017). Virtual exchanges have the flexibility to be built into a specific class or an entire program level and use internet-based tools and pedagogies to create cost-effective collaborative curriculums (Naicker et al., 2021).

For graduate students, the opportunity to engage in cross-cultural virtual exchange can be particularly appealing. Graduate students, like post-traditional undergraduate students, often simultaneously face additional significant personal, financial, and program-related barriers and stressors that prevent full participation in study abroad opportunities than undergraduate students (Nicklin et al., 2019; Witkowsky & Mendez, 2018). For these reasons, graduate students often prefer online learning environments that provide the necessary flexibility for students who cannot attend traditional face-to-face college courses, making virtual exchanges an opportune alternative to in person study abroad (Dresen et al., 2018; Peterka-Benton & Benton, 2019). Virtual exchanges can further enhance graduate student learning by supporting the development of qualities, attitudes and attributes which will inform students' intercultural competencies and sensitivities. Research has indicated that small-group online activities provide a space where culturally diverse graduate students are able to share their cultural and educational experiences confidently and effectively with their peers (Kumi-Yeboah et al., 2017). Thus, participating in a cross-cultural virtual exchange provides a beneficial introduction to internationalization for graduate students through opportunities to navigate the challenges and confrontations associated with the development of intercultural competencies and promote meaningful and empathetic interactions among learners, skills which will further enhance their future employability (Villar-Onrubia & Rajpal, 2016).

### **Developing Intercultural Competencies**

One of the primary desired outcomes of virtual exchanges is for students to develop intercultural competencies through collaboration with their international peers. Culture is considered the behavior and norms found in societies (McCurdy et al., 2004) and intercultural competencies are the processes by which students navigate these systems in intercultural interactions (Leung et al., 2014). Specifically, intercultural competencies include a set of cognitive and behavioral skills, attitudes and characteristics that determine one's ability to communicate in intercultural situations effectively and appropriately (Swartz et al., 2020). Online collaborations through virtual exchange provide a space for students to actively engage in their learning as well as develop, transform, and assess their intercultural skills and knowledge through discussions and the exchange of ideas and knowledge with international peers (Arndt et al., 2021).

### **Challenges and Opportunities**

While there are numerous benefits to virtual exchange programs, not all virtual exchanges are the same and program design and structure can impact the quality of students' learning outcomes. Mere exposure to culturally diverse peers does not in and of itself grow students' intercultural competencies and the influence of academic culture on virtual exchanges can impact students' expectations of collaboration (King Ramirez, 2020). Without the appropriate support from higher education institutions and educators, virtual exchanges run the risk of enforcing stereotypes or reducing their experience to superficial interpretations of cultural knowledge (O'Dowd, 2021). Academic culture of a specific institution, which is often informed by the regional or national cultural context, includes an institution's educational philosophy, governance, and approaches to teaching and learning and can impact students' collaboration experiences (King Ramirez, 2020). Institutional practices such as scheduling and assessment can impact project sustainability, the coordination of projects and international interactions, and overall goals of the exchange (Magen-Nagar & Shonfeld, 2018b). While research has found that virtual exchanges benefit students through sharing culturally diverse knowledge, academic culture and practices can create challenges due to different culture-specific perceptions of group work, approaches to communication, and developing a sense of interdependence and intersubjectivity within small online groups (Kumi-Yeboah et al., 2017). However, research has shown that the provision of a specific project or task to the group focusing on a global theme or issue leads to more engaged learning experiences (O'Dowd, 2021). This allows for a more collaborative learning experience in which students can take responsibility for learning from one another and establish positive, authentic interactions and relationships with peers from diverse cultures.

### **Theoretical Underpinnings: Online Collaborative Learning**

To promote valuable cross-cultural interactions among students, it is important to implement a high-quality program that creates opportunities for students to become masters of their own digital spaces through both synchronous and asynchronous learning experiences with their peers (Magen-Nagar & Shonfeld, 2018b). The current study developed a five-week course rooted in meaningful intercultural collaboration and framed by the online collaborative learning (OCL) theory. Grounded in constructivist and collaborative learning theories, OCL refers to student-centric instructional practices that encourage students to be active participants in their own learning, and work together in collaborative tasks (Magen-Nagar & Shonfeld, 2018a;

Naicker et al., 2021). Like constructivist and collaborative learning theories, OCL recognizes that knowledge is created to fit reality, and that cognitive processes and learning are impacted by socialization, interaction, and collaboration (Harasim, 2017; Vuopala et al., 2017). However, OCL builds upon these previous learning theories to include the new spaces and intellectual, social, economic, and cultural mindsets created by online digital technologies (Harasim, 2017).

As educational systems expand their teaching and learning online, OCL is a means to alleviate student loneliness in virtual learning settings through an environment that enhances student interaction and socialization irrespective of their physical or geographic location (Magen-Nagar & Shonfeld, 2018a; Vuopala et al., 2017). This in turn allows students to assume control over their own learning, drive and create new knowledge through meaning-making and information sharing, and develop problem-solving and self-reflection skills, while simultaneously becoming more comfortable with technology (Kumi-Yeboah et al., 2017; Magen-Nagar & Shonfeld, 2018a; Naicker et al., 2021). As it relates to the purpose of this research work, the examination of a virtual exchange learning opportunity for U.S. and Irish graduate education students, the OCL framework provides a lens that supports and encourages collaborative tasks within the online learning environment, creating opportunity for rich dialogue and engagement with class peers.

## **Research Methods**

We chose to employ qualitative research methods for this project as the study's purpose was to explore a virtual exchange for students enrolled in Irish and U.S. graduate education programs. As such, a qualitative approach was deemed suitable as the focus of the project was to examine the student experiences using a five-week online collaboration.

### **Ethical Considerations**

The current study was approved by both universities' human research ethics committee. Students participating in the exchange were then provided with study information and consent forms to be interviewed and recorded. Only those who consented to be interviewed and recorded were interviewed. All transcripts have been anonymized and all school and participant information were removed.

### **Design**

This study was structured through an embedded single case study approach (Yin, 2014). A case study approach is to be used when one needs to “develop an in-depth understanding of a single case or explore an issue or problem using the case as a specific illustration” (Creswell & Poth, 2018, p. 96). While a multiple case study approach could have been argued for this project if we explored the Irish and U.S. students as separate cases within a single virtual exchange experience occurring in the spring 2021 term, we instead opted to view this research through an embedded single case study design to account for methodological nationalism (Shahjahan & Kezar, 2013). Specifically, the case was defined as the virtual exchange experience, where we subsequently explored the differing experiences from the two courses included within the virtual exchange. We adhered to key features of the case study design—including multiple sources of information to explore the cases, as well as maintaining awareness of the specific boundedness of the virtual exchange for U.S. and Irish graduate education students during the 2020–2021 academic year (Stake, 1995).

## Sample & Setting

The virtual exchange included 25 students—nine U.S. students (four women and five men) and 16 Irish students (all women). All students were enrolled in graduate education coursework; the U.S. students were enrolled in an educational leadership doctoral program and the Irish students were completing educational psychology doctoral degrees. The courses included for the virtual exchange focused on data analysis and the use and application of data within educational settings. All 25 students participated in the collaborative group project and virtual exchange evaluation. Six students volunteered to participate in the optional student interviews—three U.S. students (two women and one man) and three Irish students. All Irish students were full-time students, completing mandatory full-time work placements in school psychology in addition to completing their coursework. Conversely, all but one U.S. student had full-time jobs in either the K-12 or higher education setting.

The exchange included two institutions of higher education—a large private university in the mid-Atlantic area of the U.S. and a large public research institution in the Republic of Ireland. For both institutions, the courses with the embedded virtual exchange program were housed within the respective education departments. The virtual exchange experience lasted approximately five weeks, occurring in the middle of the spring 2021 term. Due to the difference in time zones, the exchange was structured as an asynchronous experience. Additionally, as the two institutions had different learning management systems (LMS), we created a central website to house all resources, videos, and directions to ensure learning materials were accessible for all participating students. Although the virtual exchange was scheduled to occur as a remote learning experience, due to the COVID-19 pandemic, both courses also had to transition the entire course to an online format. The virtual exchange consisted of three parts: a one-week module where students create video introductions via the FlipGrid platform; a three-week collaboration where the group was divided into four smaller groups and required to complete a group presentation; and a one-week module to reflect and evaluate the virtual exchange experience. For the group project, students were assigned fictional student scenarios. Within each scenario, a student enrolled in the Irish K-12 system is looking to enroll in a U.S. postsecondary institution. Using the Growing Up in Ireland survey (Murphy et al., 2019), the group must identify the specific survey questions associated with the scenario's student profile. Based on their preferences and needs, the groups were then asked to use the National Center for Education Statistics' College Navigator Tool to construct five potential postsecondary options. The intention behind the project was for students to engage with both Irish and American educational tools and collaborate on constructing postsecondary pathways, based on scenario content and group decision.

## Data Collection

We collected several sources of data to gain a deeper understanding of the participants included within this research project, including interviews, student evaluations, and project artifacts (Stake, 1995; Yin, 2014). We all took field notes throughout the virtual exchange experience and assisted in the collection of interviews and student group artifact evaluation. One key source of data was semi-structured interviews. Interviews lasted approximately 40 minutes, with questions related to the perception of virtual exchanges, their experience within the online collaboration, and the role of international peer collaboration in their graduate education experience. Interviews occurred following the completion of the group collaboration and were audio recorded. In addition to the interviews, students' evaluation responses were included

within the data review. The evaluation questions focused on perceived strengths and weaknesses of the online collaboration, areas for potential improvement, and overall takeaways from the experience.

### **Data Analysis**

With our interest in exploring students' international virtual exchange experience and comparing the perceptions of the U.S. and Irish students, this case study was analyzed using a cross-case analytical approach (Khan & VanWynsberghe, 2008; Yin, 2014). It was essential that we did not analyze the findings just superficially (i.e., only demographic or geographic differences), but instead explored how student responses and social interactions within the online collaboration were informed by "larger forces, structures, and histories" (Vavrus & Barlett, 2006, p. 97). More specifically, interviews were transcribed verbatim, read for accuracy, and reviewed several times to ensure that we had an intimate understanding of student experiences in advance of formal qualitative coding (Yin, 2014). The coding process began with open coding with additional iterations occurring and a formal codebook was created. The use of the codebook also assisted in the review of the open-ended questions included within the students' project evaluations. Additionally, review of project artifacts further supported the analysis, as we compared quality of student work to project rubrics. We assessed the group projects separately and reviewed our evaluations and notes as a group.

### **Trustworthiness**

Trustworthiness was considered and maintained throughout the data collection and analysis of this project. Trustworthiness was guided by Lincoln and Guba's (1985) guidelines, with credibility, confirmability, dependability, and transferability considered in the study design. To ensure confirmability, the researchers continuously acknowledged their roles, not only as researchers, but as course instructors. Throughout the project, it was essential that our reflections on the project were collected, and we remained conscious of the importance to reduce researcher bias throughout the process. By thoughtfully connecting this project to the literature and constructing detailed and meaningful decisions to the study's design ensured the project's dependability. Also, although student experiences and perceptions related to their participation in a specific virtual exchange learning experience, there is transferability as there is an increased interest and use of virtual exchanges and online student collaborations within the higher education environment, including due to the in-person travel restrictions occurring due to the COVID-19 pandemic. With a case study approach, several data sources are used to explore the specific unit being examined. As such, triangulation occurred by exploring interviews, student evaluations, and course artifacts (Yin, 2014).

### **Positionality**

Noting our positionality, as well as ethical considerations addressed in the collection and analysis of this research is important to share with the reader. As noted by Marshall and Rossmann (2014), the overall quality of qualitative research depends on the positionality of the researchers. All authors had prior higher education and instruction experience, allowing us to integrate our previous postsecondary and teaching experience to support the needs of students within the two specific institutions, as well as a collective group participating in the international online student collaboration. We all actively participated in the development, implementation, and research investigation related to the virtual exchange experience. More specifically, we

served as the course instructors for their respective courses involved in this collaborative virtual exchange and each author assisted in the overall collection of student data throughout the virtual exchange experience. As this was the first virtual exchange experience for all authors, we maintained ongoing conversation through the entirety of this project to ensure that our perspectives were equally included in data source identified, interview protocol question development, and data analysis. Although the virtual experience project was in development prior to the COVID-19 pandemic, the pandemic intensified our interest and overall exploration of virtual exchange use for graduate students. Committed to the online collaborative learning lens, we engaged in our own online collaboration in the creation and implementation of the virtual exchange in advance of students' participation in the online collaborative learning experience.

## **Findings**

As previously noted, global learning is an important element of students' postsecondary education; however, graduate students often have numerous personal and professional commitments that hinder their ability to participate in in-person international learning opportunities. Virtual exchanges provide a unique experience to engage in global learning by providing collaboration with international peers through a fully online setting. There is currently limited research on graduate students participating in virtual exchanges. Findings presented in this section explore the specific virtual exchange with U.S. and Irish graduate education students and how their experiences contribute to their overall graduate education, connecting to the research questions related to peer and international collaboration, as well as the use of online collaborative tools.

### **Unequal Expectations, Commitment, and Contribution**

In the creation of the virtual exchange, we attempted to create activities that were interesting and applicable to both the Irish and U.S. students. While the activities addressed content from both groups, differences were inevitable. Specifically, Irish students were engaged in mandatory, full-time, in-person educational psychology placements and their virtual exchange was linked to their advanced quantitative coursework. Conversely, U.S. students were educational leaders employed as administrators in the P-20 educational environment and their virtual exchange was linked to a data management and accountability course. Additionally, due to the other work included in the two courses, the virtual exchange activities contributed to different percentages of the students' overall grades. These factors created perceived unequal experiences between the Irish and U.S. students that subsequently accounted for the different expectations and perceived overall commitment to the virtual exchange experience. As noted by one Irish student:

It did appear that this module was more relevant to our counterparts in the U.S. university and perhaps clearer as to the purpose and link with their learning objectivity. There was also a mismatch I feel between the two universities in terms of the weight placed on the assignment and project.

Another Irish student supported the perceived challenges in participating in the virtual exchange with the numerous other expectations of the course outside of the international learning opportunity:

I felt confused and overwhelmed through the project... I then began to feel guilty as the students in the U.S. were eager to schedule online meetings and spend time on the project... I think it might have been bad timing but during those two weeks [of the group project] I had meetings, work, and lectures scheduled every evening after a day on placement.

Although the U.S. students had full-time employment as well, the U.S. students were often flexible in supporting the Irish students and their concern of additional work from their full-day internship placements. For one student, he chalked it up to the push-and-pull created in any type of group project, where flexibility of group members was needed for the group's overall success:

I guess not being able to kind of get together to finish something... Even when you're in a [in-person] group, you know, somebody is doing one piece and you're doing the other and you're all putting it together. I, it really is the same concept, you know, in the beginning I thought it wouldn't be very difficult, but... it is doable. I mean, look what we were able to create with people in another time zone.

This virtual exchange of Irish and U.S. graduate education students highlights how different courses, academic programs, and how the virtual exchange is organized within their overall grade greatly impacts graduate student experiences within the online international learning opportunity. While course evaluations showed the overall value and positive contribution of the virtual exchange experience on the development of their global learning, their responsibilities outside of the virtual exchange, at times, complicated their overall contribution to the group work.

### **The Role of International Peer Collaboration in Graduate Education**

Despite the outside personal and professional obligations, all members of the virtual exchange found value in participating in the online international learning opportunity. While the collaboration, at times, highlighted cultural differences, the Irish and U.S. students came together to engage in group work and connect with new international peers. One U.S. student noted: "We learned so much about each other... this was a great exercise in working with foreign colleagues, who will be great references and friends to have," supporting an Irish student's experience: "It was nice to meet other students from the U.S. and hear about their experiences and fields."

Overall, the virtual exchange not only allowed the graduate students to engage in a collaborative group experience, it created the opportunity for the graduate students—current and future practitioners in the education field—to expand their network through this online learning collaboration. As one U.S. student noted, "I think we're all excited about a new experience and because it's not the same old group work...everybody was so hands-on and excited and looking at new information. So, I feel like it sparked everyone to be very involved." Collaboration not only created the ability to work with new peers but discuss their educational goals and work. For example, one Irish student noted, "I really enjoyed it, I was interested in ... learning about our lives... And so yeah, like, I suppose that was really good to kind of learn that and, and just see how, how their education system is different."



## Technology Use

Technology use was an integral part of the virtual exchange, as online tools would provide the opportunity for students to access virtual exchange readings and assignments, as well as communicate and interact with their international peers. As previously noted, the two institutions included in this virtual exchange did not have the same learning management systems (LMS). To create equitable access to virtual exchange materials, a Google Site was created where all virtual exchange resources and directions were located. Although we allowed students to use technology to best meet their needs, a “recommended technology” page was also included in the Google Site with suggested tech tools (and tutorials) that supported the communicating and collaborating with their international peers during the development of their group projects.

Overall, students used a wide array of technology to prepare and present their virtual exchange group presentations. The submitted group projects showed diversity in the technology used to showcase group findings. As students were required to create a presentation to be accessed asynchronously by the other student groups, it appeared that each group chose different audio and video recording technology when recording their presentations. As one of the male U.S. students noted, “I was pleasantly surprised that everybody... as well as the people in [the Republic of] Ireland were familiar [with technology]. So that was what we use for most of the collaboration, both for the, the, the face-to-face meeting, as well as, um, collaborating on the presentation.” Having students comfortable with technology use in advance of the virtual exchange allowed for less review of specific tech tools.

Although synchronous interactions were, in theory, necessary for peers to prepare and assign tasks for the group presentations, students—due to their numerous personal and professional obligations, most preferred technology that allowed for asynchronous collaboration. One Irish student stressed the use of asynchronous tools to provide flexibility in group communication and project development: “The only thing that was hard was the time difference, because obviously our evenings were their mornings, and we were extremely constrained with time that we could give because we were in placements and couldn't do it during our day. So then we kind of needed them to be kind of flexible, and we were available too.” Supporting this stance, another Irish student noted, “And it was easy from my perspective, that didn't require a lot of work for me to push to make my presentation, which was good for me, because I wouldn't have had the time to give to something big... because we did not have to be online, same time to edit... We used [Google Slides] ... which again, kind of helps that we are all collaborating on the one thing.”

While differences existed in other included themes between the U.S. and Irish students, findings revealed that both U.S. and Irish students understood and were confident in their technology use and how they could use technology to communicate and collaborate with their peers. Overall, the graduate students included in this virtual exchange preferred and saw the value in asynchronous technology to allow flexibility in peer collaboration, while still being able to complete their other personal and professional tasks.

## Discussion

This study focused on student experiences participating in a virtual learning exchange, which ran online for five weeks during the spring 2021 academic year. Participating students were graduate students from two education departments in the U.S. and the Republic of Ireland.

One key theme identified was related to barriers to participation in the virtual exchange. Firstly, while there were similar themes and learning goals within the included virtual exchange courses, there were also differences in course expectations and assignments that the U.S. and Irish students were taking, which may have contributed to perceptions of inequity in terms of commitment and contribution. For the Irish students, other mandatory program requirements served as barriers to participation in the online exchange and were seen as more relevant to their professional training. Insofar as possible, ensuring an alignment between the virtual exchange content and activities and the courses offering a virtual exchange may be important for the student experience (O'Dowd, 2021). Secondly, students enjoyed the opportunity to expand their networks and learn about a different education system. This reflects findings of previous research and highlights the potential for online exchanges when physical, in-person exchanges are not a viable option (Arndt et al., 2021; O'Dowd & Dooly, 2020). Thirdly, technology was used successfully to facilitate interaction and collaboration between the two groups and to produce output. Tools that allowed students to work together asynchronously were important due to time differences, and these gave students the flexibility to participate in their group project alongside other demands. As this initiative took place in spring 2021, around a year into the COVID-19 pandemic, students from both institutions had been learning online during much of the preceding year; this may have facilitated their use of the tools introduced through the exchange.

This project was guided by Online Collaborative Learning theory. The virtual exchange integrated instructional practices that encourage students to work together in collaborative tasks, promoting interaction, positive mutual dependency, and group process (Magen-Nagar & Shonfeld, 2018a) and promoted the use of online technology to explore and discuss different cultural viewpoints (Vuopala et al., 2017). Our findings highlighted the ways OCL created an online learning space that enhanced students' ability to interact with their international peers and provided a lens that encouraged collaborative tasks within the online learning environment.

Several implications can be identified for both future research and practice. As previously noted, virtual exchange is an increasingly popular option for students to gain global learning skills and collaborate with international peers (Garces & O'Dowd, 2020). While global learning opportunities within the postsecondary environment are often focused on undergraduate students, there is great benefit for graduate students to also participate in these unique learning experiences (Dresen et al., 2019; Witkowsky & Mendez, 2018). As such, additional research to explore the successful use of virtual exchanges, including within graduate coursework is warranted. Related, institutions should not only focus on the development of virtual exchanges for undergraduate students but instead establish virtual exchanges for all student levels. As we transition to a post-COVID-19 lockdown world, it is essential to investigate and further establish effective practices for integrating virtual exchange experiences within the postsecondary classroom for both undergraduate and graduate student groups.

That said, it is important for there to be institutional support of the virtual exchange initiative. To ensure successful virtual exchange experiences, institutions must foster relationships with international colleagues and institutions (King Ramirez, 2020; O'Dowd, 2021). This relationship development can support not only future virtual exchange collaborations, but also future research work as well. This was evident in the authors' own experience of online collaboration to develop this exchange. Both institutions were supportive of the introduction and piloting of this program and invested in the growth of virtual exchange opportunities within their respective education departments. Additionally, as virtual exchange relies on the successful integration of website development, learning management systems

(LMS), and appropriate use and applicable training for specific technology applications and tools, institutions need to support the development of virtual exchange experiences through institutional IT and instructional design teams. While there are best practices for developing a virtual exchange experience (i.e., COIL framework), it will be vital for institutions to also identify best practices specific to their faculty and instructor needs.

## **Limitations**

There are several limitations to note on this project. This project was planned and developed in advance of the COVID-19 pandemic. However, this project occurred during the spring 2021 semester—a time that still was impacted by the COVID-19 pandemic. While the virtual exchange was still able to occur due to its online structure, the institutions' courses were also now functioning as fully online course options during the spring 2021 semester. While this created minimal impact, it should be noted as the original intention for the collaboration included synchronous in-person sessions within the students' home institutions. Additionally, while all students participated in the project evaluations, only six students opted to participate in the optional student interviews detailing their experiences of the virtual exchange collaboration. Additional participation in the interviews could have yielded additional information about the virtual exchange experience. Lastly, as noted in the findings, there was varied commitment of the students' due to various academic and professional obligations. While this can occur in any group scenario, future virtual exchange planning will better address students understanding the project's time commitment and requirements.

## **Conclusion**

The purpose of this study was to examine a virtual exchange learning opportunity for U.S. and Irish graduate education students. Specifically, this study explored students' perceptions and experiences of participating in a virtual exchange occurring in the spring 2021 semester. The creation of a successful embedded virtual exchange required online collaborative learning from both the instructor-researchers from the two institutions as well as the participating students- especially as each group faced differences in assessment and course content outside of the exchange. Findings highlighted the need for diverse and robust tech options to support student engagement and the value of international peer collaboration. While there were varied levels of commitment and unequal expectations and contributions of the graduate students, students described the importance and significance of the unique learning experience. There is great benefit to incorporating virtual exchanges into postsecondary coursework and provides global learning opportunities that are more flexible and accessible than traditional study abroad experiences.

## **Declarations**

The authors declare no conflict of interests for this study.

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The authors received approval from the institutional review boards of St. John's University and University College Dublin for this study.

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# Building a Digital Educational Escape Room Using an Online Design-Thinking Process

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## Abstract

There is increasing interest in the application of game-based learning approaches to education. Educators across a wide range of contexts are using digital games such as educational escape rooms to promote learner motivation and support skills development. Whilst the literature describes multiple game-based learning theories that can underpin such strategies, there is little practical guidance on how to integrate such conceptual elements into the design of digital educational escape rooms. This study aims to address this gap, outlining the use of an online design-thinking process to plan, build, and test a digital educational escape room. Our findings suggest that this process provides an effective way of harnessing team collaboration and innovation in the development of digital educational resources. The process provides structure for game design teams, enabling them to address complex or “messy” educational development problems. In utilising an online design-thinking process to design games for learning, we make a number of recommendations. These include taking time to establish psychological safety within the design team so as to facilitate creative team processes and supporting team members to adopt a design-thinking mindset throughout (e.g., regularly taking the perspective of the game user, and testing game prototypes early and frequently). Finally, our study offers a detailed description of how the online design-thinking process can be applied in an education context with the aim of offering guidance to educators and students who may want to design, build, and test their own digital educational escape rooms.

*Keywords:* Design thinking, escape game, escape room, game-based learning, game design, online learning

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The use of games, specifically digital games, in educational contexts has been identified as an important emerging trend (Martin et al., 2020; Park & Shea, 2020). Game-based learning is increasingly used to promote learner motivation and improve the quality of the learning experience for students in a wide range of contexts, including online settings (An & Bonk, 2009; Moreno-Ger et al., 2008; Prensky, 2007). Game-based learning can involve students in game-making as well as game-play, and an increasing body of research focuses on the capacity of game design to support higher order learning such as creativity and critical thinking (Hayes & Games, 2008; Moreno-Ger et al., 2008).

Despite the growing evidence base behind game-based learning, it can be difficult for online educators to incorporate such approaches into their teaching. Whilst educators may be aware of the wide variety of educational theories relating to game-based learning (De Freitas, 2006; Plass et al., 2015; Steinkuehler & Tsasan, 2020), they often lack clear guidance on how to apply such conceptual elements in designing online educational games. Furthermore, there are few frameworks or models that support educators to use game design in online learning contexts (Weitze, 2021).

To address this gap in the literature, our study explores the use of an online design-thinking process to design, build, and test a type of digital game known as an educational escape room. To the authors' knowledge, this is the first study that examines the development of an educational escape room using design-thinking methods mediated entirely within an online environment. First, our article offers a review of the literature relevant to online education, game-based learning, digital educational escape games, and developing educational games using design thinking, followed by details of our research questions. Second, we present a detailed description of our study design and, in particular, the online design-thinking methodology that was used. Third, we present the results of testing an initial digital educational escape room prototype. Fourth, we discuss these results alongside the applications of online design thinking for building digital games.

## **Review of Related Literature**

### **Online Education**

The fostering of interaction and communication within learning communities is a foundational concern of online education (Conrad, 2014). From its roots in distance education, the theory of transactional distance (Moore, 1993) captured the “psychological and communication space” that emerges between teacher and learners (Giossos et al., 2009, p. 2), when they are separated physically and sometimes temporally. High levels of transactional distance require learners to exercise greater levels of autonomy in order to succeed, while learning environments that facilitate a high level of dialogue (constructive interaction) between teacher and learner serve to decrease the transactional distance (Moore, 1993). Although the theory has been criticised for its failure to operationalise the key constructs (Ekwunife-Orakwue & Teng, 2014; Gorsky & Caspi, 2005), the notion of transactional distance is still recognised as an analytical framework that can be used to understand the dynamics of online distance education systems (Gorsky & Caspi, 2005).

The Community of Inquiry (COI) (Garrison et al., 2010) focuses on the elements that support the development of a collaborative online learning environment, and is a well-researched, empirically tested framework within which to plan and research online education (Stenbom, 2018). The COI focuses on three types of presence that have been shown to be critical in online education—social, teacher and cognitive. Social presence refers to individuals' ability



to project themselves as real people, and thus provide a basis for meaningful interpersonal interaction in the virtual world. Teaching presence refers to the actions an instructor takes to guide students along their learning journey (e.g., through dimensions of instructional design). Cognitive presence relates to the extent to which the participants in a learning community are able to construct meaning through sustained communication. It is the goal toward which social and teaching presence are directed, and a manifestation of higher-order learning in the online environment (Moore & Miller, 2022).

The COI emerged at a time where interaction within the community of learners was largely asynchronous. However, more recently, the widespread adoption of video conferencing platforms has opened new avenues for synchronous online engagement as a central modality (Watts, 2016). It has been suggested that synchronous formats may be more suited to socialising and engaging in less complex tasks and planning activities (Hrastinski, 2008; Watts, 2016), while asynchronous modes are better suited to more challenging group activities that require reflection (Hrastinski, 2008; Mabrito, 2006; Watts, 2016). However, media-rich synchronous environments can be used to facilitate deep learning (Overbaugh & Casiello, 2008; Strang, 2013). Online educators are advised to factor in the subject matter, learning outcomes, and learner characteristics when seeking to determine the appropriate mix of synchronous and asynchronous activities (Watt, 2016).

### **Game-Based Learning**

Game-based learning can be defined as “an environment where game content and game play enhance knowledge and skills acquisition, and where game activities involve problem-solving spaces and challenges that provide players/learners with a sense of achievement” (Qian & Clark, 2016, p. 51). In recent years, the growing acceptance of digital games as mainstream entertainment (McClarty et al., 2012; Plass et al., 2015) coupled with an increasing focus within education on transversal skills has led to an enhanced interest in the application of game-based learning approaches in education (Taraldsen et al., 2020). A growing number of studies highlight the capacity of digital games to promote motivation and engagement; facilitate learner-centred feedback; provide opportunities for role play, practice and rehearsal of skills; and foster collaboration, problem solving, and critical thinking (Anderson, 2008; Gros, 2015; Martin et al., 2020).

Digital games are particularly suited to online learning settings. Effective online learning is interactive, flexible, and facilitates connections between educators and peers (Moore et al., 2011). Digital games for learning, if designed well and applied appropriately, can uphold many of these characteristics. Furthermore, games which harness social-constructivist or constructionist learning theories can help meet some of the challenges encountered in online learning environments (e.g., student isolation and lack of engagement) (Hu & Li, 2017; McInnerney & Roberts, 2004). Game-based learning can be employed at multiple different levels, and there is a growing recognition of the value of involving students in the design of educational games (Gros, 2015; Prensky, 2008). Through learning by doing, game design offers students routes to deep learning, and opportunities to engage with authentic problem-solving and creative processes (Prensky, 2008; Qian & Clark, 2016; Vos et al., 2011).

### **Digital Educational Escape Rooms**

Educational escape games, also known as escape rooms or breakout games, are an increasingly common way for educators and students to engage with game-making (Whitton,

2018). Originating from the entertainment industry, escape games can be defined as a “live-action, team-based game where players discover clues, solve puzzles, and accomplish tasks in one or more rooms in order to accomplish a specific goal... in a limited amount of time” (Nicholson, 2015, p. 1). When used for educational purposes, the escape game goals are aligned with learning outcomes for players.

In recent years educational escape games have transitioned into online settings, and are often referred to as digital educational escape rooms (DEERs). DEERs are used in a wide range of settings to address many, varied learning outcomes (Doroudian et al., 2017; Huang et al., 2020), and have proved a popular way of facilitating active and team-based learning during the Covid-19 pandemic (Cates et al., 2020; Ross et al., 2021). In the literature, DEERs have been linked to different educational theories including cognitivist, constructivist, and socio-cultural approaches to learning (Makri et al., 2021; Taraldsen et al., 2020). Although research in this domain is in its infancy, escape games are thought to support the acquisition of knowledge, as well as the development of team-building, problem-solving, and communication skills (Makri et al., 2021).

### **Developing Educational Games Using Design Thinking**

Digital games such as educational escape rooms offer opportunities to improve the quality of online learning experiences (Moreno-Ger, 2008). However, their incorporation into learning environments requires a thoughtful, theory-based approach that reflects the often complex cognitive, emotional, and motivational mechanisms involved (Krath et al., 2021). Educators must understand the variety of pedagogical and game design considerations involved in building engaging game-based environments (Veldkamp et al., 2020). Support and guidance is necessary when integrating game-based learning in online environments (Gros, 2015).

Design thinking offers an established framework for building digital games for learning (Hayes & Games, 2008). Defined as a “way of finding human needs and creating new solutions using the tools and mindsets of design practitioners” (Kelley & Kelley, 2013, p. 24-25), design thinking offers a structured process for teams to engage in collaborative, creative work (Kimbell, 2011). In recent years, the approach has been used extensively in the development of educational escape rooms, both physical (Eukel & Morrell, 2021; Martens & Crawford, 2019; Zhang et al., 2020) and digital (Cordova-Rangel & Caro, 2021; Vold et al., 2021). Design thinking may hold particular value for online educators as the process can be mediated entirely within virtual settings (Alnusairat et al., 2020; Zeivots et al., 2021). Online design thinking has emerged rapidly across a wide range of online learning environments and contexts (Conrad & Farao, 2020; Zeivots et al., 2021).

However, surprisingly few studies explore the use of online design thinking in the development of digital games for learning. Whilst the literature provides several examples of the use of face-to-face design thinking to build *physical* educational escape rooms (Eukel & Morrell, 2021; Martens & Crawford, 2019), there are none, to the authors’ knowledge, which examine the use of online design thinking to build *digital* educational escape rooms. This represents an important knowledge gap for online educators, and one that our study seeks to address. Thus, our research questions are:

1. How can an online design-thinking process be used to design, build, and test a digital educational escape room?
2. What are users' experiences of a prototype digital educational escape room developed using online design thinking?

## Methods

This study forms part of a larger design-based research project that aims to explore how medical students can be supported to manage uncertainty during their undergraduate education. Design-based research offers a flexible approach which allows researchers to design and test educational resources in a naturalistic settings, whilst simultaneously advancing our understanding of relevant theoretical frameworks (Barab & Squire, 2004). Design-based research projects can be organised broadly according to three phases: preliminary research, prototyping, and assessment and reflection (Plomp, 2009). This study focuses on the prototyping phase, specifically the first design cycle of the project and a small-scale usability study. The study employed qualitative data collection and thematic analysis methods in order to uncover rich contextual data around the game users' experiences (Kriz & Hense, 2006).

## Context

In 2021, researchers at RCSI University of Medicine and Health Sciences received funding to design, build, and test a digital educational escape room that aimed to help medical students to manage uncertainty. The focus of the escape room was on supporting students during transitions from pre-clinical, college-based work to clinical placements in hospital settings, an experience that is frequently recognised as stressful and anxiety-provoking (Brennan et al., 2010). A design team was enlisted to build the escape room, and medical students at RCSI, a culturally diverse, international health sciences university with over 4,000 students from 90 different countries, were invited to take part. The core team consisted of ten medical students (six female undergraduate medicine students; three male undergraduate medicine students; one female graduate-entry student) and one educationalist based in the university's faculty learning and development unit. Team members joined from five different countries across three continents.

## Intervention

We used an online design-thinking intervention to design, build, and test our digital educational escape room. This intervention followed the five-phase process of design thinking proposed by the Hasso Plattner Institute of Design at Stanford University (d.school, 2019): empathise, define, ideate, prototype, and test. The project ran over a nine-week period in the summer of 2021, and, during this time, a further 26 medical students, two educational escape room researchers, three medical education professionals, two design professionals, two illustrators, one medical uncertainty researcher, and an audio-visual professional were invited to contribute.

Prior to commencement of the design-thinking process, the lead researcher [JM] developed a high level brief for the project, which delineated how it was intended to support attainment of specific learning outcomes. Informed by socio-cultural theories of how learners engage with and support each other, the educational goal of the escape room was to introduce the topic of uncertainty in healthcare and create conditions that would enable game users to experience uncertainty and explore the processes by which they supported each other as they

progressed through the game. Subsequent to completion of the game, a debriefing session would be used to trigger reflection and offer theoretical inputs to scaffold learners' ability to manage feelings of uncertainty.

The lead researcher created a purpose-built online space that was housed on a Moodle virtual learning platform (Moodle HQ; Perth, Australia). This online environment held details of the project schedule, project aims, online meeting links, weekly activities, team contact details, and acted as a repository for collaborative teamwork and project documentation. Online teamwork and communication was facilitated by several technologies including Zoom (San José, USA), Miro (San Francisco, USA), Padlet (San Francisco, USA), and WhatsApp (Meta; San Francisco, USA). Prior to initiation of the design-thinking process, a series of online activities (e.g., ice-breakers, discussion, and games) were held so as to establish psychological safety and a design-thinking mindset within the group. During these opening online meetings, the team discussed the project design challenge: How might we use a digital educational escape room to help medical students manage uncertainty during transitions into the clinical setting? Overall, we aimed to create an online educational resource that would help medical students to manage uncertainty, with a timeline of nine weeks and a budget of €2,000 to create a prototype.

### *Empathise*

The aim of the first phase of design thinking is the development of a deep understanding of the design challenge and whom it affects. During early discussions, the team identified activities and people that could help them to build insight. We carried out a review of the academic literature with a specific focus on uncertainty and medical students, medical students' experiences of transitions from pre-clinical to clinical environments, and educational escape rooms. We also invited content experts to team meetings to further probe these research domains. As a result, we identified gaps in our knowledge such as, "How might an escape game help users to better manage uncertainty?"; "Is it important or useful for users to experience uncertainty during game-play?"; and "How can the game provide education as well as entertainment?" The team also engaged in discussions which aimed to define our audience for the escape room (i.e., the game users). The audience was primarily defined as pre-clinical medical students, although other relevant stakeholders were identified including clinical medical students, clinical educators, and patients. We spent time reflecting on the diverse nature of medical student cohorts with different socio-cultural and language backgrounds, and varying degrees of interest in, and confidence with, technology-enhanced learning.

We then explored game users' perspectives through a series of empathy interviews. Empathy interviews are a common design-thinking activity which aim to help design teams find out as much as possible about the user's experience with respect to a problem, process, or context. To complete this task, the design team co-constructed a question guide and used this to interview medical students who had recently transitioned from pre-clinical to clinical education. The design team set out to learn more about the students' experiences, address knowledge gaps, and invite advice as to how a DEER may be of value in the context of clinical transitions. The empathise stage of design thinking also invites teams to immerse themselves in the problem and gain inspiration through carrying out fieldwork or observations. To do this, our design team played a variety of online escape games that ranged from simple, online educational games (VetKind, 2020), through to more sophisticated commercial games (Escape Experience Chattanooga, 2021; Experios, 2021).

### *Define*

The second phase of design thinking involves transforming information gathered during the empathise phase into meaningful insights. To do this, the design team engaged in a series of individual and group reflections that included an affinity mapping exercise, a design activity which helps teams to organise large volumes of mixed data into themes or clusters. This activity helped the team to identify themes and scenarios around uncertainty that had emerged from interviews and could be suitable for prototyping. The affinity map was constructed using a mind-mapping software (Miro.com; San Francisco, USA) and resulted in a persistent artefact that could be re-visited at any stage of the project.

The define stage of design thinking also asks teams to reflect on further “How might we...?” questions. In our project, questions that emerged included “How might we make a game that addresses the needs of undergraduate medical students whatever their background and culture?” and “How can our game be made accessible regardless of the user’s experience or confidence with digital learning technologies?” During the define stage, the team proposed a list of draft educational learning outcomes for the DEER, and a set of design principles that could influence design of the game. With respect to the latter, we considered that DEERs that aim to support learning around uncertainty could benefit from:

- An engaging and consistent storyline
- Game goals that align with intended learning outcomes
- Gameplay which supports authentic shared reflection
- Contextualisation of gameplay with appropriate pre-briefing and de-briefing
- Game flow which involves an easy puzzle (“quick win”) at the start
- Puzzles that trigger affective experiences of uncertainty for players

Finally, we explored a range of pedagogical theories and strategies that could inform how learning might take place for the game users, including social constructivism, shared reflection, and the Community of Inquiry framework (Garrison et al., 2010).

### *Ideate*

During the ideate phase, design teams generate and refine ideas that may be relevant to the design challenge. To do this, our team engaged in separate stages of divergent (coming up with as many ideas as possible) and convergent (ranking, sorting, or narrowing ideas down) thinking. We generated and refined ideas with respect to multiple different game elements, including the narrative, game-flow, and puzzles, using an escape game design framework (Botturi & Babazadeh, 2020).

In devising a DEER theme, the design team broke into small groups and were asked to create a vision board using images that represented the “look and feel” of a DEER that would align with medical students’ experiences of uncertainty. The vision boards were created using Padlet (San Francisco, USA) and the teams presented these to each other for feedback and discussion. Then, between sessions, team members were asked to reflect on the discussions and submit ideas for themes anonymously through a shared online document (Google Docs; Alphabet; Palo Alto, USA). At the next session, the design team reviewed the themes and ranked them in order of preference. The team was subdivided into small groups and asked to advance ideas for the two top themes. This was achieved through a storyboarding exercise, facilitated through Miro.com (San Francisco, USA) (Figure 1). The team discussed the different

storyboards, and key ideas from each were synthesised into a draft DEER narrative. This draft narrative was shared with team members who were invited to add and make changes to the story.

### Figure 1

*Detail from Storyboarding Exercise*



In developing puzzles, design team members were assigned to the game learning outcomes using an educational blueprint. Each team member created one or more puzzles and used a reflective template to outline puzzle features (i.e., puzzle type, difficulty, game outcomes, and hint and reward strategies) (Appendix A). Team members then play-tested and gave feedback on each other's puzzles. The team selected the puzzles that they felt were most engaging and aligned best with the DEER learning outcomes. The design team then split into small groups and advanced the chosen puzzles. Finally, the design team play-tested this iteration of puzzles.

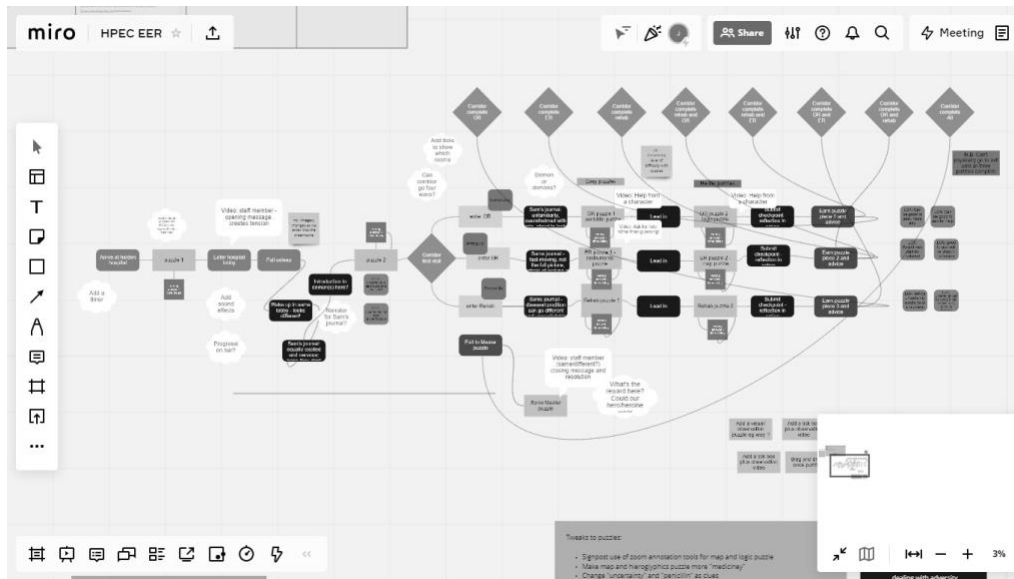
### Prototype

Design thinking is a bias towards action over discussion (i.e., ideas are tested early and frequently through the creation of prototypes). Storyboards and models allow the design team to explore how well, and in what way, their efforts address the design challenge. To test our initial concept, the design team built a prototype DEER on an online interactive content editor platform (Genially; Madrid, Spain). Puzzles were selected and placed in sequence on the platform. The final puzzle selection was cross-checked with the educational blueprint, ensuring that the game learning outcomes were addressed. A puzzle flow chart was created to provide a visual overview of the prototype and the game users' pathway (Figure 2). Finally, the team decided on topics to address during the pre-brief and de-brief aspects of the game-play session.

The resulting prototype consisted of a 10-puzzle game built on the Genially platform. The overall theme for the game was that of a clinical medical student navigating through a creepy, dream-like hospital setting, and a basic storyline was presented through a game character's reflective journal. The puzzle structure was branched or path-based (Nicholson, 2015), and involved a variety of puzzles, including numerical, word-based, logic, and general knowledge.

Each puzzle had an associated hint. This prototype was designed to be used by small groups of players (4-6), who would work collaboratively in online break-out rooms to solve puzzles and earn clues towards a final meta-puzzle. The prototype lacked a developed storyline or sophisticated audio-visual content.

**Figure 2**  
*Puzzle Flow Chart*



**Test**

The testing phase of design thinking asks users to engage with a prototype and elicits their feedback. The aim is to find out what works and why at an early stage of the process, and most design-thinking processes involve multiple stages of testing and refinement. In our project, the testing phase represented a small-scale usability study which aimed to explore game users’ experiences of the Genially platform and the puzzles (e.g., quality, difficulty, and overall flow). Details of the testing stage are provided below.

**Participants**

All medical students enrolled at the university were eligible to take part in testing, and recruitment took place through online, student-led social media channels. In addition, content experts who had taken part in the scoping aspect of the design-based research project were invited to test the prototype. Participants were arranged into play-test groups. There were no specific exclusion criteria, and no incentives were offered to take part in the study.

**Data Collection and Analysis**

In July 2021 the prototype escape room was play-tested with participants. There were two methods of data collection. First, the participants were arranged into small groups of 4-5, and asked to play the prototype game using a concurrent think-aloud protocol (Ericsson & Simon, 1983; McDonald et al., 2012). In accordance with this method, participants were asked to

describe their experiences verbally as they interacted with the game (Ericsson & Simon, 1998). Game-play took place following a short pre-brief (5 minutes) and was followed by a de-brief (15 minutes). During each play-test session a facilitator was present; the facilitator's role was to remind the participants of the think-aloud process and offer help if game-play stalled. The play-test facilitators also collected field notes that captured written observations of the users' interactions with the game.

Second, participants were invited to share their opinions on their game-play experiences in focus group discussions that took place immediately after play-testing. Focus groups were facilitated by experienced researchers, and the question guide sought the participants' experiences of the game itself, the puzzles, and their learning around uncertainty. Participants were also given the opportunity to provide advice to improve the prototype.

Both the think-aloud sessions and focus groups were facilitated through Zoom web-conferencing software (San José, USA). All sessions were video-recorded, and the audio component of each was transcribed by JM. Qualitative data from both the play-test sessions and the focus group discussion were combined and explored using reflexive thematic analysis (Braun & Clarke, 2013). The researchers used an inductive approach to identify codes and themes within the data. The transcriptions were read and re-read several times, and any comments that related to the research questions were noted, resulting in a set of opening codes. These codes were then organised into initial themes. As analysis continued, these themes were refined, re-organised and then allocated a name. The results of this thematic analysis are presented below.

## Results

### Participants

Seventeen students (11 female undergraduate medical students, three male undergraduate medical students, three female graduate entry medical students) agreed to test the prototype and were assigned to four play-test groups. Five content experts (two female escape room researchers, one male game-based learning researcher, one female uncertainty researcher, one male uncertainty researcher) also agreed to take part and were assigned to two further groups.

The following research questions guided researcher engagement:

#### **Research Question 1: How can an online design-thinking process be used to design, build and test a digital educational escape room?**

The results of this study suggest that online design thinking offers an effective approach in the development of digital educational escape rooms. Here, the online design-thinking process resulted in a 10-puzzle game built on a Genially (Madrid, Spain) platform, which was play-tested by six groups of users. All groups reported that the game functioned well, and the platform was deemed easy-to-use and intuitive by the users. All groups were able to progress through the game, although only four out of the six groups completed the escape room within the allocated time. For the groups that did finish, the average duration of play was 59 minutes, with a range of 49 minutes to 1 hour nine minutes.

#### **Research Question 2. What are users' experiences of a prototype digital educational escape room developed using online design thinking?**



Four major themes emerged from the qualitative data analysis: (1) positive aspects of the prototype, (2) negative aspects of the prototype, (3) support of learning, and (4) suggestions for improvement.

### ***Positive Aspects of the Prototype***

Overall, the game users reported many positives about the prototype game and highlighted that it was a fun experience. The main aspects of the game that they enjoyed were working as a team and engaging in challenging puzzles. Game users were also positive about the theme of the escape room, and that it presented a “good representation” of experiences of medical students on clinical placements. They also liked the “feel” of the game, the “creativity” of the storyline, and found the artwork attractive and professional. With regards to the puzzles, game users reported that there was a good variety and mix of difficulty levels. They liked certain aspects of puzzle sequencing; for example, the users appreciated an opening puzzle that was relatively easy. Finally, the game users were largely positive about the Genially platform. They reported that it was intuitive, easy-to-use and, overall, supported teamwork during the game.

### ***Negative Aspects of the Prototype***

Game users also identified several negative aspects of the prototype. For example, there were a range of technical issues such as puzzles glitches, spelling errors, and broken links which they considered had interrupted the “immersivity” of the experience. With regards to puzzles, two were thought to be “under-challenging” with “predictable answers.” It was also considered that there were too many word-based puzzles (e.g., anagrams), and that such puzzles could be especially challenging for non-native English speakers. Game users also suggested that the platform could be more interactive and use more sophisticated game elements (e.g., addition of augmented or virtual reality).

### ***Support of Learning***

With regards to learning around uncertainty, users reported that there were moments within game-play that they felt “helpless” and “uncertain,” and agreed that the game-play effectively provoked these affective experiences. For some, game-play facilitated insights such as “going with your gut,” “being comfortable with being uncomfortable,” and “it’s good to share.” Other users reported that they had failed to learn about uncertainty during game-play. They made recommendations that the game would benefit from stronger links between puzzle content and the evidence base around uncertainty.

With regards to other learning outcomes, the users reported that the prototype had supported them to engage in critical thinking. They considered that the game provided them with a “safe” environment to test ideas and engage in shared reflection. Multiple users mentioned that the game had helped them to appreciate the different strengths, skills, and perspectives of others.

### ***Suggestions for Improvement***

Users also made suggestions for improvement of the escape room. With regards to puzzle design, they thought that there should be fewer word-based and general knowledge puzzles, and more visual or pattern-based ones. Clearer instructions should also be added to some puzzles. Several extra features were suggested including a progress bar, timer, and “scratch pad” to capture written team-work. Participants also thought that a different game strategy (e.g., time penalties or supplementary puzzles for incorrect answers) might help reduce the motivation for

users to engage in guessing behaviour. Successful solving of each clue, and of the game overall, could be linked to a more explicit reward, for example, a message of gratitude from a patient. Game users also offered ways to improve the pre-brief (e.g., providing greater guidance over team roles as well as rules around using the internet to solve puzzles). Finally, game users expressed a preference for a richer audio-visual experience (i.e., improved graphics and the addition of videos and a soundtrack.)

### ***Written Observations***

During play-testing, facilitators collected field notes. According to these written observations, all groups were able to progress through the game. Overall, the Genially platform functioned as expected and the users were able to click through puzzles and content with ease. There were, however, some issues that emerged during game play. For example, the hint strategy was not used by players as intended. Hints were provided to the game users through a map feature. Many groups failed to notice the map and, for others, its purpose was not clear and appeared to cause confusion. Furthermore, the groups that were aware of a hint strategy seemed reluctant to use this function; it is possible the presence of a facilitator during game-play may have had a negative influence on the game users' decisions to use the hint strategy, or to engage in guessing behaviour.

## **Discussion**

Our study set out to explore the use of an online design-thinking process to design, build, and test a digital educational escape room. The results of our first design cycle suggest that the online design-thinking framework supported the creation of a functional prototype educational escape room which was well-accepted by users. Overall, game users were positive about key game elements such as the platform and puzzles, and they commonly reported experiences of fun and enjoyment during gameplay. In addition, the users identified ways in which game-play had supported their learning around uncertainty through both cognitive and affective mechanisms, as well as the value of the game in promoting a “safe” space for teamwork. The users also offered guidance around how to advance the platform, puzzles, and other game elements which can be fed into further design cycles and iterations of the game. In addition, the study results appear to substantiate our initial digital educational escape room design principles.

Whilst our study aimed to evaluate the *product* of online design thinking, an educational escape room, our findings also offer insight as to the *process* of online design thinking and how it can be used to develop games for learning in online settings. Designing games and integrating these into online learning environments can be a “laborious and complex process” (Berg Marklund & Alklind Taylor, 2015, p. 367). When the development process itself is taking place in a technology-mediated context, a complex range of factors need to be considered to provide a holistic insight into the dynamics involved (Bower, 2019). A strength of online design thinking is its capacity to structure such processes, helping game development teams to organise their activities and methods. Moreover, this approach promoted a high degree of dialogue and reduced the transactional distance (Moore, 1993) between students who were grappling with unfamiliar technologies and activities. Design thinking also appears to have helped to facilitate the development of an online community that in many ways mirrored a community of inquiry (Garrison et al., 2010) with the aspects of social, teaching, and cognitive presence clearly evident. Within this community, the educator could scaffold the overall learning experience for the students (i.e., teaching presence) who had little background experience of game design or

game-based learning. Scaffolding has been shown to be particularly important in online learning environments, and educators are advised to reflect on students' needs, and to use appropriate, supportive learning resources and instructional methods (Jumaat & Tasir, 2014).

Furthermore, online design thinking facilitated the creation of a structured blend of synchronous and asynchronous activities (Watts, 2016), with synchronous meetings used to brainstorm and exchange ideas supported by the use of collaborative white board (Duncan et al., 2012; Hrastinski, 2008; Rockinson-Szapkiw & Wendt, 2015), and the asynchronous Moodle virtual learning environment configured to support aspects of the projects that required deeper discussion and reflection (Hrastinski, 2008; Mabrito, 2006). This approach to online communication during the project seemed to facilitate team formation and break down perceived power hierarchies. This supports the notion that students' ideas can attain "greater equality, exposure and consideration" when online design-thinking processes are compared to those that take place in physical design studios (Griffen, 2016, p. 30). The project also cultivated a sense of connection and camaraderie within the team (i.e., social presence) against the backdrop of a particularly difficult year defined by Covid-19 lockdowns and restrictions. Overall, these conditions supported our educator-student team to work together in a genuinely collaborative manner, overcome geographical distance, and to engage effectively with a "messy" design challenge.

Our experiences of online design thinking suggest that this approach offers a unique environment for testing educational games in naturalistic online settings. With its emphasis on human-centredness, design thinking keeps the needs of the user in the foreground as ideas and solutions are generated. Online design thinking, by its very nature, also keeps issues of technology and how learners operate in online settings in sharp focus. It appears that an online environment can offer more insight as to how a target audience may use a digital educational game, as compared to a face-to-face environment. This human-centred approach also meant that the design team engaged in critical thought around how the game could be designed to meet the needs of diverse students from different cultures, backgrounds, and familiarity with digital games for learning. When combined with frequent periods of prototyping and testing, this process led to a digital game that worked well in an authentic online learning setting and was well-received by its target audience.

Online design thinking is not, however, without its challenges. The process is time-consuming and resource heavy. Design teams need to harness expertise from a wide range of disciplines and backgrounds. In addition, careful team facilitation is required. Engaging in creative teamwork can be demanding, especially in online settings where nonverbal interpersonal communication is more restricted and where team members often connect across socio-cultural, language, and time zone barriers. Online design educationalists have noted that design teams' social interactions can be harder to facilitate in online settings (Fleischmann, 2021). It is thus necessary to have design team leads who can generate a learning environment that supports effective communication and encourages individuals to share ideas and offer authentic feedback to each other. Finally, although design thinking can take place on minimal budgets, the process does benefit from some degree of funding. Here, our budget allowed us the freedom to explore different avenues (e.g., test out different escape games, enlist the help of graphic designers, and experiment with different technologies).

## Strengths and Limitations

To our knowledge, this is the first study that explores the use of an online design-thinking process in developing a digital educational escape room. The process can provide insight to educators that would like to use this approach in their own teaching context. However, there are limitations to this study. It should be noted that our student design team had self-selected to take part in the study; thus they were likely highly motivated to take part in the online design-thinking process. Research suggests that students often engage with collaborative online learning interventions to different degrees; some students find it harder to connect online, share ideas, and engage in deep dialogues than others (Thomas & MacGregor, 2005). Our findings may have been different if a wider cohort of students, with varying levels of engagement, had participated. Furthermore, design thinking is a context-specific activity and, as such, further studies that examine its use in designing different types of digital games, in multiple and varied online settings, would be valuable.

## Conclusion

This study set out to explore the use of online design thinking as a model to support educators in harnessing game-based learning and game design in their online learning programmes. In doing so, it viewed the challenge of creating an online design-thinking process in terms of a teaching and learning challenge, mindful of the complex web of elements that require consideration in technology-mediated learning contexts (Bower, 2019). Overall, it was deemed that the design-thinking process worked well in the online setting. The approach proved an effective way of harnessing team collaboration and innovation within a geographically dispersed educator-student team, enabling them to address a “messy” educational development problem. Insights from this study may be helpful for educators, researchers or practitioners who want to use similar methodological approaches and co-create digital educational games with their students. In conclusion, we recommend the online design-thinking process as a strategy to design, build, and test online games for learning such as digital educational escape rooms.

## Declarations

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

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## Appendix A

### Puzzle Reflection Template

Learning outcome: What content is covered?	
Learning outcome: What do you want our gamer to know/do/feel/understand?	
What type of puzzle is this?	
What is the solution?	
What is the reward for getting the solution right?	
What effect does solving this clue have?	
What does the gamer need to do to reach the solution?	
What do we need to create for the gamer to reach the solution?	
What hint might you give to the gamer that gets stuck?	
Overall level of difficulty (tick one)	Easy                      Moderate                      Difficult
What else would you like to say about this puzzle?	

# A Comparison of Cognitive and Social Presence in Online Graduate Courses: Asynchronous vs. Synchronous Modalities

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## **Abstract**

Over the last decade, the prevalence of online courses has continued to grow, and students in higher education are being offered increased access to technology and communication tools in online learning programs. This action research study analyzed the impact of two distinct types of online course instruction (100% asynchronous and weekly online synchronous meetings) on learning outcomes, including cognitive and social presence, knowledge gained, and student perceptions. Study participants consisted of graduate students enrolled in online sections of a course on program evaluation. Four sections of the course were available: Two included a synchronous meeting using web-conferencing, and two used an asynchronous format. A quasi-experimental design was used and included pre- and post-test knowledge assessment, a modified version of the Community of Inquiry (CoI) questionnaire, and end-of-course student evaluations. Our results suggest that when students learn in an asynchronous format, they have a higher cognitive presence. The average scores on the knowledge pre-test were the same for both sections, but post-test scores were slightly higher in the asynchronous section. Instructor ratings were high for all courses. These findings may offer valuable implications to higher education programs that have recently transitioned to online teaching modalities.

*Keywords:* Online instruction, synchronous vs. asynchronous format, cognitive presence

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Over the last decade, the prevalence of online courses has continued to grow, and students in higher education are being offered increased access to technology and communication tools in online learning programs. When the COVID-19 pandemic disrupted work and learning in March of 2020, programs in higher education that had not already adapted to online learning were forced to transition to a digital environment quickly. The importance of recognizing the benefits and limitations of asynchronous and synchronous learning has hence become essential in today's online learning environment. As faculty members discover new ways to engage students in the online classroom, the cognitive and social benefits of these different learning approaches are still being reviewed.

Over the years, research on blended learning (Garrison & Kanuka, 2004; Graham, 2006; Hilliard & Stewart, 2019; Vaughn & Garrison, 2005; Yamagata-Lynch, 2014), flipped classrooms (Ozdamli & Asiksoy, 2016; Young et al., 2014) and distance learning (Midkiff & DaSilva, 2000; Watts, 2016) have provided a variety of recommendations for engaging online students in both asynchronous and synchronous ways. Further, a recent meta-analysis indicated that online synchronous learning could, in fact, result in slightly better learning outcomes when compared to asynchronous online and in-person courses (Ebner & Gegenfurtner, 2019).

Our action research study contributes to this body of knowledge and focuses on a non-traditional graduate student population in particular. The study assesses the value of these types of exchanges in the online environment through both synchronous and asynchronous learning using the Community of Inquiry (CoI) framework. The purpose of the study was to understand how synchronous and asynchronous modalities impact student levels of cognitive and social presence in online learning. Specifically, this research included the following questions:

1. Are there significant group mean differences between the asynchronous and synchronous students' scores on pre- and post-knowledge tests?
2. Does synchronous learning in an online environment elevate social and cognitive presence?
3. Does the use of different online teaching approaches (asynchronous vs. synchronous) impact students' assessment of each course?

Since educational outcomes are “dependent upon the complex dynamics of the purposes, design, and interactions within the educational environment” (Akyol & Garrison, 2001, p. 234), it is important to understand which teaching modalities enable deep learning (Shea & Bidjerano, 2009). The theoretical literature explored includes the CoI instrument (Garrison & Arbaugh, 2007), the type of learning environment, the amount of knowledge gained, and student satisfaction among online classroom modalities.

We should note that throughout this article, we use *synchronous* to refer to online instruction that requires a “live” webinar component of the class. *Asynchronous* refers to online learning that students can complete more autonomously and at an individualized pace. We use these terms generally, recognizing that there are many different models of online instruction (including blended instruction). Our specific online learning contexts are described later in the article.

## Literature Review

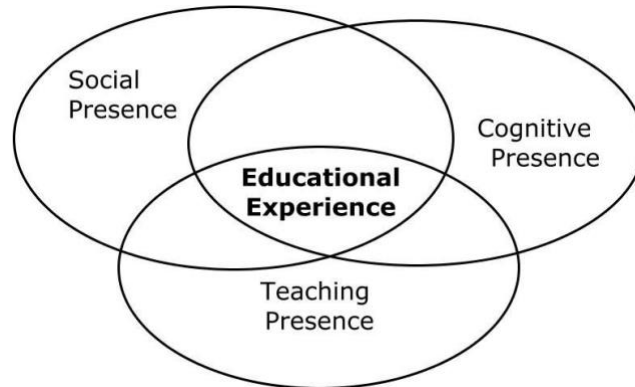
As distance learning has grown, research on the quality of synchronous versus asynchronous learning environments and the quality of the learning experience have improved (Chou, 2002; Lease & Brown, 2009). Thus, teaching methods and practices in the online space have also improved, and different results in student learning outcomes have occurred (Offir et al., 2008). Students have learned to adapt to a variety of online delivery methods and modalities. Because of this, there is increased potential for students to have greater autonomy and flexibility with learning in an online classroom (Slater & Davies, 2020), and the delivery method is key to the primary instructional tasks necessary for student success (Anderson, 2001).

The faculty skills needed to help increase learning in both synchronous and asynchronous classrooms can include facilitation of both social and cognitive learning (Alvarez et al., 2009; Varvel, 2007), and the use of various instructional design tools as well as the traditional tasks of course designer, facilitator, or teacher (Martin et al., 2019). Each of these faculty roles plays an important part in student learning in both synchronous and asynchronous online spaces, and developing an understanding of knowledge building in these environments may help to increase student academic success (Shea et al., 2005). Many faculty members continue to debate whether all course content can effectively be delivered online and whether the most effective delivery is synchronous or asynchronous. Complicating the question of learning outcomes is the issue of faculty instructional preference, student instructional preference, and institutional requirements. Nevertheless, the prevalence of online learning continues to grow whether faculty members are prepared and informed or not (Brown & Green, 2019).

Another confounding issue is how to determine the effectiveness of online education. Some studies examine readily available outcome data like student course evaluations (e.g., Gómez-Rey et al., 2018; Holmes & Reid, 2017) and student course grades (e.g., Joosten & Cusatis, 2020). Other studies have examined factors like course engagement (Cole et al., 2019) and student satisfaction (Choe, 2019). A well-known framework for understanding online classroom engagement and success of an online course is the Community of Inquiry (CoI) framework (Garrison & Arbaugh, 2007). This framework, depicted in Figure 1, is designed to help improve learning online and considers higher-level learning outcomes for cognition and the social presence of students in the online classroom. As asynchronous learning provides students the flexibility to learn at any time, synchronous learning has been viewed as playing a more prominent role in the learning environment, offering immediate feedback and increased learner motivation (Chen, 2006; Hrastinski, 2008). Several studies have been done on the impact of blending online learning with both synchronous and asynchronous (Fadde & Vu, 2014; Power, 2008; Yamagata-Lynch, 2014) and the relationship to learning using the Community of Inquiry (CoI) instrument (Rockinson-Szapkiw et al., 2016). The cognitive and social presence of the CoI instrument has been researched extensively (see, e.g., Garrison et al., 2001; Sadaf & Olesova, 2017) with a variety of implications around the varying abilities of online learners.

**Figure 1**

*Community of Inquiry Framework (Garrison et al., 2000)*



The CoI framework has been used in prior empirical studies to identify learning outcomes and student satisfaction (Garrison et al., 2001; Swan & Shih, 2005), assess the value of case-based student assignments (Sadaf et al., 2021), and explore student-learner perceptions and satisfaction based on different online modalities (Arbaugh, 2008; Garrison et al., 2010). Research related to online learning has increased significantly over the years (Sitzmann et al., 2006; Tallent-Runnels et al., 2006), with meaningful studies supporting the CoI framework as a valid and reliable instrument (Garrison et al., 2000; Stenbom, 2018). This framework was designed to explain the structures of online learning through the thinking processes individuals construct and the individual learning that takes place in group work (Garrison et al., 2001; Sadaf et al., 2021). The CoI framework, shown in Figure 1, offers the basic theoretical model assessing the cognitive, social, and teaching presence of online learning environments and has been utilized by a number of researchers to consider students' perceptions of online experiences (Arbaugh et al., 2008; Hixon et al., 2016; Roulston et al., 2018).

The CoI was designed to review the social, cognitive, and teaching presences of students and instructors in the online educational experience while looking at the classroom discussions, classroom climate, course content, and communication methods used (Garrison & Arbaugh, 2007). The *cognitive presence* dimension focuses on the ability of students to reflect on and find meaning in course content through dialogue with instructors and classmates (Garrison et al., 2001; Garrison et al., 2000). Cognitive participation is crucial to the learning process but can often be challenging to measure (Atapattu et al., 2019). The *social presence* dimension focuses on how participants identify with other students in the online community, develop trust in the learning process and learning space, and how interpersonal relationships develop in the online classroom (Garrison, 2009). Recent research suggests the recognition and cultivation of social presence in the online classroom may also help enhance learner satisfaction (Arbaugh & Benbunan-Fich, 2006; Peacock & Cowan, 2019). While both cognitive and social presences provide explanations for students' higher-level learning, the *teaching presence* dimension offers an understanding of student perceptions of instructional leadership throughout the course. Past research has suggested that instructor availability and real-time access to instructors in an online classroom can increase learning and help students engage in the content (Chen et al., 2019; Martin & Bolliger, 2018). Using the CoI framework to assess asynchronous and synchronous,



and blended learning environments has been a successful tool in several former research studies (Garrison & Kanuka, 2004; Hilliard & Stewart, 2019).

As asynchronous learning has been shown to increase cognitive participation (Lui et al., 2020) and synchronous learning has increased personal participation on the part of the student (Hrastinski, 2008), an analysis of student perceptions and the intersection of these learning experiences between the two formats seems appropriate. For those faculty members attempting to stay current and improve online learning as course delivery methods continuously change, understanding best practices in asynchronous versus synchronous online learning is essential.

## Methods

### Design

For this study, we collected data from students enrolled in graduate-level Human Resource and Organizational Development (HROD) courses at a large public university during the Spring 2020, Summer 2020, and Spring 2021 semesters. The HROD program at this university offers large portions of its curriculum online. This university program has relied on weekly synchronous webinars and continually evolves to meet enrollment, student learning, and university goals. This study specifically sought to compare relationships among Community of Inquiry (CoI) presences between courses offered in a 100% asynchronous and 100% synchronous formats. This study used a quasi-experimental design. The data for this study included student responses to a modified version of the CoI questionnaire (Arbaugh et al., 2008), pre- and post-tests of knowledge, and student end-of-course evaluations.

The independent variables include synchronous course offering (0) and asynchronous course offering (1). The dependent variable in this analysis utilized a modified version of the CoI questionnaire designed to help guide research and understand the student online learning experience (Akyol & Garrison, 2011). The other dependent variable was post-course student evaluations.

### Participants

The sample for this study consisted of students enrolled in a graduate-level course focused on program evaluation. Four sections of the course were available: Two that included a synchronous meeting each week using web conferencing and two offered in a asynchronous format, meaning that no class meeting time was required. The course materials and assignments were the same for all sections. Students self-enrolled into each course section. A total of 103 students enrolled in this course over three semesters, with 62 students enrolled in a synchronous course section and 41 enrolled in an asynchronous course section. Four students were removed from the study for incomplete data leaving a sample size of 99 students. There were a total of 43 men and 56 women in the combined courses.

### Instrumentation

#### *Community of Inquiry (CoI) Questionnaire (Pre and Post)*

The original CoI survey was modified to remove a typo and two repeated questions. Additionally, the *teaching presence* section of the original questionnaire was not used, as the student course evaluations offered by the institution provided similar data. The 21-question survey used a Likert-type scale (1=*Strongly disagree*, 2=*Disagree*, 3=*Neutral*, 4=*Agree*, and 5=*Strongly Agree*). The CoI survey assessed both cognitive presence (*Online discussions were valuable in helping me appreciate different perspectives*) and social presence (*Online discussions*

*help me to develop a sense of collaboration*). The questionnaire is included in Appendix 1 and shows the 21 questions presented to students. Past research has shown the survey to be a reliable and valid instrument (Arbaugh et al., 2008).

### ***Knowledge Questions (Pre and Post)***

The questions used to assess knowledge were developed by the lead instructor. Prior to use in the study, they were sent to the author of the textbook used in the course, who is a well-known expert in the field of program evaluation. The expert provided helpful suggestions, and two questions were edited for clarification.

### ***Course Evaluations (Post Only)***

End-of-course evaluations offer a rich source of data that can be mined to understand perceptions of the experience of the course (Lowenthal et al., 2015). The data on student evaluation of the course presented were obtained from the aggregated, de-identified, post-course evaluations completed in the university's online evaluation repository. The Office of Institutional Research coordinates survey distribution and completion for the purpose of program evaluation. The response rate for the two courses differed. The two asynchronous courses averaged a 58.81% response from students, while the synchronous courses averaged a 52.27% response rate. The two measures chosen for review were the student's overall assessment of the course by combining all questions, and separately, we examined ratings for the instructor.

## **Results**

The results have been organized according to the three guiding research questions. Data for each research question are presented along with the relevant analytical process.

### **RQ1: Are there significant group mean differences between the asynchronous and synchronous students' scores on pre- and post-knowledge tests?**

The pre- and post-tests of knowledge included various questions about course content. These items were developed by the authors and reviewed by an external expert in program evaluation. The highest possible score on these tests was 30 points. Interestingly, average scores on the pre-test were the same for both sections ( $\bar{x} = 20.2$ ). However, post-test scores were slightly higher in the asynchronous section ( $\bar{x} = 26.4$ ) when compared to the synchronous section ( $\bar{x} = 24.6$ ). Results of an independent samples t-test showed no significant difference between the mean scores of the synchronous ( $M = -5.55$ ,  $SD = 3.77$ ) knowledge scores and asynchronous ( $M = -5.507$ ,  $SD = 3.93$ ) knowledge scores  $t(97) = -6.06$ ,  $p = .546$ . These results suggest students' scores on knowledge tests did not differ from asynchronous and synchronous courses.

### **RQ2: Does synchronous learning in an online environment elevate social and cognitive presence?**

Descriptive statistics for the CoI items used in this study are presented in Table 2. Overall, when reviewing the results of the descriptive statistics, the mean results were all above 3.75, indicating limited dispersment of data. This is not ideal, as there could be issues or concerns with item quality. Item quality is important for the accuracy of manually entered data,

completeness of the data, and the ability to identify errors in reliability (Fox et al., 1994). The mean ratings of the CoI ranged 3.75–4.60 out of 5, with cognitive presence receiving the highest mean, followed by social presence. Of the responses for the 21-item survey, Q50 (*I was able to form distinct impressions of some course participants*) had the lowest mean of 3.75 (SD= .873). The highest mean was Q42 (*I can apply the knowledge created in this course to my work or other organizations I am involved in*), with a mean of 4.60 (SD= .605). When reviewing all student responses on the CoI, cognitive presence responses collectively yielded a mean of 4.35 (SD= .509), while social presence resulted in a mean of 4.18 (SD=.574).

**Table 1**

*Descriptive Statistics for CoI Items*

<b>Scale Item</b>	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>S Error</b>	<b>SD</b>
<i>Cognitive Presence Total</i>	99	2.45		4.35	.051	.509
Q31	99	2		4.46	.072	.719
Q32	99	2		4.51	.068	.677
Q33	99	2		4.40	.073	.727
Q34	99	1		4.16	.081	.804
Q35	99	2		4.32	.072	.712
Q36	99	2		4.01	.094	.931
Q37	99	2		4.26	.068	.679
Q38	99	2		4.41	.070	.700
Q39	99	2		4.40	.068	.684
Q40	99	1		4.45	.070	.689
Q41	99	2		4.40	.069	.638
Q42	99	3		4.60	.061	.605
<i>Social Presence Total</i>	99	2.70		4.18	.058	.574
Q43	99	2		4.45	.074	.732
Q44	99	2		4.36	.079	.788
Q45	99	2		4.40	.079	.781
Q46	99	1		3.98	.091	.903
Q47	99	2		4.27	.076	.754
Q48	99	2		4.09	.084	.834
Q49	99	2		3.95	.095	.941
Q50	99	2		3.75	.088	.873
Q51	99	1		3.91	.102	1.011

Cronbach's alpha was used to test each scale for internal consistency and reliability. Both scales showed high levels of internal consistencies (Cronbach's alpha was .897 for cognitive presence and .879 for social presence), indicating how closely related the items are as a group and indicating reliability (consistency) of the items.

**Table 2***CoI Scale Reliability Statistics*

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>S Error</b>	<b>Cronbach's <math>\alpha</math></b>
<i>Cognitive Presence Total</i>	97	47.75	5.64		.897
Synchronous	59	4.26	.530	.069	
Asynchronous	40	4.47	.454	.072	
<i>Social Presence Total</i>	98	41.78	5.77		.879
Synchronous	59	4.19	.611	.079	
Asynchronous	40	4.15	.522	.082	

The group statistics among the key variables of cognitive and social presence and the differences between the variables are displayed in Table 3. There was a significant difference between the cognitive presence scores for synchronous ( $M=4.26$ ,  $SD=.529$ ) and asynchronous ( $M=4.47$ ,  $SD=.454$ ) conditions, and in the independent samples t-test (Table 3)  $t(97)=-2.07$ ,  $p=.041$ . These results suggest that asynchronous learning environments do have an effect on cognitive presence for graduate-level online learners. Specifically, our results suggest that when graduate students learn in an asynchronous format, they have a higher cognitive presence.

To explore this further, two separate independent t-tests (see Table 4) were utilized to compare cognitive and social presence scores, respectively, between participants completing the course in synchronous and asynchronous modalities. The scale scores for cognitive and social presences were calculated from the CoI survey. Social presence was not significant as a predictor in either the asynchronous courses or synchronous courses. A Levene's Test for Equality of Variances was performed, and results indicated that for cognitive presence  $t(97)=2.067$ ,  $p<.041$  was significant, thus indicating that asynchronous courses have a much higher cognitive presence than the synchronous. Additionally, the social presence showed non significance ( $t(97)=.330$ ,  $p>.742$ ), meaning there was no difference in the asynchronous or synchronous courses as it related to social presence.

**Table 3***Independent Samples T-Test of Synchronous vs. Asynchronous Modalities*

<b>Variable</b>	<b>F</b>	<b>t</b>	<b>df</b>	<b>Sig</b>
Cognitive Presence	-.364	-2.067	97	.041*
Social Presence	.262	.330	97	.742

\* $p < .05$

After reviewing the above results of the t-tests by scale, further analysis was conducted to investigate which specific cognitive presence questions between participants completing the course in synchronous and asynchronous modalities showed significant differences. The cognitive presence questions that showed significant results include: Q32 (*Course activities engaged me in the topic*)  $t(96)=-2.032$ ,  $p<.045$ ; Q40 (*I can describe ways to apply the*

knowledge created in this course)  $t(97) = -2.366, p < .042$ ; and Q41 (I have developed solutions that can be applied in practice)  $t(97) = -2.241, p < .027$  indicating significance at the .05 level.

**Table 4**

*Independent Samples T-Test of Cognitive Presence Items of Significance*

Variable	F	t	df	Sig
Q32	8.018	-2.032	96	.045*
Q40	2.366	-2.062	97	.042*
Q41	.504	-2.241	97	.027*

\* $p < .05$

**RQ3: Does the use of different online teaching approaches (asynchronous vs. synchronous) impact students' assessment of the instructor of each course?**

This study utilized items from the university's standard course evaluation form administered at the end of each course to address this research question. This survey is administered centrally by the university's Office of Institutional Research. Items were rated on a 1-5 Likert scale. The items included were:

- Q1: The instructor's teaching was...(rated from poor to excellent)
- Q2: Difficult concepts were explained in a helpful manner.
- Q3: Judging by presentations and answers to questions, the instructor displayed a clear understanding of course topics.
- Q4: The instructor found alternative ways of explaining material when students didn't understand.

Overall descriptive statistics for these items are presented in Table 5.

**Table 5**

*Independent Samples T-Test of Cognitive Presence Items of Significance*

Variable	N	Min	Max	Mean	S Error	SD
Q1	60	2	5	4.63	.101	.780
Q2	60	2	5	4.48	.115	.892
Q3	60	2	5	4.70	.090	.696
Q4	60	2	5	4.47	.099	.769
Overall Score	60	2.45	5	4.57	.087	.672

As this research investigated how ratings of the instructor in synchronous and asynchronous approaches might differ, an examination of the descriptive statistics of instructor rating items by course modality was performed. These data are presented in Table 6.

**Table 6***Synchronous and Asynchronous Instructor Ratings*

Item	N		Mean		SD		S Error	
	Synch	Asynch	Synch	Asynch	Synch	Asynch	Synch	Asynch
Q1	28	32	4.32	4.91	1.02	.296	.193	.052
Q2	28	32	4.14	4.78	1.08	.553	.204	.098
Q3	28	32	4.46	4.91	.922	.296	.174	.052
Q4	28	32	4.18	4.72	.905	.523	.171	.092
Overall	28	32	4.27	4.82	.811	.373	.153	.066

In general, students in the asynchronous courses rated the instructor more highly than students in the synchronous courses rated their instructor. Question 3 (*The instructor displayed a clear understanding of course topics*) received the highest mean score in both synchronous and asynchronous modalities. The lower standard deviations of items from the asynchronous class also indicated that there was less dispersal of the responses. To determine whether statistically significant differences existed between the synchronous and asynchronous courses, a t-test was utilized. These results are presented in Table 7.

**Table 7***Independent Samples T-Test of Synchronous vs. Asynchronous Instructor Items*

Variable	F	t	df	Sig
Q1	34.02	-3.10	58	.001*
Q2	12.92	-2.94	58	.001*
Q3	26.99	-2.57	58	.001*
Q4	3.27	-2.88	58	.076
Overall	11.69	-3.45	58	.001*

\* $p < .05$

The overall mean for the teaching presence questions evaluated indicates a significantly higher mean for asynchronous courses ( $M = 4.82$ ,  $SD = .373$ ) than for synchronous ( $M = 4.91$ ,  $SD = .296$ ),  $t(58) = 26.9$ ,  $p < .001$ ,  $d = .34$ ). The asynchronous mean was significantly higher for Q1 (*general teacher rating*) ( $M = 4.82$ ,  $SD = .373$ ) than for synchronous ( $M = 4.27$ ,  $SD = .811$ ),  $t(58) = 3.40$ ,  $p < .001$ ,  $d = .34$ , and Q2 (*difficult concepts explained*) also showed a higher mean in asynchronous course evaluations ( $M = 4.78$ ,  $SD = .553$ ),  $t(58) = 12.9$ ,  $p < .001$  than those student evaluations in synchronous courses ( $M = 4.14$ ,  $SD = 1.08$ ). In addition, when students were assessed regarding understanding Q3 (*Instructor helped with clear understanding in the course*), the asynchronous course evaluations were significant ( $M = 4.91$ ,  $SD = .296$ ),  $t(58) = 12.9$ ,  $p < .001$  (Table 7). There was no significant difference in student evaluation means of Q4 (*teachers offering alternative ways to explain materials*) between synchronous and asynchronous courses  $t(58) = -.288$ ,  $p = .076$ .

## Discussion

The purpose of this study was to investigate how two different online teaching approaches (asynchronous vs. synchronous) impact graduate student learning, social and cognitive presence, and the evaluation of the teacher in these classroom environments. This research showed that the student has to work harder in an asynchronous learning environment and that student investment in the learning process is more prevalent. Those students who are not interested or invested in the learning process may not be as successful in developing a cognitive commitment to asynchronous learning. Online learning may be more effective at the graduate level, where students have a stronger investment that is not always visible in undergraduate online courses (Mason, 2018).

With the first research question, we sought to understand how synchronous vs. asynchronous delivery methodology impacted student learning. Though the pre-and post-test approach may have only measured information recall and retention (rather than other forms of learning like synthesis or application), results indicated that while there was learning growth from pre- to post-tests, no significant difference in student learning existed between the two modalities. It is important to reiterate that students self-selected the course modality; thus, it is possible that students who selected the asynchronous course understood the more self-directed nature of an asynchronous offering (Zhu et al., 2020).

The second research question examined how social presence and cognitive presence differed between the course delivery modalities. Social presence is defined as “the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities” (Garrison et al., 2009, p. 2). Results indicated that social presence did not differ between course modalities and were both relatively high. For the synchronous course, this could be due to the interactive nature of the webinar sessions, which utilized breakout groups, question and answer sessions, group chats, class discussions, and other active learning strategies (Finelli et al., 2018). In those ways, students were able to connect with peers and instructors and build social relationships. In the asynchronous course, students also reported being highly “socially present” in the class. Strategies encouraging social presence in these particular asynchronous courses included student blogs and wikis, discussion boards, and group work supported by the instructor and enabled through technology. These kinds of strategies encouraged students to connect with peers even though the course never met in person. Additionally, the asynchronous course was not a fully self-paced course, as some asynchronous courses tend to be. That is, students were required to interact with peers and complete modules, discussions, and other interactive content on a weekly basis. This may have aided in building social presence in the classroom.

Along with social presence, cognitive presence of students was investigated. Cognitive presence is defined by the intellectual effort put in by students to engage in course materials, think critically about new information, and identify and solve complex problems (Garrison et al., 2001; Garrison, 2009). Interestingly, cognitive presence *did* differ between the course modalities, with students in the asynchronous course reporting higher levels of cognitive presence. Three items on the cognitive presence scale were more highly rated than others: Q31 (*Topics discussed increased my interest in this course*), Q32 (*Course activities engaged me in the topic of program evaluation*), and Q42 (*I can apply the knowledge created in this course to my work or other organizations I am involved in*). After review, these three areas in particular may be important to consider when developing content for online graduate learning: Student interest, student

engagement, and perception of receiving applicable knowledge in the online course. Past research has shown that something inherent happens in asynchronous classes where students post more detailed reflections, are often more thoughtful in their discussions, and think more critically in these online environments (Vaughan & Garrison, 2005). Additionally, this could reflect the graduate student's interest in the quality of the course content, as asynchronous discussions can offer deeper understanding of others' ideas, more time to reflect on the content, and more detailed responses over time (Meyer, 2005).

It is important to note that each of these asynchronous courses was highly interactive in nature. That said, course design contributes to higher levels of cognitive presence in asynchronous courses. Unlike some asynchronous courses, which simply require reading and testing, these particular asynchronous classes were specifically designed to be more interactive, including structured modules that led students through curated readings, videos, interactive activities (both graded and ungraded), and scaffolded projects (Garrison & Cleveland-Innes, 2005). Previous evidence suggests that intentionally designed course activities increase cognitive presence (Akyol & Garrison, 2011; Midkiff & DaSilva, 2005; Sadaf & Olesova, 2017), and this may have played a role in the results of this research.

It is important to note that these considerations do not exist in isolation (Garrison et al., 2001; Shea, 2009), as the role of the instructor is essential in developing both social and cognitive presence in the online classroom. While specific strategies to engage students socially and cognitively may differ by course and instructor, this study noted a variety of differentiators in teaching. Several specific activities have been supported by previous research as being highly impactful for student learning and engagement (e.g., Martin et al., 2020). Engagement strategies common to both the synchronous modality and the asynchronous modality included communication in the course, such as sending a minimum of two announcements per week to the students. The purpose of these announcements was to encourage students as well as to notify them of upcoming deadlines and milestones. In these announcements, the instructor also highlighted specific student work (i.e., "pats on the back") and discussed the work in student groups. According to Shea and colleagues (2006), "students are likely to report a better sense of learning community when instructors are reinforcing student contributions, injecting their own knowledge, and confirming student understanding" (pg 4). It should be noted that group work for both of these courses was optional. For some assignments, students could choose to work together or choose to work alone. Providing students with this small amount of autonomy and choice may have also increased their cognitive presence and investment in the course. Both courses also included individual tests and quizzes as knowledge checks to evaluate student learning outcomes.

One of the biggest differences in instructor engagement in the synchronous versus asynchronous courses was participation in discussion forums. These were only utilized in the asynchronous course. However, instructors' high visibility and continual engagement with students in these forums throughout the course reinforced their presence, expertise, and support of students. It is important to note, however, that two different instructors taught these courses.

## **Limitations**

This study had several limitations. First, the small sample size limited the ability to perform a question-by-question analysis of both the cognitive and social presence questions. The self-selection of the course was also a possible limitation of the study. Future research should consider a sample size larger than 300. We also recognize that students' ability to self-select into



the synchronous or asynchronous modality may impact their relative success in and satisfaction with the course. Additionally, it is important to note that instructors have different styles and approaches. This factor might have had considerable impact; indeed, many factors may be impacted by different instructors even if the materials and topics are the same. However, as this was an action research study, the realities of course scheduling and staffing issues necessitated different instructors for these courses. Nevertheless, we hope these findings will be useful in designing online courses.

Future research could look at student social and cognitive engagement in a weekly format, alternating from synchronous to asynchronous to measure student perception of the differences in engagement in course components (Moskal et al., 2015). Additionally, a more in-depth analysis of the CoI framework using the four phases of the practical inquiry cycle (triggering events, exploration, integration, and resolution) could have been utilized by operationalizing specific assignments and interactions in the varying courses to identify key differences and similarities (Garrison et al., 2001; Garrison & Anderson, 2003; Vaughn & Garrison, 2005).

This research did not use the teaching presence portion of the CoI instrument due to the number of teaching evaluations already presented to this population of students. However, it is recommended that those using the CoI instrument in the future use this tool or other teaching presence frameworks to measure teaching presence. It is important to recognize that individual students responded specifically to teacher involvement in the synchronous and asynchronous courses.

Another important caveat is that this study took place as the COVID-19 pandemic began to disrupt daily life globally. While no shift in modality was necessary for these courses (they were already offered online), other factors may have affected the study that we cannot fully account for, including student stress and anxiety, instructor stress and anxiety, shifting priorities, job loss, and many other issues. Therefore, the results of this study, while informative, may not be indicative of a “normal” semester or operating environment.

## Conclusion

This evaluation will help determine the future evolution of course curriculum development and may also assist other higher education institutions in understanding whether weekly webinars are valuable learning tools. A recent meta-analysis indicated that online synchronous learning could, in fact, result in slightly better learning outcomes when compared to asynchronous online and in-person courses (Ebner & Gegenfurtner, 2019). Our results suggest this is not always the case. This study may offer valuable implications to higher education programs still navigating the digital transformation. Given the student sample used in this study (working adults), this study may also, by extension, help advance Human Resource Development (HRD) practice by illuminating learning preferences and practices in an online environment. As more and more work is completed remotely, the potential to advance our knowledge of how best employee training can be carried out could benefit from this study’s findings. Researchers in this study recognize, however, that the purpose of this study likely addresses the needs of HRD educators rather than HRD practitioners. Though data analysis is ongoing, our preliminary findings suggest that learning may be equally effective in both types of instruction, but that a high degree of instructor preparation and interaction are necessary for both modalities.

**Declarations**

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

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## Appendix A

### Community of Inquiry (CoI) Questionnaire

#### Cognitive Presence

- Q31: Topics discussed increased my interest in the course.
- Q32: Course activities engaged me in the topic.
- Q33: I felt motivated to explore the topic of program evaluation.
- Q34: I utilized a variety of information sources to explore the topic in this course.
- Q35: Brainstorming and finding relevant information helped me resolve content related questions.
- Q36: Online discussions were valuable in helping me appreciate different perspectives.
- Q37: Combining new information helped me answer questions raised in course activities.
- Q38: Learning activities helped me construct explanations/solutions.
- Q39: Reflection on course content and discussions helped me understand fundamental concepts in this class.
- Q40: I can describe ways to apply the knowledge created in this course.
- Q41: I have developed solutions that can be applied in practice.
- Q42: I can apply the knowledge created in this course to my work or other organizations I am involved in.

#### Social Presence

- Q43: I felt comfortable conversing through the online medium.
- Q44: I felt comfortable participating in the course discussions.
- Q45: I felt comfortable interacting with other course participants.
- Q46: I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.
- Q47: I felt that my point of view was acknowledged by other course participants.
- Q48: Online discussions help me to develop a sense of collaboration.
- Q49: Getting to know other course participants gave me a sense of belonging in the course.
- Q50: I was able to form distinct impressions of some course participants.
- Q51: Online or web-based communication is an excellent medium for social interaction.

## Appendix B

### Teaching Presence Related Course Evaluation Items

- Q1: The Instructor's teaching was (Poor=1, Below Average to Excellent= 5)
- Q2: Difficult concepts were explained in a helpful manner. (Strongly Disagree=1 to Strongly Agree=5)
- Q3: Judging by presentations and answers to questions, the instructor displayed a clear understanding of course topics. (Strongly Disagree=1 to Strongly Agree=5)
- Q4: The instructor found alternative ways of explaining material when students didn't understand. (Strongly Disagree=1 to Strongly Agree=5)



# Adaptation of an Activity Theory Framework for Effective Online Learning Experiences: Bringing Cognitive Presence, Teaching Presence, and Social Presence to Online Courses

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## Abstract

Offering online courses can be seen as a way of enhancing the three essential “presences” (teaching, cognitive, and social) of the Community of Inquiry (CoI) model. Creating and enhancing cognitive, teaching, and social presences require an innovation for teachers during planning, implementing, and evaluating their online courses. As teachers develop their own expertise in teaching online, they contribute to the enhancement of cognitive, teaching, and social presences for effective online learning. The present conceptual study provides a review of the models presented previously and develops a complete model for effective online learning experience by adapting the Activity Theory within the context of online learning management. The study discusses a framework developed to adapt the Activity Theory for the design, development, implementation, and evaluation of online courses to enhance the cognitive, teaching, and social presences within complex cognitive tasks so that the learning outcomes of the course, as well as the required qualifications of higher education, can be reached.

*Keywords:* Designing online course, activity theory, models for online learning, community of inquiry.

Gogus, A. (2023). Adaptation of an Activity Theory framework for effective online learning experiences: Bringing cognitive presence, teaching presence, and social presence to online courses. *Online Learning*, 27(2), 265-287.

While shifting to digital learning environments, it becomes vital to support teachers for adapting their teaching to online platforms and appropriate teaching and assessment techniques. This became evident during the Covid-19 pandemic in early 2020. Dhawan (2020) conducted a study about the importance of online learning and the Strengths, Weaknesses, Opportunities, & Challenges (SWOC) analysis of e-learning models in the time of crisis. The digital transformations of teaching and learning are faced with several challenges. These challenges include the lack of teaching experiences, the use of technology skills, time constraints to plan for the accompanying changes, and issues to enhance effective online learning environments (Adedoyin & Soykan, 2020; Dhawan, 2020; Gogus, 2021; Yakubu & Dasuki, 2021). It is challenging to develop content which not only covers the course plan but also involves students (Dhawan, 2020; Kebritchi, et al., 2017). Enhancing effective learning environments requires the use of well-developed models for online learning environments. Online learning is not about accessing information but, rather, about learning via online courses by active and collaborative engagement in exploring, creating meaning, and confirming understanding. Therefore, to enhance effective learning, creating collaborative communities of inquiry in online learning environments is required, as suggested in Garrison, et al. (2000). According to Garrison (2009):

A community of inquiry goes beyond accessing information and focuses on the elements of an educational experience that facilitates the creation of communities of learners actively and collaboratively engaged in exploring, creating meaning, and confirming understanding (i.e., inquiry). Constructing knowledge through discourse and shared understanding requires more than disseminating information either through a study package or lecturing. It requires a commitment to and participation in a community of learners that will support critical reflection and collaborative engagement. (Garrison, 2009, p.352)

Offering online courses can be seen as a new way to enhance cognitive presence, teaching presence, and social presence. Rogers (1983) defines an innovation as an idea, practice, or object perceived as new by an individual. Individual teachers may pass through a technology adoption process whereby teachers progress through various stages as they integrate technology into their instruction (Gogus, 2005; 2008; 2021). Rogers (1983) defines diffusion as a process that individuals pass through over time in the stage of knowledge, persuasion, decision, implementation, and confirmation in the innovation-decision process. Rogers' (1983; 2003) model of stages in the innovation-decision process helps us to understand the evolution of teachers' decision-making process as they develop expertise on teaching online courses.

Those three presences are embodied in the Community of Inquiry (CoI) model for online learning environments, developed by Garrison et al. (2000), reflecting a collaborative-constructivist approach to learning. Providing an effective online course requires bringing a cognitive presence into class to construct meaning through sustained communication (Garrison, et al., 2001). Garrison, et al. (2001) define cognitive presence as “the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry” (p. 11). While adapting to teaching online, teachers can develop expertise to facilitate higher levels of learning in synchronous courses and asynchronous text-based discussion tools to enhance cognitive presence (i.e., critical, practical inquiry) besides teaching presence and social presence.

On the other hand, activity theory offers a conceptual framework for studying human behavior (Engeström, 1987; Leont'ev, 1978) and, thus, provides a clearer view for examining how to mediate teachers' technology integration practices. An activity system is a means for conceptually defining social and material resources that interact to enable and constrain what individuals and social groups can accomplish (Engeström, et al., 1999; Anthony, 2012). By adapting activity theory to online learning management contexts, the present study aims to present how to design and deliver online courses that enhance cognitive, teaching, and social presences. This study presents a complete activity theory framework, details each part of the Activity theory and shows the puzzle in its complete form. The complete framework gives teachers and educational designers meaningful insight during planning, implementing, and evaluating their online courses. Thus, teachers use the framework to develop their own expertise in teaching online and enhancing cognitive, teaching, and social presences for effective online learning. Also, using the framework allows teachers to improve the processes or the learning outcomes (Shambaugh, 2010; Yakubu & Dasuki, 2021).

Creating and enhancing the cognitive presence, teaching presence, and social presence require an innovation for teachers during planning, implementing, and evaluating their online courses. As teachers develop their own expertise in online teaching, they contribute to the enhancement of the three presences in online learning. The model developed in the present article can guide teachers to implement effective and efficient online learning activities for bringing cognitive, teaching, and social presences into class. This paper contributes to the field of Educational Technology Research and Development by reviewing the online learning models and explaining many complex relations using the following sub-titles to discuss: (1) The importance of online learning and Strengths, Weaknesses, Opportunities, & Challenges (SWOC) analysis of e-learning modes in the time of crisis (Dhawan, 2020); (2) A review of the most relevant models: Connectivism (Siemens, 2005), Online Collaborative Learning (OCL) (Garrison, et al., 2000; Harasim, 2012), Anderson's Online Learning Model (Anderson, 2011), Bosch's Blending with Pedagogical Purpose Model (Bosch, 2016), Picciano's Multimodal Model for Online Education (Picciano, 2017), and Community of Inquiry (CoI) (Garrison, et al., 2000); (3) The importance of the elements of the CoI Framework (Garrison, 2009, p. 353; Martin, et al. 2022; p.340); (4) Specific lesson plan activities as related to the four phases of cognitive presence from McCarroll and Hartwick, (2022), in which the impact of weekly task design and the facilitation of (either synchronous or asynchronous) lesson plans on the learner- and teacher-perception of cognitive presence based on four phases: initial interaction, exploration, integration, and resolution; (5) The steps of a complete framework which activity theory offers for teachers and educational designers to gain meaningful insight for planning, implementing, and evaluating their online courses; (6) The complex tasks within Figure 5 presents Effective Online Learning Experience and Activity Theory Framework that offers a conceptual framework for studying human behavior (Engeström, 1987; 2001; Leont'ev, 1978) and a lens for examining how to mediate teachers' technology integration practices for effective online learning experiences.

## **The Importance of Online Learning and Strengths, Weaknesses, Opportunities and Challenges (SWOC) Analysis of e-Learning Modes in the Time of Crisis**

Online learning is defined as learning experiences in synchronous or asynchronous environments using different devices with internet access by connecting to a course anytime and anywhere (Singh & Thurman, 2019). The issues related to online pedagogy are stated as accessibility, affordability, flexibility, learning pedagogy, life-long learning, and policy. The challenges posed by the COVID-19 pandemic pushed online learning beyond choice and into necessity (Dhawan, 2020). Regarding online learning, a lack of standards seems to pose further challenges for quality, quality control, development of e-resources, e-content delivery, and the quality of online education (Cojocariu, et al., 2014; Dhawan, 2020). Educators should consider developing and enhancing the quality of online courses delivered during crises (Affouneh, et al., 2020). Many academic institutions now seek more effective online learning to improve teaching and learning processes. Dhawan (2020) conducted a study about the importance of online learning and the SWOC analysis of e-learning modes in the time of the crisis, during which online teaching was no more an option but a necessity. Dhawan (2020) presents the SWOC analysis of online learning as in Table 1.

**Table 1**

*The SWOC (Strengths, Weaknesses, Opportunities, & Challenges) Analysis of Online Learning During Such Crises (Dhawan, 2020, p.14)*

<p><b>STRENGTHS</b></p> <ol style="list-style-type: none"> <li>1. Time flexibility</li> <li>2. Location flexibility</li> <li>3. Catering to wide audience</li> <li>4. Wide availability of courses &amp; content</li> <li>5. Immediate feedback</li> </ol>	<p><b>WEAKNESSES</b></p> <ol style="list-style-type: none"> <li>1. Technical difficulties</li> <li>2. Learner’s capability &amp; confidence level</li> <li>3. Time management</li> <li>4. Distractions, frustration, anxiety &amp; confusion</li> <li>5. Lack of personal/physical attention</li> </ol>
<p><b>OPPORTUNITIES</b></p> <ol style="list-style-type: none"> <li>1. Scope for innovation &amp; digital development</li> <li>2. Designing flexible programs</li> <li>3. Strengthening skills: problem solving, critical thinking, &amp; adaptability</li> <li>4. Users can be of any age</li> <li>5. An innovative pedagogical approach (radical transformation in all aspects of education)</li> </ol>	<p><b>CHALLENGES</b></p> <ol style="list-style-type: none"> <li>1. Unequal distribution of ICT infrastructure</li> <li>2. Quality of education</li> <li>3. Digital literacy</li> <li>4. Digital divide</li> <li>5. Technology cost &amp; obsolescence</li> </ol>

Natural disasters can stimulate educators’ motivation for the adoption of highly innovative communication technology and e-learning tools (Ayebi-Arthur, 2017; Dhawan, 2020; Meyer & Wilson, 2011; Tull, et al., 2017). During pandemics, online platforms should allow (a) video conferencing with at least 40 students, (b) discussions with students to keep classes organic, (c) lectures accessible to both mobile phones and laptops, (d) recorded lectures, (e) the capacity to receive instant feedback from students, and (f) the capacity to deliver feedback for assignments (Basilaia, et al., 2020). To enhance effective learning experiences in such challenging times, educators and learners need to focus on more efficient uses of online learning

models. Towards the development of a complete model for effective online learning experiences by adapting activity theory, the present paper reviews previous models for online education below.

## **A Review of Models for Online Learning**

Learning is explained by various learning theories. Among the major learning theories are Behaviorism, Cognitivism, and Social Constructivism. By deriving from major learning theories, several theories present models for the online environment, such as Connectivism (Siemens, 2005), Online Collaborative Learning (OCL) (Garrison, Anderson & Archer, 2000; Harasim, 2012), Anderson's Online Learning Model (Anderson, 2011), Bosch's Blending with Pedagogical Purpose Model (Bosch, 2016), and Picciano's Multimodal Model for Online Education (Picciano, 2017), and the Community of Inquiry (CoI) (Garrison, Anderson & Archer, 2000). The present conceptual study provides a review of the previous models and develops a complete model for effective online learning experiences by adapting activity theory within the context of online learning management.

*Connectivism*, to start with, emphasizes the effect of internet technologies on the way people communicate and their contribution to how people learn in a digital age (Siemens, 2005). Connectivism is a learning model that sees knowledge as a network and learning as a process of pattern recognition (Siemens, 2006). Connectivism is an integration of the principles related to the chaos, network, complexity, and self-organization theories (Siemens, 2005). Connectivism is particularly appropriate for courses with very high enrollments and where the learning goal or objective is to develop and create knowledge rather than to disseminate it (Picciano, 2017).

*Anderson's Online Learning Model* (Anderson, 2011) is constructed on the two major human actors—namely, learners and teachers—and their interactions with each other and with content by taking place within a community of inquiry, using a variety of net-based synchronous and asynchronous activities. To construct an online learning model, Anderson (2011) considered several theories and focused on Bransford, Brown, and Cocking's (1999) work (Picciano, 2017) which consists of four overlapping layers for effective learning environments: community-centeredness, knowledge-centeredness, learner-centeredness, and assessment-centeredness. Anderson's Online Learning Model (Anderson, 2011) also emphasizes the structured learning tools associated with independent learning such as computer-assisted tutorials drills, and simulations (Anderson, 2011). Drawing upon the model, Picciano (2017) examines theoretical frameworks and models that focus on the pedagogical aspects of online education by integrating the work of several other major theorists and model builders such as Anderson (2011) and Bosch (2016).

*The Blending with Pedagogical Purpose Model* developed by Bosch (2016) suggests that blending the objectives, activities, and approaches within multiple modalities might be mostly effective for, and appeal to, a wide range of students. The model contains six basic pedagogical goals, and approaches for achieving them, to form learning modules (Bosch, 2016):

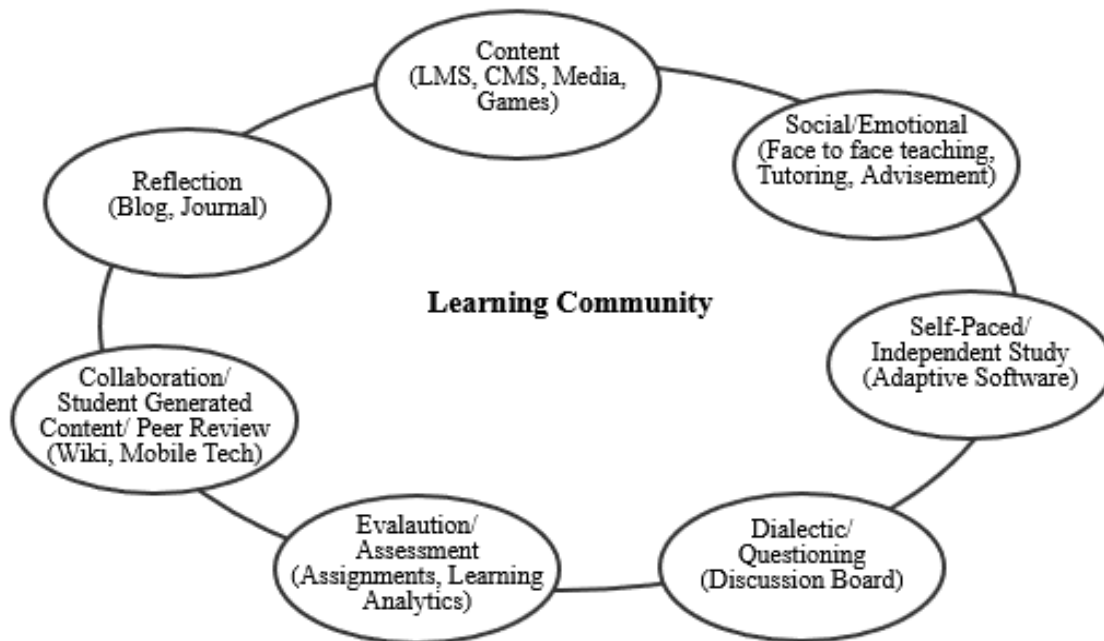
- (1) Content is one of the primary drivers of instruction; there are many ways in which content can be delivered and presented via a variety of media, including text, rich digital images, video, audio, and games or simulations.
- (2) Social and emotional support should be provided in online learning via face-to-face meetings and the physical presence of an instructor during office hours.

- (3) Dialectics or questioning like the Socratic method is an important activity that allows faculty members to probe what students know and to help refine their knowledge via electronic discussion boards or forums such as *VoiceThread* to present a topic or issue and have students respond to questions and provide their own perspectives, while evaluating and responding to the opinions of others.
- (4) Reflection can be incorporated as a powerful pedagogical strategy that requires students to reflect on what they learn and to share their reflections with their teachers and fellow students. Reflection can be extended and enriched via blogs and blogging, whether as group exercises or for individual journaling activities, which have evolved into appropriate tools for student reflection and other aspects of course activities.
- (5) Collaborative learning is a technique for group problem solving and can be used in online education by eliminating the limitations of the group work such as logistical issues or time conflicts, and the like, via email, mobile technology, other forms of electronic communication, and Wikis that allow students to generate content that can be shared with others.
- (6) Evaluation of learning can be conducted electronically via a variety of mechanisms of CMSs/LMSs and other online tools and platforms by using many assessment techniques such as papers, tests, assignments, portfolios, essays, term projects, oral classroom presentations, or weekly class discussions on discussion boards or blogs. These online technologies provide a permanent, accessible record for students and teachers, and allow the use of learning analytics to improve learning and teaching.

*The Multimodal Model for Online Education*, that describes the phenomenon of pedagogically driven online education, is proposed by Picciano (2017). The model was formed by integrating Anderson's (2011) and Bosch's (2016) models with the inclusion of such new components as "community," "interaction," and "self-paced and independent instruction." In this new model, self-study learning, or independent learning is integrated as a part of instructional delivery via adaptive learning software used primarily in stand-alone mode with teachers available to act as tutors when needed. Picciano (2017) emphasizes that online education has evolved as a subset of learning in general rather than a subset of distance learning (see Figure 1).

**Figure 1**

*Multimodal Model for Online Education* (Picciano, 2017, p. 182)



The present conceptual study uses these seven components of the Multimodal Model for Online Education (Picciano, 2017) in the development of a complete model for effective online learning experiences by adapting activity theory in the online learning management context. In so doing, it adopts activity theory, which covers the other most relevant online learning models, namely, Connectivism (Siemens, 2005), Online Collaborative Learning (OCL) (Garrison, Anderson & Archer, 2000; Harasim, 2012), Anderson’s Online Learning Model (Anderson, 2011), Bosch’s Blending with Pedagogical Purpose Model (Bosch, 2016), and Picciano’s Multimodal Model for Online Education (Picciano, 2017). Activity theory is taken as a big umbrella term that can cover the components of other online learning models. In addition, these components can fit the Community of Inquiry model for online learning environments. The present study presents a framework which aims to adapt activity theory to the design, development, implementation, and evaluation of online courses enhancing cognitive presence, teaching presence, and social presence within complex cognitive tasks to reach the learning outcomes of the course as well as the required qualifications of higher education. The concept of presence requires particular attention, because it is highly complex in nature due to the fact that it is the result of the dynamic interplay of thought, emotion, and behavior in the online world (Garrison & Arbaugh, 2007; Harb & Krish, 2020).

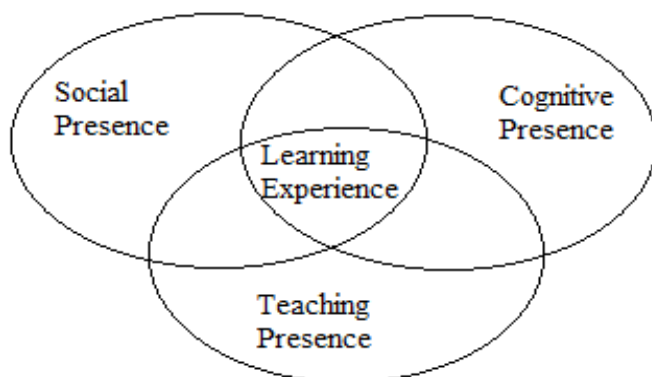
### **Community of Inquiry (CoI) Model for Online Learning Environments**

The *Community of Inquiry (CoI)* model for online learning environments, developed by Garrison, Anderson & Archer (2000), is based on the concept of three distinct “presences”; namely, cognitive, social, and teaching (see Figure 2). Garrison (2009) defines CoI as “a framework that reflects a collaborative-constructivist approach to learning,” that “fuses individual construction of meaning and collaborative validation of understanding” (p. 355)

through interactions among students and instructors by using discussion boards, blogs, wikis, and videoconferencing in online learning environments.

## Figure 2

*Community of Inquiry* (Garrison, et al., 2000)



Garrison (2009, p. 355) defines the three presences as (1) *cognitive presence*, the process of practical inquiry distinguished by discourse and reflection for the purpose of constructing meaning and confirming understanding, (2) *social presence*, the ability to identify with a group, communicate purposefully, and develop inter-personal relationships, and (3) *teaching presence*, the design, facilitation and instruction directed toward creating and sustaining a community of inquiry. In the context of CoI, cognitive presence is defined as a research process that involves defining a problem or an issue (initial interaction), conducting a detailed investigation of information related to this issue (exploration), combining ideas to develop a meaningful structure or obtain a solution (integration), and then testing directly or indirectly the usefulness or validity of the solution (resolution) (Garrison, 2006; Olpak, 2022). Social presence, on the other hand, is defined as “the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities” (Garrison, 2009, p. 352). As for teaching presence, Anderson, et al., (2001) defines it as “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (p. 5). It begins prior to the start of a course (e.g., in the preparation and planning of a subject by an instructor) and continues throughout the course (e.g., instructor facilitating discussions) (Anderson, et al., 2001; Olpak, 2022). Creating and sustaining a CoI requires an understanding of the progressive or developmental nature of each of the presences and how they interact. The elements of the CoI framework can be found in Table 2, designed to combine the “examples for indicators” and “elements of presence” from Garrison (2009) (Garrison, 2009, p. 353; Martin, et al. 2022; p.340).



**Table 2**

*The Elements of the CoI Framework (Garrison, 2009, p. 353; Martin, et al. 2022; p.340)*

<b>Presence</b>	<b>Categories</b>	<b>Examples for Indicators</b>	<b>Elements of Presence</b>
Cognitive Presence	<ul style="list-style-type: none"> <li>• Initial interaction</li> <li>• Exploration</li> <li>• Integration</li> <li>• Resolution</li> </ul>	<ul style="list-style-type: none"> <li>• Sense of puzzlement</li> <li>• Information exchange</li> <li>• Connecting Ideas</li> <li>• Applying new ideas</li> </ul>	<ul style="list-style-type: none"> <li>• Taking notes</li> <li>• Reading in/posting to forums</li> <li>• Each group meeting 3 times a week in virtual space</li> <li>• Provide feedback for group members</li> <li>• Readings, video resources, and assignments by instructors</li> <li>• Students participating in online discussions</li> <li>• Synchronous communication among peers</li> <li>• Synchronous communication among instructors and students</li> <li>• Students working collaboratively on course assignments, studying for exams and quizzes, class presentations, and listening to lectures</li> </ul>
Teaching Presence	<ul style="list-style-type: none"> <li>• Design &amp; Organization</li> <li>• Facilitating</li> <li>• Discourse</li> <li>• Direct Instruction</li> </ul>	<ul style="list-style-type: none"> <li>• Setting curriculum &amp; methods</li> <li>• Shaping constructive exchange</li> <li>• Focusing and resolving issues</li> </ul>	<ul style="list-style-type: none"> <li>• Contacting the teacher or teaching assistant</li> <li>• Instructors facilitating live lectures and discussions</li> <li>• Using LMS to host syllabus, content, assignments, and discussion forums</li> <li>• Teachers collaborating with students via email, message boards, announcements, wikis, blogs and discussions</li> <li>• Establishing curriculum content, learning activities and timelines</li> <li>• Monitoring and managing purposeful collaboration and reflection</li> <li>• Ensuring that the community reaches the intended learning outcomes by diagnosing needs</li> <li>• Providing timely information and direction</li> </ul>
Social Presence	<ul style="list-style-type: none"> <li>• Open Communication</li> <li>• Group Cohesion</li> <li>• Personal /Affective</li> </ul>	<ul style="list-style-type: none"> <li>• Learning climate</li> <li>• Group identity/ collaboration</li> <li>• Self-projection / expressing emotions</li> </ul>	<ul style="list-style-type: none"> <li>• Making friends in forums</li> <li>• Joining social media groups</li> <li>• Groups of 8 to 10 to foster intimate interaction among members</li> <li>• Real-time chat among group members</li> </ul>

A recent study by Olpak (2022) examined the research trends related to CoI over the past two decades and stated that the reviewed studies relate mainly to online learning, the CoI, its main elements, and a consideration of the CoI framework from a collaborative-constructivist point of view to understand the online learning experience (Olpak, 2022). Among the recent meta-analysis studies on CoI, Caskurlu, et al., 2020; Martin, et al., 2022; and Richardson, et al. 2017 can be given here. Social presence and teaching presence are studied in Richardson, et al. (2017) and Caskurlu, et al. (2020), respectively; and Martin, et al. (2022) conducted a meta-analysis focusing on the CoI presences (teaching presence, social presence, and cognitive presence) and their correlations with learning outcomes, including actual learning, perceived learning, and satisfaction.

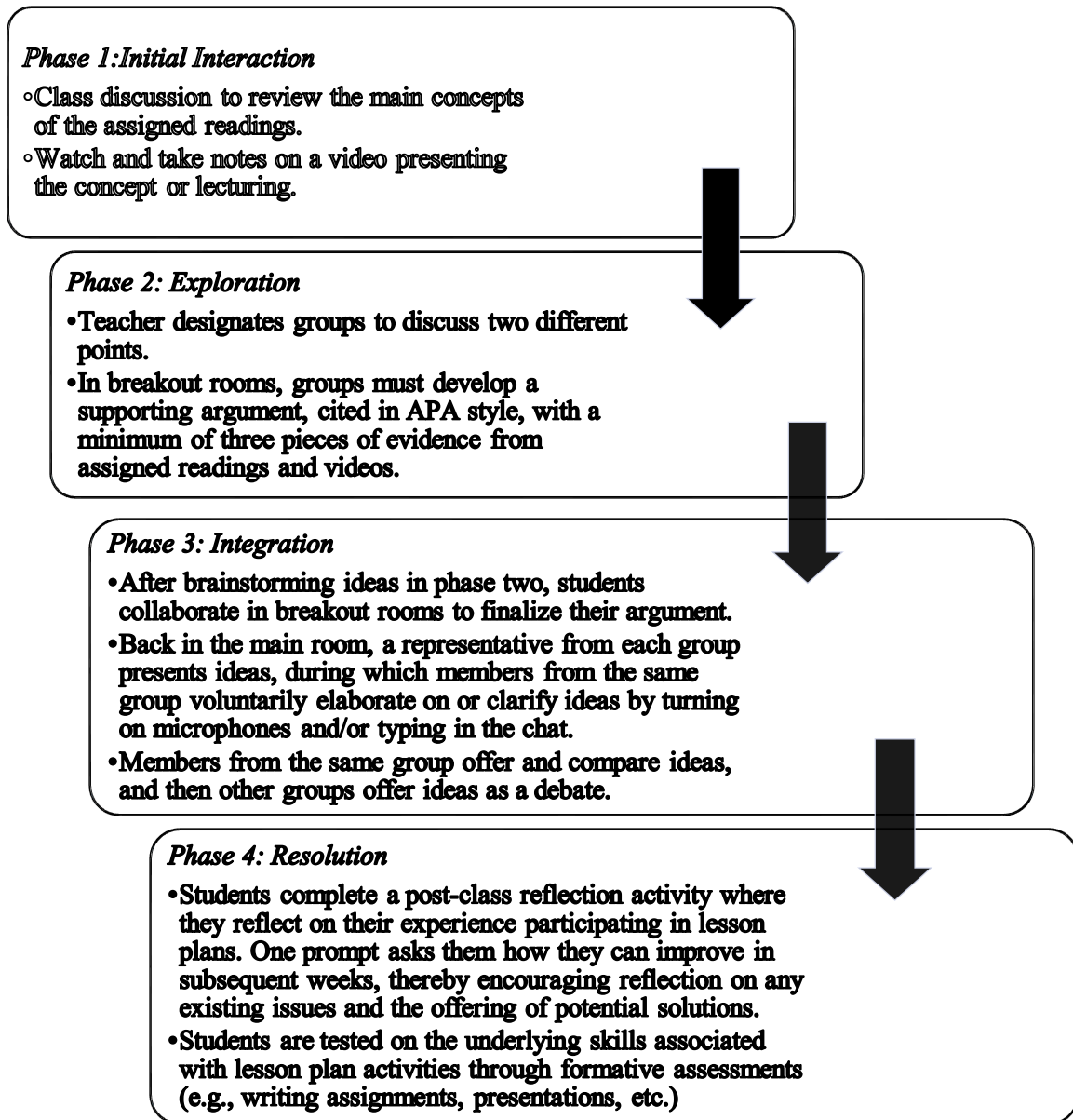
Cognitive presence is the ability of the learners to project their mental and perceptual presence through the process of reflection, discourse, analysis, and synthesis (Harb & Krish, 2020; Garrison, et al., 2001). Cognitive presence, sustained in a community of inquiry, is partly dependent upon how communication is restricted or encouraged by the medium (Garrison, Anderson, & Archer, 2001). Cognitive presence has the potential to assess the quality of critical inquiry in terms of providing a means to assess the systematic progression of thinking over time (Garrison, Anderson, & Archer, 2001). According to Garrison and Anderson (2003), cognitive presence is the process of both reflection and discourse in the initiation, construction, and confirmation of meaningful learning outcomes. Cognitive presence indicates the extent to which students are capable of constructing meaning through a continuous reflection in a critical research community, thus indicating the extent to which the learning objectives are achieved (Garrison & Anderson, 2003; Garrison, Anderson, & Archer, 2001; Harb & Krish, 2020). Akyol and Garrison (2011) emphasize that measuring actual learning outcomes to connect collaborative and engaging approaches of blended and online learning to a depth of learning is critical, and it requires understanding how to support cognitive presence in blended and online learning environments (Akyol & Garrison, 2011).

According to Garrison, et al. (2001), cognitive presence is based on the literature of critical thinking as a necessary condition for learning, and it matches with learning outcomes and the required qualifications in higher education (Garrison, et al. 2000; Harb & Krish, 2020). Critical thinking and inquiry skills can support students' understanding and confirming meaning and their knowledge construction (Akyol & Garrison, 2011; Harb & Krish, 2020; Shea & Bidjerano, 2009). Cognitive presence is considered an essential element of success in higher education since it is a vital element in critical thinking and inquiry (Garrison, et al., 2000; Harb & Krish, 2020).

McCarroll and Hartwick (2022) state that online learning requires new approaches to pedagogy to create rich online learning contexts that stimulate curiosity and the process of inquiry, thereby facilitating cognitive presence and suggest that task design and facilitation play a major role in students' perceived experience of cognitive presence. McCarroll and Hartwick (2022) assess how weekly task design and the facilitation of lesson plans, lessons being either synchronous or asynchronous, impact student and teacher perception of cognitive presence based on the four phases of initial interaction, exploration, integration, and resolution, and they present specific lesson plan activities as related to the four phases of cognitive presence as presented in Figure 3 (McCarroll & Hartwick, 2022, p.90-91).

**Figure 3**

*Lesson Plan Activities as Related to the Four Phases of Cognitive Presence* (McCarroll & Hartwick, 2022)



### **Adaptation of an Activity Theory Framework for Effective Online Learning Experiences**

As one of the classical theories of cognition, activity theory (Leont'ev, 1978; Engeström, 1987; Nardi, 1996) is rooted in Vygotsky's cultural-historical psychology and founded by Leont'ev and then extended by Engeström (1987). Vygotsky (1978) pointed out that human beings deeply understand the things around them and acquire knowledge through their meaningful actions, such as collaborative dialogue, interaction, and social activities. Leont'ev (1978) further developed this theory into a conceptual framework to understand human activities as complex, socially situated phenomena. Then, Engeström (1987) extended the ideas of

Leont'ev and Vygotsky to explain how the individual or subgroup adjusts the framework in response to the challenges of the situation changing.

Activity theory has a heuristic approach that can be used to analyze activity systems. Activity theory proposes that people are embedded actors, with learning considered via six elements: subject (e.g., the learner, participants involved in activities), object (the reason of the task or the activity), tools (the content or the instrument), community (the environment in which the activities are carried out), rules (strategies or teaching mode of the activities), and division of labor (the procedures by which the responsibilities are duly distributed) (Engeström, 1987; Leont'ev, 1978; Nardi, 1996). With these six elements, many scholars used activity theory to design learning systems (e.g., Chung, Hwang, & Lai, 2019; Peña-Ayala, et al., 2014; Shambaugh, 2010).

Engeström (2001) emphasizes that activity theory and its concept of expansive learning should be examined with the help of four questions:

- (1) Who are the subjects of learning?
- (2) Why do they learn?
- (3) What do they learn?
- (4) How do they learn?

Engeström (2001) presents five central principles of activity theory, namely, the activity system as the unit of analysis, multi-voicedness of the activity, historicity of the activity, contradictions as the driving force of change in the activity, and expansive cycles as possible forms of transformation in the activity. Contradictions constitute a key concept or principle in activity theory (Engeström, 2001) and are “historically accumulating structural tensions within and between activity systems” (Engeström, 2001, p. 137). The Murphy and Rodriguez-Manzanares (2008) study uses activity theory and its principle of contradictions to guide research in educational technology. The study emphasizes that the notion of contradictions as the driving force of change and development in activity systems has been gaining “due status as a guiding principle of empirical research” (Engeström, 2001, p. 135).

Engeström's (2001) defines five principles of activity theory. *Principle 1, a collective, artifact-mediated and object-oriented activity system* is the prime unit of analysis, and all the independent goal-directed operations subordinate the units of analysis. *Principle 2 is the multi-voicedness of the activity systems* that should be the focus of the division of labor in demanding actions of translation and negotiation with a community of multiple points of view, traditions, and interests. *Principle 3 refers to the historicity of the activity systems*, the problems and potentials of activities, ideas, concepts, procedures, and tools employed need to be analyzed and observed to see how they get transformed over lengthy periods of time. *Principle 4 concerns the central role of contradictions as sources of change and the development of the activity, the use value and exchange value of commodities*. Contradictions may not be the same as problems or conflicts, but they can be innovative attempts to change the activity when an activity system adopts a new element, a new technology, or a new object. *Principle 5 points to the possibility of expansive transformations in activity systems*; this happens while moving through relatively long cycles of qualitative transformations and some individual participants begin to question and deviate from its established norms.

Activity theory has been employed in various studies and applications, such as the analysis and design of human-computer interactions (Nardi, 1996), constructivist learning environments (Jonassen & Rohrer-Murphy, 1999), and computer-supported collaborative learning (Zurita & Nussbaum, 2007). Peña-Ayala et al. (2014) apply activity theory to design

adaptive e-learning systems. Chung, et al. (2019) adopt activity theory for mobile learning. Shambaugh (2010) uses an activity theory framework to present a conceptual representation of an activity-in-context, which provides an analysis and synthesis tool to help department faculty begin to develop an online instructional design and technology master's program. Jonassen et al. (1999) suggest six steps while adopting an activity theory framework: (1) Clarify the purpose for the activity, (2) provide a big picture of the overall initiative, (3) specify the activities to be analyzed, (4) examine the role of the tools, (5) address the internal and external contexts, and (6) monitor what is happening and document the progress and the process.

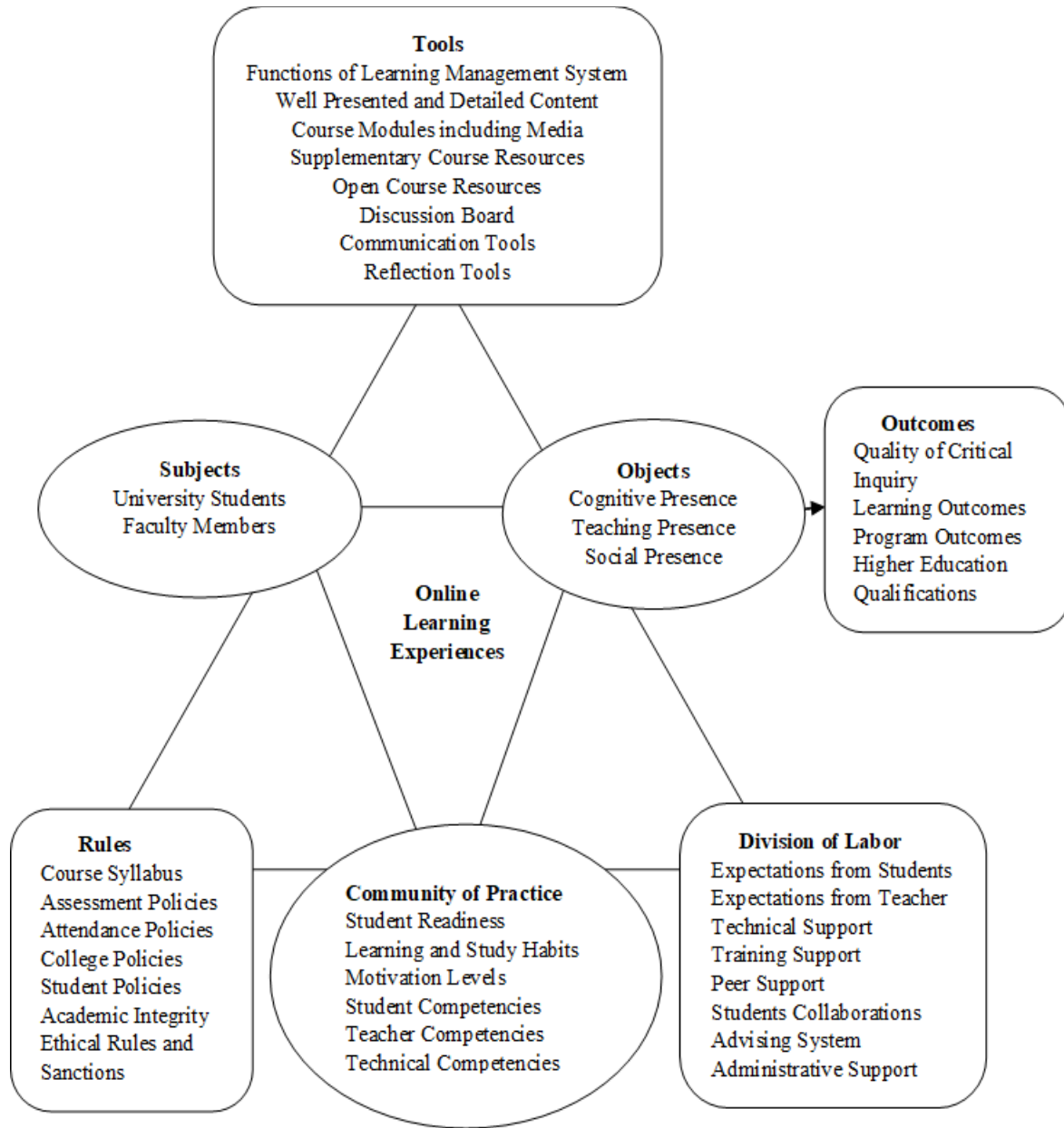
To use the activity theory to design learning systems, it is necessary to respond to the following questions posed by Mwanza and Engeström (2005): (1) For activity, what sort of an activity are you interested in? (2) For tools, by what means are the subjects fulfilling the activity? (3) For subjects, who is involved in achieving the activity? (4) For object, what is the purpose of the activity and why is the activity taking place? (5) For outcomes, what is the specific result to be delivered from the activity? (6) For rules, are there any cultural norms and regulations governing the development of the activity? (7) For community, what is the social environment in which the activity is being accomplished? (8) For division of labor, who are the individuals responsible for what; and, how are those roles organized?

An activity theory framework is suitable to represent the components of online learning experiences in the present article (see Figure 4). Activity theory offers a complete framework that gives scholars a meaningful insight into what the actors do in an activity that produces changes that potentially could improve the processes or outcomes of the activity (Shambaugh, 2010; Yakubu & Dasuki, 2021). Figure 4 (Gogus, 2022) presents the Effective Online Learning Experience and Activity Theory Framework, which offers a conceptual framework for studying human behavior (Engeström, 1987; Leont'ev, 1978) and a lens for examining how to mediate teachers' technology integration practices for effective online learning experiences. An activity system is a means for conceptually bounding social and material resources that interact to enable and constrain what individuals and social groups can accomplish (Engeström, et al., 1999; Anthony, 2012).

As seen in Figure 4 (Gogus, 2022), the conceptual framework, adapted from activity theory, presents the main components of an online learning activity aiming at concrete learning outcomes. The main components include "*context* (e.g. the learners' characteristics, teachers' characteristics, and online learning management systems' functionalities), *the tools and resources used* (e.g. resources for content delivery and learning activities, communication tools between the learners and the teachers or among the learners), *the concrete learning tasks* (e.g. learning activities, teaching techniques, assessment methods), and *the relations between the three* (e.g. how the tools and resources are used, how self-paced/individual the tasks are designed and implemented, and how the learning outcomes are assessed)" (Gogus, 2022, p.59).

**Figure 4**

*Effective Online Learning Experience and Activity Theory Framework (Gogus, 2022)*



In the present study, the components of the conceptual framework adapted from activity theory refer to “*subjects* (university students, faculty members), *objects* (online learning experiences with cognitive presence, teaching presence, social presence), *outcomes* (the quality of critical inquiry, reaching expected learning outcomes, program outcomes, higher education qualifications), *tools* (functions of the Learning Management System, well-presented and detailed content, course modules including media, supplementary course resources, open course resources, discussion board, communication tools, reflection tools), *rules* (course syllabus,

assessment policies, attendance policies, college policies, student policies, academic integrity, ethical rules and sanctions), *community of practice* (student readiness, learning and study habits, motivation levels, student competencies, teacher competencies, technical competencies), and *division of labor* (expectations from students, expectations from teacher, technical support, training support, peer support, student collaborations, advising system, administrative support)” (Gogus, 2022, p.59-60).

As a main component of the conceptual framework, *subjects* refer to the university students of online or remote courses and the faculty members who develop online courses and adopt their teaching skills to online courses. The study logic is constructed on offering online courses. This can be seen as a new way of orchestrating teaching and learning since individual teachers may pass through a technology adoption process whereby teachers progress through various stages as they integrate technology into their instruction (Gogus, 2005; 2008; 2021). *Objects* refer to the online learning experiences with cognitive presence, teaching presence, and social presence. It is considered that enhancing cognitive presence, teaching presence, and social presence means reaching the learning outcomes of a specific course besides matching the required qualifications of higher education. *Outcomes* refer to the quality of critical inquiry, and achieving the expected learning outcomes, program outcomes, and higher education qualifications. Outcomes in the model presented in Figure 4 suggest consideration of essential learning outcomes of higher education besides the students’ learning outcomes at a specific online course. The Association of American Colleges and Universities (AAC&U, 2011), the European Qualifications Framework (EQF, 2006) in Europe, and many national qualifications of higher education (Gogus, 2015) point out that the essential learning outcomes of higher education should include three areas: (a) *Knowledge*. Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles; (b) *Skills*. Developed critical thinking skills and advanced skills required to solve complex and unpredictable problems in a specialized field; (c) *Competencies*. Managing complex technical or professional activities. Teaching presence, cognitive presence, and social presence are vital to success in higher education by considering knowledge, skills, and competencies to be areas of the essential learning outcomes. Cognitive presence is considered an especially essential element of success in higher education since it is a vital element for developing critical thinking skills (Garrison, et al., 2000; Harb & Krish, 2020).

Another main component of the conceptual framework, *tools* refer to many features of the content delivery in the context that uses *Blackboard* as a Learning Management System. Tools include all the functions of Blackboard; well-presented and detailed content including course presentations, articles, e-books, assignments that match the learning outcomes; course modules including media like Khan Academy videos, Jove videos, Panopto videos, YouTube etc.; supplementary course resources by using Blackboard Collaborations with publishers such as Pearson’s *MyLab & Mastering*, McGraw Hill Higher Education, and Wiley Course Resources; Open Course Resources; regularly and effectively used discussion board, communication tools such as e-mail and announcements; and reflection tools like blog and journals. *Rules* include the statutes that state the regulations of the higher education institutions related to course design, progress of teaching and learning activities, assessment policies, and rules and sanctions to be followed. All the rules and expectations should be stated in the course syllabus and students should be informed of the expected learning outcomes, weekly course activities, expectations of students during and after the course hours, assessment methods to be followed, assessment policies, attendance policies, additional policies including college policies, student policies,

academic integrity, and ethical rules and sanctions. A course syllabus should include all course aims, students' learning outcomes, weekly activities to be followed, teaching and learning techniques, assessment and evaluation techniques, expectations from students, and web links that can inform all the regulations and sanctions of the higher education institution. The course syllabus should be informative and used as a contract between the teacher and student.

In the present work, *community of practice* presents all the related issues affecting the effective online learning environment. The community of practice can be affected by students' readiness, learning and study habits, motivation levels, student competencies used to follow the course and complete expectations, teacher competencies to design, develop, deliver, and evaluate course activities, and technical competencies of the teacher and students to be able to use the course delivery, communication, and assessment tools. *Division of labor* includes expectations from students informed in the course syllabus in addition to written and verbal explanations in the learning management system, and also expectations of the teacher as part of student and university administrations. Division of labor requires technical support that should be provided to the *subjects*. Teachers should be provided with technical support during their adoption of integrating technology into their courses. Students should be provided with technical support while using the learning management system. In addition, training support and administrative support should be provided for faculty members about the management of online courses and online pedagogy. A student support system should be provided to engage students to complete expectations via peer support, students' collaboration activities, and an advisement system that encourages students to meet with faculty members when necessary. Picciano (2007) presents a Multimodal Model for Online Education and suggests development of online courses by providing content via learning management system, providing activities for self-paced or independent study, social and emotional support, dialectics or questioning, reflection, collaborative learning, and evaluation of learning. These parts of the Multimodal Model for Online Education (Picciano, 2007) can be considered during planning of course activities under the *division of labor* component of the presented Activity Theory Framework in Figure 4 for effective online learning experiences.

## Conclusion

This study reviews models for online learning experiences and proposes a new model by adapting activity theory in the online learning management context. This conceptual framework presents a model to design online learning environments by reviewing literature within the framework of activity theory comprised of the components of subjects, objects, outcomes, tools, rules, community of practice, and division of labor (e.g., Morrison and Morrison, 2003, Jonassen and Rohrer-Murphy, 1999, Rapanta, et al. 2020; Richardson and Alsup, 2015, Wang, 2020). It is suggested here that the seven parts of Multimodal Model for Online Education (Picciano, 2017), rich content, social and emotional support, dialectics or questioning activities, reflection, collaborative learning, and evaluation of learning maybe used while developing effective online courses.

Online courses can draw on cognitive presence, teaching presence, and social presence of the Community of Inquiry (CoI) model, yet its comparison with activity theory is an aspect of the model not yet explored. Creating and enhancing cognitive, teaching, and social presences requires an innovation for teachers during planning, implementing, and evaluating their online courses. As teachers develop their own expertise in teaching online, they hopefully contribute to the enhancement of the cognitive, teaching, and social presences for effective online learning. Rosser-Majors, et al. (2022) emphasized the importance of *instructor presence applications*



*training* and suggest that application of instructor presence practices in the classroom positively and significantly affect course pass rates and reduces drop rates, which, in turn, affect student success and retention. The findings of Rosser-Majors, et al. (2022) support the present research in the field connected to online teaching best practices and student achievement (McCarroll & Hartwick, 2022). McCarroll and Hartwick (2022) argue that the CoI framework can be a useful model to illuminate the student's perspective of the teaching, social, and cognitive presences, which, in turn, helps teachers and designers to improve learning communities and, eventually, learning outcomes.

Reviewing the literature in the fields of CoI, cognitive presence, and teaching presence in online learning environments (e.g. Abbitt and Boone, 2021; Akyol and Garrison, 2008; Caskurlu et al., 2020; Choo et al., 2020; Garrison, Anderson, and Archer, 2001; Garrison, 2009; Garrison, 2021; Lee, 2020; Lindberg and Brown, 2020; Martin et al., 2020; Wang, 2020), the study suggests that objects be considered to be online learning experiences with cognitive presence, teaching presence and social presence, since enhancing the three presences means reaching the learning outcomes of the course besides matching the required qualifications of higher education. The presented new model in Figure 4 can contribute to teachers' adoption of the cognitive presence, teaching presence, and social presence in online courses. This effort can contribute to reaching both students learning outcomes for specific courses and also essential learning outcomes in higher education.

Activity theory has been considered a suitable framework by several authors to examine the use of technology for teaching and learning (Basharina, 2007; Gedera & Williams, 2013; Shambaugh, 2010; Yakubu & Dasuki, 2021). However, contradictions constitute a key concept, or a principle, in activity theory (Basharina, 2007; Engeström, 2001; Gedera & Williams, 2013) as “disturbances and conflicts, but also innovative attempts to change the activity” (Engeström, 2001, p. 134). For these reasons, activity theory is ideally suited to explain the phenomenon of effective online learning experiences. With regards to emergency online teaching and learning, there seems to be only a few studies that attempt to examine the responses and experiences of students and instructors especially pertinent to the Covid-19 pandemic (e.g., Hodges, et al., 2020; Yakubu & Dasuki, 2021); and, hence, the contribution of the present study to the relevant literature with its model to guide the teachers who want to develop experiences on designing and delivering online courses.

By adapting activity theory in online learning management contexts, the present study guide educators on how to design, develop, implement, and evaluate online courses that enhance cognitive, teaching, and social presences. Teachers and instructional designers use the framework to develop their own expertise in teaching online and in enhancing cognitive, teaching, and social presences for effective online learning, thus, improving the processes or the learning outcomes.

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# Teaching Presence in Asynchronous Online Classes: It's Not Just a Façade

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## **Abstract**

The expanding scale and scope of online education options, both in terms of design and delivery, create significant questions that increasingly warrant research attention. Previous research has demonstrated that higher levels of teaching presence in online courses is positively related to student engagement, satisfaction and learning. Although there are many methods for infusing one's teaching presence into an online class, practicalities constrain choices. The purpose of this study is to identify and assess those methods students perceive to be the most valuable. We empirically investigate students' perceptions and evaluative judgments of a range of methods of setting and sustaining teaching presence in an online asynchronous course. Post hoc factor analysis of our data suggests refining our understanding of teaching presence in terms of stylistic versus substantive methods. Analyses of student survey data indicate that, while students see value in both types of teaching presence, they perceive significantly greater benefit from substantive relative to stylistic methods.

*Keywords:* teaching presence, asynchronous online classes, Community of Inquiry

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Online classes are no longer a novelty in post-secondary education. As of 2019, 89% of U.S. universities had online classes (Song et al., 2019) and by 2021, 52% of college students had taken an online class (Smalley, 2021). The trend toward increased online course offerings abruptly escalated in the Spring 2020 semester, when nearly all colleges and universities pivoted to online course delivery in response to the global COVID-19 pandemic. As concerns fade, most colleges in the U.S. have reverted to delivering many courses in some sort of in-person format. Nevertheless, it is likely that students' and instructors' exposure to online classes during the pandemic significantly legitimated online classes as an effective, meaningful educational format.

The nearly global use of online course delivery during the pandemic highlighted both the advantages of and concerns with online education. Online courses offer a unique flexibility for students to navigate the class and allow for larger class sizes (Song et al., 2019; Young et al., 2014). Students who appreciate working independently with reduced expectation of peer engagement are particularly drawn to online academic settings (Young et al., 2014). However, there are concerns that online education is not as effective as traditional in-person learning. These concerns largely stem from the lack of student-student and student-instructor relationships and interactions, which leave some students feeling isolated and disconnected (Song et al., 2019; Young et al., 2014). Furthermore, studies reveal students have lower quality of work, diminished satisfaction, and fewer opportunities for spontaneous formative feedback in online settings (Martin, 2019). According to Vygotsky's sociocultural theory of learning, higher-order thinking is fostered through social interaction, which is fundamental to cognition (Subban, 2006). Considering this, and the reduced social interaction in online courses, it is not surprising that students report perceiving poorer educational experiences and outcomes in online classes than traditional in person classes (Song et al., 2019). One of the most effective ways to limit the isolation and perceived lower educational experience is to increase the instructor's teaching presence in online courses (Mandemach et al., 2006).

## Teaching Presence

The concept of teaching presence in online courses is a rich, expanding theme in the literature. Despite wide-ranging interpretation, there is consensus that it is a vital element of effective online education. While some researchers use the term, instructor presence, Richardson and colleagues advocate a broader interpretation that speaks directly to the intersectionality of teaching and social presence (Richardson et al., 2015). This literature argues that instructor presence and teaching presence are distinct, in that instructor presence concerns the implementation of instruction in an online setting and reflects the online personality, or interactions, that an instructor has with students. Alternatively, teaching presence is more focused on the pedagogical design and development of the course (Richardson et al., 2015). In their review of this literature, Sheridan and Kelly (2010) conclude that "instructor presence is one of the keys to the effectiveness of online learning and that instructors need to be actively engaged in online courses" (p. 769). Instructor presence is essential in the creation of online norms, and the fostering of digital social interactions (Lear et al., 2009). Richardson, et al. (2015) define instructor presence as "the specific actions and behaviors taken by the instructor that project him/herself as a real person. In other words, instructor presence relates to how an instructor positions him/herself socially and pedagogically in an online community" (p. 259). Similarly, Bangert (2008) refers to instructor presence as "the 'methods' that instructors use to create ... quality online instructional experiences..." (p. 40). Ultimately, the conjuncture of social

presence and teaching presence results in instructor presence, which focuses on facilitating active learning in online classes (Martin et al., 2018).

Expectedly, efforts to develop integrative models to guide instructors seeking to establish their presence in online courses are growing. Much of this research anchors teaching presence within the context of the Community of Inquiry (COI) framework (Garrison, et al., 2000). The COI proposes that effective online education is best understood in terms of the interrelationship of three types of presence: cognitive presence, the ability of learners to construct meaning through sustained communication; social presence, the capacity of learners to identify with the learning community and convey individual characteristics; and teaching presence, the role of the instructor in setting and sustaining cognitive and social presences that support student success. In their detailed analysis of these presences, Kozan & Caskurlu (2018) note that cognitive presence specifically focuses on aspects of the course that are designed to assist cognitive development, such as assignments, feedback, and lectures (Sheridan & Kelly, 2010). Social presence stems from interpersonal interactions and is an essential component of classes as it helps build community and increases perceived learning (Martin et al., 2018). In online classes, through their teaching presence, instructors are facilitators who support and enhance cognitive presence and social presence. Teaching presence has been conceptualized as having the subdimensions of (1) instructional design and organization, or the design and planning of the online course, (2) facilitating discourse, or engaging students in active learning, and (3) direct instruction, which is the instructor's delivery of subject content (Anderson et al., 2001; Garrison and Cleveland-Innes, 2000).

The focus of this present study is on the role of the instructor in designing and delivering a course that encourages high levels of both cognitive presence and social presence. Thus, we will follow the COI terminology and use the term *teaching presence*, which most closely aligns with the intent of our study. There is a unique interconnectedness between teaching presence and the development of social and cognitive presences in online settings (Kozan & Richardson, 2014), as teachers must be intentional about how they craft their courses in ways that facilitate interpersonal relationships while also providing subject matter expertise. For example, many online classes have a discussion board. Here students and instructors alike post discussions to foster learning and cognitive development, while simultaneously interacting with others, facilitating social presence. Best practices of online learning require blended methods of teaching presence. These blended methods proactively encourage relationship building through course design elements (Dockter, 2016). This blended learning style creates a more student-centered, active learning environment. These blended environments increase student engagement through employing problem-based learning, case-based reasoning, computer simulations, design projects, and collaborative learning (Hannafin & Land, 2000). By creating learner-centered environments, instructors value the knowledge and skills students bring to class, and instructors can build on students' personal and cultural beliefs (Stewart et al., 2009). Furthermore, methods to increase teaching presence increase relationships, which are directly related to increased student outcomes (McCarty et al., 2016). Ultimately, post-secondary institutions that employ student-centered learning experience higher learning outcomes (Lightweis, 2013).

Research has shown that students' perception of the instructor's teaching presence in their online course is positively related to student satisfaction (Baker, 2010; Caskurlu et al., 2020; Ladyshevsky, 2013; Wise et al., 2004). Subsequent work operationalizes the dimensions of teaching presence, proposing a host of measures and advocating a series of techniques (Anderson et al., 2001; Baker, 2010; Lowenthal & Parscal, 2008; Miller et al., 2014). Cormier

and Siemans (2010) for instance, advise teachers to develop their teaching presence in terms of “amplifying, curating, aggregating, and modeling.” Likewise, Miller and colleagues (2014) link teaching presence to six methods: peer-to-peer interaction, active student engagement in learning, emphasis on practice and student effort, and personalization. While there are many ways to increase teaching presence, students place the most value on aspects of teaching presence directly linked to their learning (Martin et al., 2018).

As suggested by these definitions and research results, there is an abundance of means and methods to enhance teaching presence. Choices include video overviews/lectures that feature the instructor, discussion board interactions with students, in-depth feedback on activities and assignments, and course structures that promote student engagement (Swan & Shih, 2005). Furthermore, instructors can create videos to introduce themselves, create videos to review assignments, establish clear course expectations, and create opportunities for students to share relevant personal experiences (Martin, 2019). There is an ever-growing abundance of online tools to increase points of contact in online classes. These interactions build rapport and collaboration, while creating spaces for students to receive feedback (Dixson, 2010). Moreover, instructors can employ other technological tools to increase engagement and points of contact (Martin, 2019). These digital interactive communication tools foster strong student-student and student-instructor interactions that enhance student perception of instructor presence (Park & Kim, 2020). These interactions build a learning community that is essential for cognitive growth and the development of critical thinking (Stewart et al., 2009). Many methods of enhancing teaching presence are regularly linked to higher student satisfaction in online courses (Garrison & Cleveland-Innes, 2005; Caskurlu et al., 2020) and they enhance ways for students to actively engage online (Martin et al., 2018).

Although it is clear that a strong teaching presence is linked to higher rates of perceived learning and better learning experiences, there is a dearth of research on students’ perception of the relative value of specific methods of instilling teaching presence into an online course (Dixson, 2010). Therefore, the purpose of this study was to determine which methods of teaching presence students perceive to be the most valuable.

### **Research Questions**

The existing teaching presence literature offers helpful guides to instructors aiming to optimize their presence in their online class activities. This paper, based on our issues encountered in personal class experiences and questions raised in related research activities, aims to enrich as well as extend this literature. A recurring perspective in the teaching presence literature regarding the relationship between the use and value of methods of teaching presence, is the idea that “more is more” (Imlawi et al., 2015; Kendall and Kendall, 2017). Studies advocate expanding the repertoire of methods that ostensibly establish an instructor’s presence, consistently reporting a positive correlation between teaching presence and various means of communication, responsiveness, direction, and engagement (Hajibayova, 2016; Skramstad et al., 2012). Hence, instructors are encouraged, often strongly, to engage in any and all efforts to set and sustain teaching presence to improve the learning experience. However, there is little guidance regarding which of the many methods of enhancing teaching presence are most worthwhile.

This exploratory study was designed to determine the methods of teaching presence that students perceive to be the most valuable to their academic success, or to answer the following research questions:

1. How well do students perceive the various methods of infusing teaching presence into an online course?
2. What methods of teaching presence do students perceive to be most valuable to their learning?

The results of our tests to answer these basic research questions led to a series of post-hoc analyses in which we determined through factor analysis that students perceive an underlying difference between the various methods of teaching presence that we conceptualize here as substantive versus stylistic methods. We then explored whether students perceive a significant difference in the value of these substantive versus stylistic methods of infusing teaching presence into an online course.

## Method

### Data Collection and Measurement

The sample for this study consists of students in the graduate business program at a mid-Atlantic university. We collected course analytics data and administered an exit survey to students in seven sections of the online version of the capstone course of the MBA program, from spring 2017 through spring 2019. Sections ranged in size from 31 to 44 students, most of whom were working adults enrolled in the graduate program part time. The survey was administered at the conclusion of each section of the course to a total of 259 students; 256 students submitted the survey, which was a response rate of 98.8%.

We follow precedent and interpret teaching presence as the proactive choices an instructor makes designing, influencing, facilitating, and directing cognitive and social processes in order to deliver a productive, meaningful educational experience (Anderson et al., 2001). As discussed earlier, there are numerous methods for enhancing teaching presence in an online course from which instructors and course designers must select those most suitable for their particular course. Given the nature of the capstone MBA course that served as the setting for data collection, we used eight course-embedded design elements to enhance the instructor's teaching presence. Specifically:

1. Teacher-created narrated PowerPoint content lectures
2. Weekly update emails/announcements from the teacher explaining upcoming assignments and deadlines
3. Three-minute professionally recorded, highly personal course introduction video of the teacher
4. Seven professionally recorded one-minute module overview videos by the teacher
5. 500-word biographic page profile of the instructor that incorporates a personal photo
6. Discussion board introduction post by the teacher that presents her personal and professional background
7. Individualized teacher feedback on assignments
8. Teacher email responses to individual student questions

In the post-course survey, we listed these eight course design elements and asked students (1) "For each of the following, please indicate how well it added to the instructor's presence in the course" (1 = Extremely well, 5 = Not well at all), as well as (2) "For each of the following types of instructor presence, please indicate the degree to which it provided value to you as a student in the course" (1 = Provided a great deal of value, 5 = Did not provide any value at all).

## Analysis and Results

Our analysis consisted of an examination of the means of the eight course design elements with respect to students' perceptions of how well they added to the instructor's presence in the course and their relative value to them as students. These results led to a set of post-hoc analyses in which we first conducted factor analyses of the two sets of items, which resulted in our conceptualization of substantive versus stylistic design methods. We then tested for significant differences in the effects of stylistic and substantive methods on their contribution to the level of the instructor's presence in the course, as well as their perceived value.

Results consistently indicate that students saw all applied teaching presence methods as increasing the presence of the instructor in the online course. Table 1 reports students' mean response, on a scale of 1 to 5, where 5 = "extremely well" and 1 = "not well at all," as to how much that element of the course increased the instructor's presence in the class. Students rated all eight elements at least 3.8 out of 5.0, indicating that all elements contributed to teaching presence. Average ratings ranged from 3.84 to 4.60 out of 5.0, as shown in Figure 1, in ranked order.

**Figure 1**  
*Strategies for Increasing Instructor Presence*

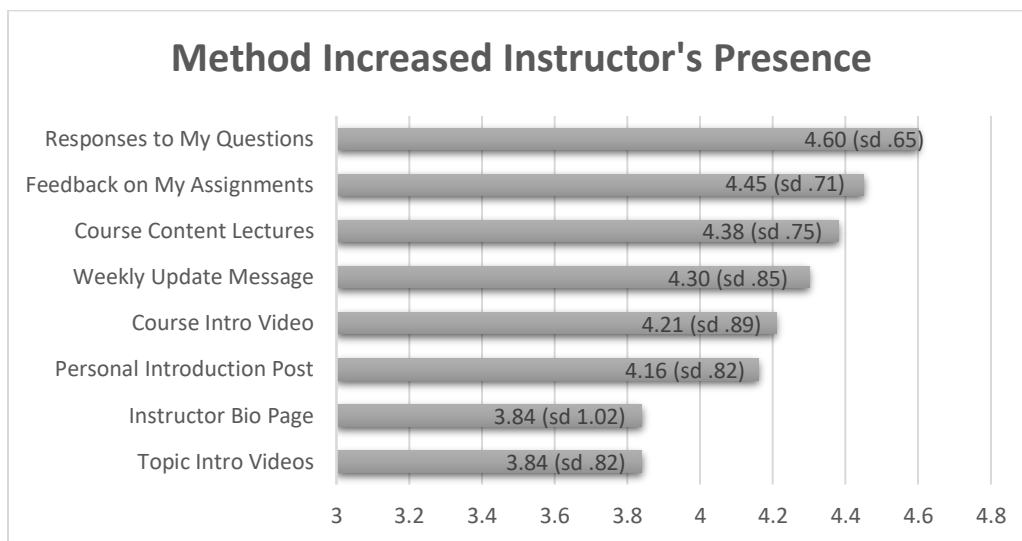
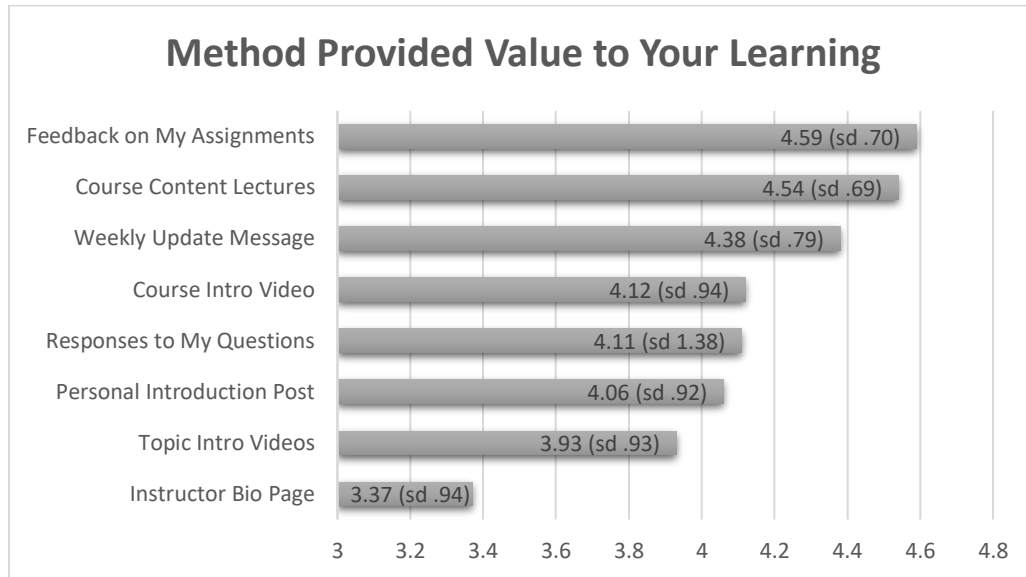


Figure 2 displays in ranked order the mean value of students' perceptions of the degree to which each element of teaching presence provided value to their learning. Similar trends mark students' perception of the value, with the mean for all elements at a level of 3.8 or better. Yet here, the range was a bit greater, from 3.37 to 4.59 out of 5.0.

**Figure 2**  
*Strategies for Learning Support*



We found it interesting that, for both questions, students' ratings of the various methods of teaching presence were quite similar, in that methods reflecting direct interaction with the instructor or course content were rated more highly than personal/professional information about the instructor or informational videos about the course. These results prompted us to engage in a set of post hoc analyses.

### Post Hoc Analyses

Given the rankings of students' responses to the survey as shown in Figures 1 and 2, we suspected that there might be deeper factors underlying students' perceptions of the various methods of teaching presence embedded in the course. We performed exploratory factor analysis on our data to better understand whether associations existed between the eight initial variables, and whether the eight variables could be reduced to fewer dimensions or latent variables.

We factor analyzed both sets of teaching presence items separately, first using the eight items that asked how well each element contributed to the instructor's presence in the course, and then the items assessing the degree to which each element added value to their learning experience. Factor analysis using varimax rotation and an eigenvalue cutoff of 1.0 resulted in a two-factor solution for each set of eight teaching presence items. Figures 3 and 4 show the results of the two factor analyses, respectively.

In both instances, the same four items loaded on each of the two factors. The four items loading on the first factor were: the instructor's personal introduction on the discussion board, the professionally shot video introduction by the instructor, the professionally shot one-minute topic introductions by the instructor, as well as the instructor's internet bio page. These elements of teaching presence all show information, photos and/or video footage of the instructor, but they provide little in the way of course content, nor do they provide direct interaction with either the instructor or other students. Rather, these items provide a visual or narrative overview of the instructor or the course material. The items in this factor we named *stylistic* teaching presence because they all add an aesthetic presence of the instructor, but little else.

The four items that loaded on the second factor were quite different. These items all related to substantive course content or personal interaction with the instructor: the instructor's weekly update regarding upcoming assignments and due dates, the instructor's personal responses to individual student email questions, the instructor's personal feedback on students' individual assignments, and the content lectures narrated by the instructor. Each of these elements of teaching presence provides students with essential information on the course structure or content that they needed to make successful progress in the course. Because of their substantial contribution of course information, we named this second factor *substantive* teaching presence.

**Figure 3***Instructor Presence Items***Factor Analysis Loadings—Instructor Presence Items**

Item	Factor 1	Factor 2
	Stylistic Presence	Substantive Presence
Instructor's Introduction Post on Discussion Board	<b>0.812</b>	0.275
Professionally Shot Instructor Course Introduction Video	<b>0.787</b>	0.324
Instructor's Bio Page	<b>0.833</b>	0.119
Professionally Shot Instructor Topic Introduction Videos	<b>0.758</b>	0.215
Instructor's Weekly Update Message	0.229	<b>0.738</b>
Instructor Prepared Voice-over Content Lectures	0.361	<b>0.559</b>
Instructor's Responses to Individual Student Questions	0.130	<b>0.841</b>
Instructor's Feedback on Individual and Team Assignments	0.203	<b>0.767</b>

**Figure 4***Value Added to Student***Factor Analysis Loadings—Provide Value to Student**

Item	Factor 1	Factor 2
	Stylistic Presence	Substantive Presence
Instructor's Introduction Post on Discussion Board	<b>0.807</b>	0.239
Professionally Shot Instructor Course Introduction Video	<b>0.852</b>	0.240
Instructor's Bio Page	<b>0.786</b>	0.199
Professionally Shot Instructor Topic Introduction Videos	<b>0.784</b>	0.247
Instructor's Weekly Update Message	0.373	<b>0.715</b>
Instructor Prepared Voice-over Content Lectures	0.256	<b>0.633</b>
Instructor's Responses to Individual Student Questions	0.186	<b>0.664</b>
Instructor's Feedback on Individual and Team Assignments	0.101	<b>0.850</b>

### Stylistic versus Substantive Teaching Presence

In broad terms, style refers to methods that focus on impression management, aiming to influence what students perceive, think, and feel. Methods include information about or presented by the instructor, such as a personal introduction discussion post, video introduction to the course, brief video overviews of topics, and the link to the instructor's professional website. In contrast, substance refers to methods that focus on content management and delivery, aiming to provide helpful information, recommendations, and interpretations to students. Methods include detailed feedback on assignments, responses to email inquiries, direct moderation of discussion board activities, and video content lectures. In actuality, both stylistic and substantive elements of teaching presence are commonly used concurrently, although to different degrees. Given the demands imposed by both, the matter of degree has pivotal importance to optimizing the design of an online class.

### Value of Stylistic versus Substantive Teaching Presence

Based on these results, we created multi-item scales using the four items that loaded together, each measuring a critical dimension of the course design. Regarding the results for teaching presence shown in Figure 3, we combined the four items that loaded on the first factor into a four-item scale; it is labeled *Stylistic Teaching Presence*, and shows a high measurement reliability, with a coefficient  $\alpha$  of .854. The remaining four items that loaded on a second factor we labeled *Substantive Teaching Presence*. It, too, has a high reliability, with a coefficient  $\alpha$  of .763. Applying the same procedure to items assessing the perceived learning value of each item resulted in the *Value of Stylistic Teaching Presence* ( $\alpha = .848$ ) and *Value of Substantive Teaching Presence* ( $\alpha = .691$ ).

To statistically test whether stylistic or substantive elements of teaching presence added more to the instructor's presence in the course, we conducted a paired samples t-test of mean differences between these two multi-item constructs. These results are shown in Table 1. The variable, Stylistic Teaching Presence, had a mean of 4.00 out of 5, while the mean of Substantive Teaching Presence was 4.41. Results of the paired samples t-test indicate that these means are significantly different ( $p < 0.000$ ), with Substantive Teaching Presence contributing significantly more to the teacher's presence in the course than Stylistic.

**Table 1**

*Increases in Instructor Presence Alongside Value to Students*

Increases Instructor Presence			Provides Value to the Student		
Variable	Mean (std dev)	Paired Samples t-test	Variable	Mean (std dev)	Paired Samples t-test
Stylistic Presence	4.00 (sd .79)	t = -9.488	Stylistic Presence	3.87 (sd .87)	t = -11.116
Substantive Presence	4.41 (sd .60)	p < .000	Substantive Presence	4.41 (sd .68)	p < .000
N = 253			N = 256		



We conducted a second paired samples t-test of mean differences to test whether students perceived more value to their learning from stylistic versus substantive forms of teaching presence (see Table 1). The variable, Value of Stylistic Teaching Presence, had a mean of 3.87 out of 5.0, whereas Value of Substantive Teaching Presence had a mean of 4.41 out of 5.0. The paired samples t-test indicated a significant difference in these means ( $p < 0.000$ ), with students indicating that substantive teaching presence is significantly more valuable to them than stylistic teaching presence.

## Discussion

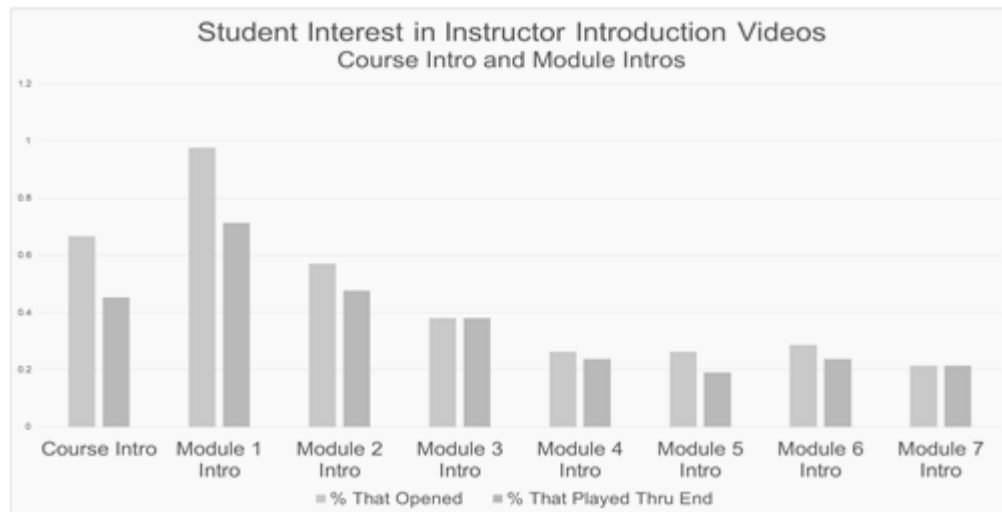
Presently, assessing the issues and identifying best practices in the realm of teaching presence is challenging. In the least, the rapid emergence and expansion of online education runs ahead of educators' efforts to design classes with high levels of teaching presence. For instructors, synthesizing best practices requires sifting through an expanding, variegated literature, or reliance on course designers for advice on which elements of teaching presence will provide the most value in their courses. Consequently, one routinely sees advocacy of the idea of "more is better," with teachers encouraged to devise and implement any and all possible methods and means to enhance students' sense that the instructor is a proactive, vigilant, and conscientious presence in the course. Yet, the time, effort, and resources required to design an online class suggest that instructors face limitations on how much they can reasonably do to institute a confident, engaging teaching presence.

Where is the balance for instructors striving to enhance their presence in their online courses? Our findings suggest that students see value in nearly all methods of teaching presence, which expands on the findings of Sheridan and Kelly (2010). However, students assign higher value to elements of teaching presence that provide meaningful substance, such as content lectures, assignments that directly apply course material, detailed feedback on their performance, and quick response to email queries. These results are not surprising as they are points of contact for students and instructors specifically designed to enhance student learning, which has been found to be the most valuable part of class in prior research (Martin et al., 2018; Richardson et al., 2015; Sebastianelli & Tamimi, 2011; Sheridan & Kelly, 2010). Students assign lesser value to elements of teaching presence that emphasize visual personalization, presence, socialization, or interaction, such as that developed via introductions and an ongoing series of professionally shot overview videos. This finding is consistent with existing literature, as these aspects of teaching presence are more stylistic in nature and less substantive, or they are course features less directly linked to the development of course content and feedback (Martin, 2019; Sheridan & Kelly, 2010). Ultimately, while stylistic forms of teaching presence can increase students' feelings of online community, the cornerstones of learning are those aspects we call substantive teaching presence.

Indeed, data from the LMS analytics on student behavior support our finding that students do not see high value in stylistic elements of teaching presence. This is not surprising as stylistic elements, such as short videos, do not provide significant content or skills. Rather, they create another space for interactions between instructors and students that aspires to increase the social learning environment climate online (Lear et al., 2009). We gathered data on the number of student views of the professionally shot course introduction video, as well as each of the seven one-minute module introduction videos. As depicted in Figure 5, less than 70% of students opened the course introduction video, while less than half watched the entire three minutes. The results are even more striking when looking at students' behavior with respect to the module

introduction videos. Nearly all students opened and began watching the one-minute introduction to the first course module, yet only 70% watched it in its entirety, despite it being only one minute long. As the course progressed, fewer and fewer students opened the module introduction videos, with less than 60% opening the video for module 2, less than 40% for module 3, and between 20 to 30% opening the remaining module introductions. Clearly, as demonstrated by their video-viewing behavior, students see lower value in elements of teaching presence that provide style with little substance. In fact, Martin et al. (2018) also noted that introductory videos and other stylistic media were less valued than substantive materials. Instead, students found value in clear directions provided on the syllabus with timely feedback (Sharoff, 2019). Although the module introduction videos were a brief snapshot of what was to come in the upcoming module, they had little in the way of substantive content, being only one minute in duration. Thus, while there are endless ways to enhance class features, students appreciate substance over style (Martin et al., 2018).

**Figure 5**  
*Student Interest in Videos by Module*



These findings support and extend previous research that demonstrated the importance of teaching presence in terms of course structure and design in promoting cognitive and social connections (Garrison & Cleveland-Innes, 2005). Our findings indicate that, in the “clicks of the students,” not all forms of teaching presence provide equivalent value. Instead, students find value in clear, organized classes that are designed to help them efficiently learn while receiving direct, timely feedback from instructors (Martin et al., 2018; Sebastianelli & Tamimi, 2011). Moreover, our findings clarify the performance implications of substance and style when designing and delivering a productive, meaningful online learning experience. Similar to traditional class settings, the most useful forms of interaction are still individualized feedback designed to develop mastery of knowledge or skill (Martin, 2019).

While our findings echo those of some of these previous research studies, the results of our factor analysis confirm that students in online classes perceive the difference between what we have herein labelled substantive and stylistic forms of teaching presence. These findings have implications for best practices in online education. For instance, some of these substantive

elements of teaching presence that are most valued by students, such as detailed, individualized feedback on assignments and quick responses to individual questions can be quite time consuming for instructors. Thus, high quality online courses may require either smaller class sizes or multiple instructors in order to maintain a manageable student-instructor ratio so that instructors are able to provide such individual attention to students. It also is important that instructors new to fully online teaching receive appropriate training and support, not only in course design, but also with respect to within-course delivery, to build and maintain a high level of teaching presence in their courses.

## **Limitations and Future Research**

This research was conducted within the official context of an existing asynchronous online course, which limited some of our research decisions and methods. For instance, we included eight important methods commonly used to establish teaching presence in an online course, but there were other methods that we did not include. For instance, the course did not include discussion boards in which the instructor was an active participant, in large part because the course already included other rigorous assignments and assessments for which the instructor provided detailed feedback. We also collected the data from multiple sections of a single academic course, taught by the same instructor. While this method controlled for course content and instructor, there may be some moderating effects due to those factors. We encourage future research to evaluate additional elements of teaching presence in a course as well as across multiple courses and instructors. Another possible limitation of this study is the sample, which consists of graduate students in a Master of Business Administration program. Graduate students tend to be older and more experienced and have higher education, so they may be more aware of the differences between stylistic and substantive teaching presence as compared to undergraduate students. Graduate business students tend to be working adults, often with family obligations on top of their school and work commitments. Thus, they may perceive more value in those elements of teaching presence that facilitate their timely and effective completion of assignments in the course. Expanding the sample to include undergraduate students and students in disciplines outside the business field may enhance the generalizability of the findings of this study.

In principle, the process of assessing, systematizing, and validating the usefulness of various options is a hallmark of improving understanding and refining interpretation in any domain. Here, we find that students perceive various methods of enhancing teaching presence in an online course quite differently; in particular, elements of teaching presence are perceived as either stylistic or substantive. In this study, our results validate the utility of including both stylistic and substantive methods of teaching presence into online courses, although students perceive substantive methods as providing significantly more value to their learning experience. In other words, the stylistic methods provide a general façade of teaching presence, whereas the substantive methods construct a more concrete or solid presence. In practice, these results help both the novice and experienced teacher identify options and make tradeoffs in the quest to optimize his or her teaching presence. Together, these issues frame our assessment of the challenge and opportunity of infusing teaching presence in an online course.

### **Declarations**

The authors declare no conflict of interests for this study.

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# Effectiveness of the Flipped Classroom in the Teaching of Mathematics in an Online Environment: Identification of Factors Affecting the Learning Process

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## Abstract

The purpose of this study was to carry out an analysis of the effectiveness of the Flipped Classroom methodology for teaching mathematics—specifically geometry, in an online environment. Specifically, we measured: (1) the academic achievement of students who were taught based on this method; and (2) the perceptions of satisfaction with this methodology and with the virtual sessions attended through digital resources. In order to gather the data a pre-experimental and ex-post-facto design was used with a sample of 113 secondary education students. Regarding academic performance, positive and significant differences were found between the pre-test and the post-test. In addition, different significant variables were found that affected the academic performance of the students, such as having previously failed the subject of mathematics, the perception of the students about their effort in learning mathematics or the educational level of the parents. In respect of the students' perceptions, the results showed that they were generally happy with the use of the Flipped Classroom methodology, bearing in mind that the environmental context in which the educational process takes place affects the students' perceptions. However, slightly negative perceptions were also found in respect of virtual sessions that made use of digital resources. These findings were significantly affected by the frequency with which resources and electronic devices were deployed. These results would support the integration of this methodology into the teaching of mathematics, where the use of digital resources to study geometry in particular helps to improve the different competences and skills of the students.

*Keywords:* students, Flipped Classroom, educational innovation; research methods, online education, academic achievement

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The recent pandemic caused by SARS-CoV-2 presented the educational community with an unprecedented challenge: how to acquire the skills to teach online (Bautista et al., 2022). UNESCO (2020) reported that 1.6 billion students from more than 190 countries made the transition from traditional learning methods to virtual ones. This had a major impact on the pedagogical and social aspects of teaching with psychological aspects also coming into play (López-Noguero et al., 2021). This new challenge “has shaken up teachers at all levels and at the same time inspired them to find solutions to problems they have not encountered before” (Flores & Swennen, 2020, p. 456). Technology now must be viewed as a key tool for education in the 21st century. This particularly applies to the study of mathematics (McCulloch et al., 2021), with a particular relevance for geometry, the area of interest in this study.

The shift to online teaching has given a big impetus to the use of information and communication technology (ICT) in the area of mathematics. The pedagogical vision (Weinhandl & Lavicza, 2021) states that the physical presence of an educator is not required, and neither is that of a classroom (Camacho et al., 2020). In other words, the space-time barriers have been reduced in virtual teaching thanks to the teaching strategies carried out by the teachers (Weinhandl et al., 2020). This advance has favored the use of digital resources both in a synchronous and asynchronous way (Schallert & Weinhandl, 2019), where the student has the role of protagonist with a more active role. In this online context, Hossein-Mohand et al. (2021) states that learning mathematics could be much more significant and enriching for the students themselves. Furthermore, in the context of this study, the use of ICT will allow not only the development of students’ geometric thinking (Zaranis & Synodi, 2017), but also the visualization of geometric figures (Dockendorff & Solar, 2018), through augmented reality for example (Arvanitaki & Zaranis, 2020).

To frame the study of mathematics within a more realistic context, the use of active methodologies helps students to actively construct their own learning process (Azevedo & Maltempi, 2020). One example of this is the Flipped Classroom (FC) (Campillo-Ferrer & Miralles-Martínez, 2021). Şenel et al. (2020, p. 77) define FC as “to transform the traditional instructional method to a novel approach with the use of instructor-developed videos and interactive activities such as problem-based and collaborative activities.” According to Tucker (2012), the FC procedure is as follows: at the beginning of the application of this methodology, students asynchronously access and study the theoretical content of the course (through different digital resources such as documents, videos, or multimedia presentations). This action is carried out before the students begin the synchronous sessions in which they will participate and interact with the teacher and classmates in solving problems and doubts (Galindo & Bezanilla, 2019). With these actions, more active, collaborative, and significant learning for the student would be achieved. In short, as Giménez & Porlán (2017) and Herrera & Prendes (2019) state, the FC model is to do at home what is traditionally done in the classroom, and what is commonly done at home as homework is done in the classroom. In our case for this study, FC was implemented through virtual learning platforms and videoconference platforms, respectively.

This methodology offers a range of benefits, from helping students to learn autonomously (Zainuddin & Perera, 2019), and improving academic results (Bulut & Kocoglu, 2020; Cronhjort et al., 2018), to encouraging the students to interact with one another (Son, 2016; Xiao et al., 2021) and to work on intrinsic aspects such as emotions, motivations, and interests (Kim et al., 2014). However, as pointed out by Mengual-Andres et al. (2020), for the educational process to succeed through FC an ideal working environment is required to optimize the visualization of content in digital format. The literature has shown that in the area of mathematical knowledge,

the male gender is linked with higher skills and qualifications compared to the female gender (Abín et al., 2020; Gomes et al., 2020). To address this, it is necessary to focus on teaching mathematics irrespective of gender stereotypes and to give the students a more practical, motivational angle (Husein et al., 2018; Maass et al., 2019). The use of FC methodology can provide a good alternative to support this objective.

As a key factor—and in common with other methods—the FC method primarily aims to reorganize and optimize the use of time in the teaching-learning process (Balan et al., 2015; González et al., 2016). As the usual class structure is flipped around, students can access pre-classes or videos (Ríos & Romero, 2022) that contribute greatly to the fundamental knowledge that turns students into active participants in classroom discussions (Fung, 2020). Teachers adjust to the pace and interests of their students. This process is supported (Guillén et al., 2020; Limniou et al., 2018) by the presence, guidance, and expertise of the teacher, who spends time enhancing and facilitating other processes of knowledge acquisition and practice, applying concepts and creatively engaging with content, answering questions, and solving problems (Jeong et al., 2021). Applied to the area of mathematics, different studies show how FC favors mathematical problem-solving, meaningful learning, motivation, and academic performance (Adams & Dove, 2016; Bhagat et al., 2016; Clark, 2015; Kirvan et al., 2015; Lo et al., 2018).

In short, the use of active methodologies such as FC would be a good option, as it presents a multitude of benefits to train students academically, where the use of digital resources will allow them to continue with online education COVID during the pandemic. However, no studies exist that connect the application of this methodology in the classroom with the use of ICT in online scenarios, which is the main objective of this study. Thus, the objectives of this study are:

- (1) To analyze students' academic performance in the subject of mathematics (knowledge area, geometry) when using the FC methodology in a distance learning educational scenario.
- (2) To find out students' perceptions of the use of the FC methodology, as well as the use of ICT resources in virtual sessions.
- (3) To identify predictors that affect both students' academic performance and their perceptions about FC and use of virtual sessions.

## **Theoretical Framework**

### **The Effect of FC on Student Learning and Satisfaction**

On the one hand, research has shown the positive impact on the academic performance of students in secondary education (Guillen-Gamez et al., 2019). There is abundant literature on this topic up to the point that there are several meta-analyses that summarize this information. The study by Strelan et al. (2020) showed a moderate and positive effect of FC between control and experimental groups ( $n = 21$ ; Hedges'  $g = 0.64$ ). In the same context, Wagner et al. (2020) carried out an analysis on the effectiveness of this methodology through “post-test only”, “pre-test-post-test (time)” and “pre-test-post-test with control group (treatment)” designs, finding a moderate effect size ( $n = 25$ ; Cohen's  $d = 0.42$ ). Similar results were also reported by Galindo-Domínguez (2021). Against this backdrop, we agree that at the very least, the use of this FC methodology “yielded a neutral or positive impact on student achievement when compared to traditional classroom” (Lo & Hew, 2017, p. 1). Therefore, it is essential that there is a good learning of mathematics by the students so that they do not repeat the academic year. In this context, Alexander & Maeda (2015) state that the use of the FC methodology can be ideal for achieving both positive learning and academic performance in students.

On the other hand, other studies have focused on analyzing students' perceptions of FC. Gómez et al. (2015) used a post-test design in a control and experimental group, with a sample of 29 secondary school students from Seville (Spain). The results showed no differences as to satisfaction, although they did show more positive differences in respect of the pace of learning and effort towards mathematics for the experimental group. Similar results were found by both Stratton et al. (2020) and Kazu & Kurtoglu (2020), also finding that gender is not a significant variable. In the same context, Yang (2017) used a qualitative design with interviews with students ( $n = 3$ ) at the secondary school stage. Not only did this show that students had a more positive perception of themselves, but they also developed greater self-management and motivational skills, although the latter did not present in all students. As to motivational skills, Young (2015) found that students develop a negative attitude towards mathematics after using this methodology, which is similar to those of Lape et al. (2014), who emphasized students' lack of motivation due to not being taught the subject in face-to-face classes. An effect such as this may pose a general difficulty in the implementation of the flipped classroom in mathematics, where carrying out this methodology in virtual sessions is likely to yield better results.

Finally, many authors have tried to analyze predictors that affect students' academic performance or perceptions of FC. Gender is one of the best-known predictors, with more positive ratings for females (Chiquito et al., 2020; Gross et al., 2015), although other studies reported opposite results (Guillen-Gamez et al., 2019). Others did not find any significant differences (Cho et al., 2021; Kadry & El Hami, 2014; Onojah et al., 2019). Regarding perceptions, disparate results have been found in the literature, finding more favorable results in the male gender (Aljaraideh, 2019) but, conversely, also in the female gender (Colomo-Magaña et al., 2020).

### **The Effect of Digital Resources on Student Learning**

As to online learning, the use of digital resources is an essential tool. Nevertheless, Adarkwah (2021) states that “there is an uneven spread of access to ICT among different populations, households, and spaces because network coverage varies locally,” so differences occur in terms of academic performance or student satisfaction among those using digital tablets versus those using laptops, with the latter ranking higher (Liberatore & Wagner, 2021).

Another significant factor studied in the literature has been the attitude towards ICT (Romero et al., 2020). Specifically, Peytcheva-Forsyth et al. (2018) have analyzed the relationship between this type of attitude and the learning of mathematics, finding more favorable attitudes for the female gender. Moreover, the literature confirms that there is a strong relationship between attitudes towards technology and its use in educational contexts (Hu et al., 2018). This leads to better student skills, including digital skills (Hernández-Martín et al., 2021). If we focus on the area of mathematics, the application of digital resources can have a positive impact on the academic performance of students (Gómez et al., 2020; Sharp & Hamil, 2018). So does the use of mobile applications (Kristianti et al., 2017), which increase both the motivation as well as the performance of students. Thus, the incorporation of technology enhances the motivation for learning mathematics, which is linked to a greater willingness to learn and overall, a better achievement in mathematics (Gilar-Corbi et al., 2019; Hammoudi, 2019; Lipnevich et al., 2016).

## Method

### Design and Participants

To achieve the objectives of this study, a quasi-experimental design was used where one of the main characteristics of this type of design is that the participants are not assigned according to random criteria (Cook, 2015). With this type of design, both the academic performance of the students and their perceptions of the FC methodology were analyzed. This design was carried out with a three-week treatment through virtual sessions. Specifically, we conducted the experiment with four groups in the fourth year of secondary education, previously assigned at the beginning of the stage. For data collection, a non-probabilistic purposive sample was used, with a total of 113 students in the fourth year of secondary eEducation, from Malaga (Spain), during the 2020–2021 academic year. The distribution of the groups was as follows: group A (24.8%), group B (25.7%), group C (25.7%), and group D (23.9%). In terms of gender, 65.30% were female, while 34.70% were male. The average age of the students was 15.

### Instrument

In order to achieve the objectives of the study, two types of instruments were used. On the one hand, several tests were employed to assess the academic performance of the students on one of the didactic units of the mathematics subjects: geometry. These tests were provided by the textbook publisher (SM) and are based on a 10-point scale. And, on the other hand, we used a questionnaire to ascertain the students' perceptions of the FC methodology in virtual sessions, developed by the authors themselves and consisting of two dimensions. The first dimension (DIM-FC) focused on the students' benefits from and satisfaction with the FC methodology used by the teacher, with a total of nine items. The second dimension (DIM-VIRTUAL) was based on student perceptions of the virtual sessions for teaching the practical and theoretical contents of the subject, comprising a total of 12 items. A seven-point Likert scale was used to measure student perceptions, where a value of 1 was allocated to the variable "strongly disagree" and a value of 7 to the variable "strongly agree."

The psychometric properties of the questionnaire were tested through Cronbach's alpha reliability and construct validity with exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). SPSS V.22. AMOS V.22 were used as statistical software. The principal components method with oblimin rotation was used for the PCA. The Kaiser-Meyer measure of sampling adequacy ( $KMO = 0.9337$ ) as well as Barlett's test of sphericity ( $\chi^2 = 1090.659$ ;  $gl = 66$ ;  $sig. = 0.001$ ) showed the dimensionality of the instrument. The model revealed the presence of the two dimensions explaining 73.78% of the true variance in the instrument scores (DIM-FC, 62.10%; DIM-VIRTUAL, 11.58%). As recommended by Henson & Roberts (2006), items that are weighted at less than 0.3 are eliminated as they correlate on different scales. The final version consisted of 12 items. The maximum likelihood method was selected for the CFA, whilst the satisfaction thresholds recommended by Hu & Bentler (1999) were taken into consideration. The first version of the model did not fit with the expectation of the authors, so we refined the items of the tool and eliminated those items that had large covariances with other items outside their own dimension. The second version proved a satisfactory fit with a total of 10 items. Table 1 shows the indices analyzed together with their respective coefficients, while Table 2 shows the questionnaire. In addition, Mardia's coefficient (r.c.) states multivariate normality by finding values between 3 and 70 (Byrne, 2010). This amounted to 10.756 in our model.

**Table 1**  
*Psychometric Properties of the Instrument*

Coefficients	Model coefficients	Hu & Bentler recommendations
CMIN/DF	1.381	< 3
GFI	.922	> 0.7
NFI	.938	> 0.7
PNFI	.709	> 0.7
IFI	.982	> 0.9
TLI	.976	> 0.9
RMESEA	.058	< 0.07

**Table 2**  
*Instrument Items*

**DIM-Flipped Classroom:**

- ...is a motivating strategy for learning the subject
- ...favours the resolution of doubts about the content of the subject
- ...offers me more opportunities to collaborate with my classmates
- ...makes it easier for me to understand the content of the subject
- ...allows me to develop skills that will be of value in my learning

**DIM-Virtual Sessions:**

- ...improves interactivity with teachers and classmates
- ...helps to understand information more clearly
- ...encourages my concentration on the teacher's explanation
- ...increases the number of digital resources to complement my training
- ...improves organization and use of time

**Data analysis techniques**

The analysis of the results required the following procedures:

- To measure the academic performance of the students, a mixed repeated measures ANOVA was used. The dependent variable (academic performance) was used in the intra-group factor. The study was carried out at three points in time: at the end of the first week of work with the Flipped Classroom methodology through virtual sessions (post-test 1), at the end of the second week (post-test 2) and at the end of the third and final week (post-test 3). As a between-groups factor, the nominal polytomous variable group (group A, B, C, and D) was used. In addition, the assumptions for this test were checked for compliance with Box's M, sphericity of variance (Mauchly), and Levene's test.
- To measure how the students perceived the FC through virtual sessions, we applied both the Wilcoxon and Man-Whitney tests, due to the absence of the assumption of data normality ( $p < .05$ ). Data collection was carried out a couple of days after the start of the project, to give the students time to interact with the digital resources and evaluate their use.
- To identify significant predictors, different statistical tests were used, depending on the design of each variable. Each type of statistical test is described in its corresponding analysis in the results section. This analysis was performed on the scores of the last questionnaire (post-test).

**Procedure**

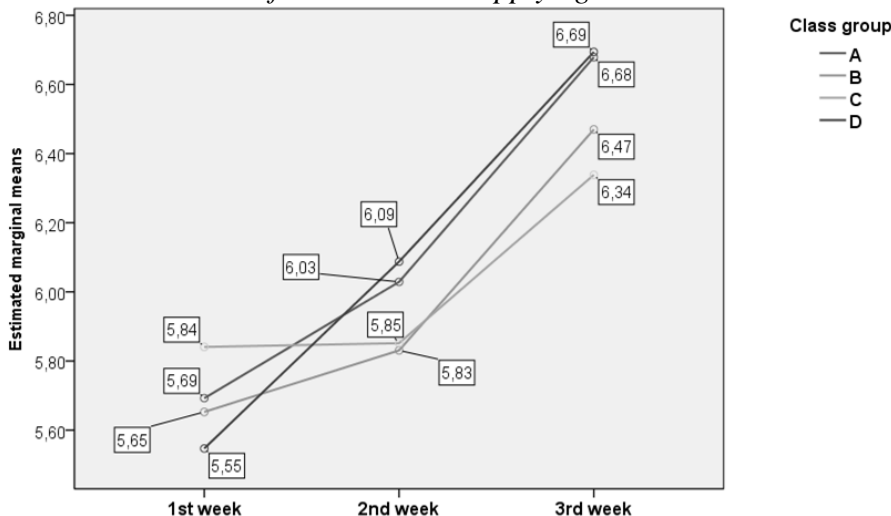
The subject of mathematics, specifically a didactic unit (geometry) was taught online through digital resources, using the FC methodology. This online learning was carried out from the homes of all the agents involved in the educational process due to the confinement and the COVID-19 pandemic. For this reason, the entire process of the FC methodology, both asynchronous and synchronous, was implemented online from home. Before the virtual sessions in an asynchronous way, students were provided with videos and digital resources on the theoretical content of the subject of geometry through the Moodle platform. These materials were developed both by the teacher who taught the four groups of students and by one of the researchers in this study, an expert in educational technology as well as a mathematics graduate. During the virtual sessions in a synchronous way, half of them were focused on guidance and resolution of doubts, while the other half focused on working in small groups on the exercises in this unit, using digital materials and applications. The digital resources were classified according to levels of difficulty (development, reinforcement, and extension) as they were part of the Erasmus+ Increasing Mathematical Attainment in Schools (IMAS) project, funded by the European Union. The teacher granted access to the digital applications and exercises. The teacher also provided guidance to the students on how to use these tools so they could increase their level of commitment to learning and complete more tasks than requested, either to add additional homework or to improve their grades.

**Results**

**Analysis of Academic Performance and Predictor Variables**

Figure 1 shows the average grades of the four class groups, for each time the data was collected at any data point. At the beginning (first week), the students had achieved an average score of between 5–6 points out of 10 for all groups. At the end of application of the FC methodology through virtual sessions (3rd week), the students’ grades had increased slightly by a few tenths of a point in all groups.

**Figure 1**  
*Student Academic Performance when Applying the FC*



In relation to the students' grades, normality was found in the grades (Kolmogorov-Smirnov  $> .05$ ). The Box's M test ( $M = 22.765$ ;  $p > 0.05$ ) allowed us to accept the hypothesis of equality of variance-covariance matrices. We therefore conclude that both groups are equal. Levene's test determined that the assumption of homogeneity of variances was met, in the three within-subjects factors: first week,  $F(3, 109) = 1.158$ ,  $p = .329$ ; second week,  $F(3, 109) = 1.303$ ,  $p = .277$ ; and last week,  $F(3, 109) = 1.303$ ,  $p = .277$ . Finally, Mauchly's test of sphericity was significant, failing to meet the assumption of variance sphericity ( $W = .275$ ;  $X^2 = 139.279$ ;  $p < .05$ ). Therefore, from now on the calculated significances will be interpreted with the Greenhouse-Geisser correction.

The results of the repeated measures mixed ANOVA indicated the existence of main effects on the factor "time of application of the Flipped Classroom methodology",  $F(1.160, 126.404) = 44.642$ ,  $p < 0.005$ . However, no significant interaction effects were found between the within-groups factor and the between-groups factor,  $F(3.479, 126.404) = .270$ ,  $p > 0.05$ . The pairs comparison allowed us to detect whether significant differences existed between the three points in time at which the students were assessed. This was done by adjusting for error using the Bonferroni method. Significant differences were found to exist between the first test and the second moment ( $p = .016$ ), between the second and the third moment ( $p = .001$ ), as well as between the first and the third moment ( $p = .001$ ).

In order to check which predictors were significant for the academic performance of students (Table 3), we used a variety of statistical tests, depending on the design of the variable. A predictor analysis was performed, considering the scores of the last exam (post-test 3), i.e., at the end of the last week of the research. Regarding the gender of the students, the t-Student test determined that there were no significant differences in the scores ( $t = -1.205$ ;  $p > .05$ ), where the male sex ( $M = 6.75$ ) stated a slightly higher mean than the female gender ( $M = 6.44$ ). In relation to not achieving the grade for mathematics, significant differences were found ( $t = -7.158$ ;  $p < .05$ ), where students who had ever failed ( $M = 5.15$ ) had a lower grade than students who had never failed ( $M = 6.90$ ), with a large effect size (Cohen's  $d = -1.672$ ). Regarding the influence of the education of both the father and the mother on their children's academic performance, Spearman's correlation was applied. It was found that there was a positive and significant correlation, both with the educational level of the father's education ( $r = .342$ ), but especially with that of the mother ( $r = .579$ ). Finally, a positive and significant correlation was also found about effort made towards mathematics ( $r = .327$ ), but no significant correlation was found with the methodology satisfaction.

**Table 3**

*Description of the Analyzed Predictors of Academic Performance*

- 
- Gender: male (1); female (2)
  - Have you ever failed mathematics in secondary education? Yes (1); No (2)
  - Father's/mother's education: from "No education" (0) to "Doctorate" (7)
  - Effort towards mathematics: Likert scale from 1 to 10
  - Satisfaction about the methodology: Likert scale from 1 to 10
- 

**Analysis of the Flipped Classroom and Virtual Sessions**

Figure 2 shows the students' perceptions (arithmetic mean) before and after applying the FC methodology and using the digital resources for the virtual sessions. For the FC dimension, a significant increase in student perceptions was observed from the beginning of the project until

its completion, both for the female gender ( $Z = -5.420$ ;  $p < .05$ ) and for the male gender ( $Z = -2.927$ ;  $p < .05$ ). In a comparison between both genders, no significant differences were found at the end of the project ( $U = 1145.000$ ;  $Z = -1.502$ ;  $p > .05$ ). For the virtual sessions dimension, a significant decrease in student perceptions was found between the beginning and the end of the project, both for the female gender ( $Z = -7.383$ ;  $p < .05$ ) and for the male gender ( $Z = -4.990$ ;  $p < .05$ ). In a comparison between both genders, no significant differences were found at the end of the project in this dimension either ( $U = 1123.000$ ;  $Z = -1.627$ ;  $p > .05$ ). As no differences were found between the genders, the analysis of predictors will be carried out on a general basis, without distinction between the genders.

**Figure 2**  
*Learners' Perceptions of FC and e-Learning*

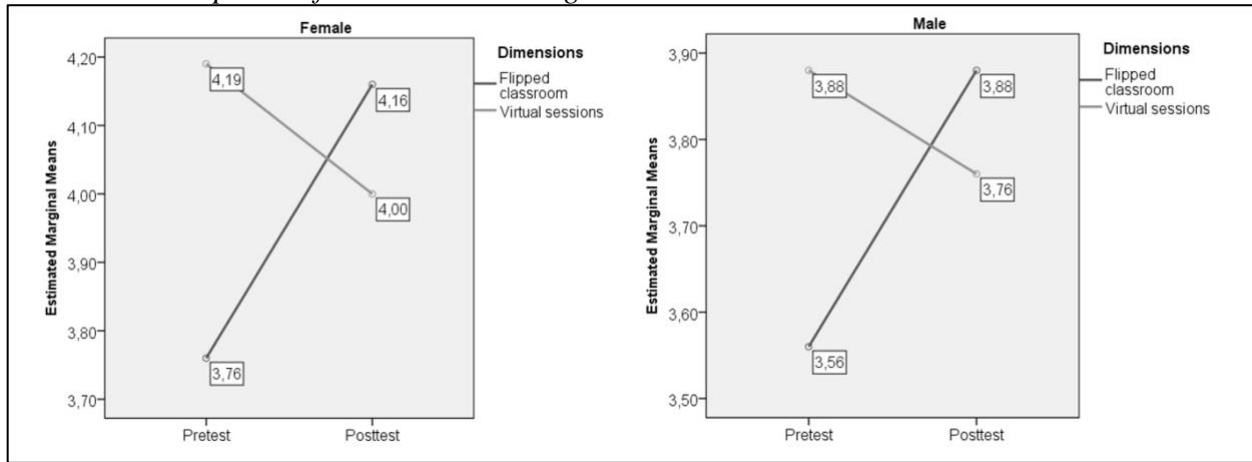


Table 4 shows the predictors analyzed in the students' perceptions of the FC. As these are ordinal variables, Spearman's correlation was used. Regarding the context of the family environment that would be suitable for working with this type of methodology, the students required a suitable home environment to continue with the sessions ( $M = 5.11$ ), which states a positive and significant correlation ( $r = .649$ ), with a moderate effect size. With respect to autonomous learning, students did not feel entirely competent to carry out their learning by themselves, with a medium perception ( $M = 4.20$ ), not finding a significant correlation ( $r = .090$ ;  $p > .05$ ). Finally, students did not feel very motivated to carry out their educational process ( $M = 3.78$ ), with a significant and negative correlation with perceptions of the benefits of FC ( $r = -0.570$ ), with a moderate size.

**Table 4**  
*Description of the Analyzed Predictors of FC*

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- Family environment context suitable for working on FC. (Likert scale from 1 to 10)
- Autonomous learning (I learn very well on my own). (Likert scale from 1 to 10)
- Motivation level in learning mathematics, due to being in lockdown. (Likert scale from 1 to 10).

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Table 5 shows the predictors analyzed in the students' perceptions of the virtual sessions. Depending on the design of the variable, different statistical tests were applied. Regarding the type of device used to connect to the virtual sessions, significant differences were found ( $\chi^2 =$



38.204;  $p < 0.05$ ), where the students' use of smartphones obtained a lower mean ( $M = 2.39$ ) compared with digital tablets ( $M = 3.04$ ) and laptops ( $M = 4.21$ ). Regarding the opportunity to view the theoretical sessions once more, significant differences were found ( $U = 354.000$ ;  $p < .05$ ), where students who re-watched the sessions obtained more favourable perceptions ( $M = 4.85$ ) than those who did not re-watch them ( $M = 3.15$ ). The frequency of use of the webcam was medium ( $M = 3.84$ ), although there was no significant correlation between this use and the student's perceptions of the virtual sessions. The frequency of turning on the microphone was slightly below average on the 7-point Likert scale ( $M = 3.26$ ), and there was a significant correlation with student perceptions ( $r = .575$ ), with a moderate impact. Finally, the frequency of use of the videoconferencing platform chat was medium-high ( $M = 3.90$ ), although there was no significant correlation.

**Table 5**

*Description of the Analyzed Predictors of Virtual Sessions*

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Which technological tools do you use to participate in the virtual sessions: Smartphones (1); tablets (2); laptops (3)?
Do you usually watch the pre-recorded videos again? (yes/no)
How often do you usually turn on the web cam for virtual sessions? (Likert scale from 1 to 10)
How often do you turn on the microphone to ask questions? (Likert scale from 1 to 10)
How often do you use the Hangout chat to ask questions? (Likert scale from 1 to 10)

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Taking into consideration all the statistical analyses carried out to meet the research objectives, the main results found can be seen in Table 6.

**Table 6**

*Main Research Results*

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<b>Study Purposes</b>	<b>Main Findings</b>
Analyze students' academic performance when using FC	-Positive effect on student academic performance from pre-test and post-test
Know the perceptions of students about the use of FC and virtual sessions	-Student satisfaction with FC increased between the pre-test and post-test -Student satisfaction regarding the use of virtual sessions decreased between the pre-test and post-test
Identify significant predictors in academic performance of students and in their perceptions about FC and use of virtual sessions	<p><b>Academic performance</b></p> <p>-Gender not a significant predictor, although males had better grades -Failing math subject or the effort in learning this math had a significant influence, together with educational levels of parents</p> <p><b>Perceptions about the FC</b></p> <p>-Gender not a significant predictor, although females held more favorable perception -Having a good family environment to carry out this methodology virtually had a positive effect, while motivation to learn mathematics in a period of confinement had a negative effect</p> <p><b>Perceptions in the use of virtual sessions</b></p> <p>-Gender was not a significant predictor, although the females obtained more favorable perceptions -Types of technological devices used to participate in sessions influenced perceptions of the students, as did viewing pre-recorded videos</p>

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## Discussion

When face-to-face teaching in secondary education was impossible in Spain, due to the restrictions caused by COVID-19, this research was aimed at analyzing both the impact of FC on students' performance in the subject of mathematics and their perceptions of this methodology and the use of digital resources in virtual sessions. For both aspects, predictors affecting the results have been identified.

Focusing on the academic performance of mathematics students when implementing the FC methodology, the results point towards a positive impact on academic performance, similar to what has been found by other authors (Galindo-Domínguez, 2021; Guillen-Gamez et al., 2019; Strelan et al. 2020; Wagner et al. 2020). This increase in grades mounts up progressively over the time of FC implementation, with grades improving significantly week-on-week. This may be due to the adjustment time required both to achieve positive results when switching from a traditional methodology to FC, in line with Lo & Hew (2017), and to adjust to the pace and interests of the learners (Guillén et al., 2020; Limniou et al., 2018).

As for predictors affecting performance, the male gender presents better grades, a common trend in mathematics according to related literature (Abín et al., 2020; Gomes et al., 2020). These results are similar to the study by Guillén-Gámez et al. (2019) but contrary to Chiquito et al. (2020). Nevertheless, gender does not show significant differences, coinciding with the work of several authors (Cho et al., 2021; Kadry & El Hami, 2014; Onojah et al., 2019). Both the fact of failing the subject of mathematics and the effort devoted to it do cause significant differences, with the performance of students who have never previously failed this subject being higher, as they make more of an effort, in line with the ideas proposed in the work of Gjicali & Lipnevich (2021). In addition, the educational level of the parents correlates positively with performance, which may be due to the importance that the family attaches to the study of mathematics. This coincides with the work of Meza-Cascante et al. (2021).

With a primary focus on student perceptions, we focused initially on FC users. We found that student satisfaction with FC has increased between the beginning and the end of the study, corroborating the findings of the study of Yang (2017) but contradictory to the results of Lape et al. (2014) and Young (2015). Looking at the gender factor, girls show higher satisfaction with FC, similar to the findings of Colomo-Magaña et al. (2020) but differing from those of Aljaraideh (2019). Despite this increase in scores, no significant differences in perceptions were observed between the sexes, as has occurred in other studies (Gómez et al., 2015; Kazu & Kurtoglu, 2020; Stratton et al., 2020). Among the predictors, it is worth highlighting how a good family environment and context correlates significantly with a better perception of the implementation of FC, coinciding with the statements of Mengual-Andres et al. (2020), as the educational process through FC requires an ideal working environment for viewing content in digital format, especially if teaching is being done remotely. Regarding students' motivation to learn mathematics while in lockdown, the perception is significantly negative, with contradictory results in the study of López-Belmonte et al. (2019). These results may be due to the social pressure exerted by the pandemic when students are in lockdown and cannot leave home for several months. These results should be interpreted with caution: as they depend on the context in which the learning process takes place, motivation may vary.

As to the general perception of virtual sessions, in this case the participation of both sexes tailed off quite soon from the start until the end of the project, with a slightly higher rating by the female sex, as in the study by Peytcheva-Forsyth et al. (2018). No significant differences in perceptions between the sexes were observed in this respect. Regarding the predictors, the type

of electronic device determines the assessment of the virtual sessions, with significant differences between them. Smartphones were rated at the bottom of the scale, while students who use laptops gave a better perception compared to tablet users. These findings coincide with those of Liberatore & Wagner (2021). As to devices associated with the interaction in the online session (camera, microphone, and chat), the results reflect an average use, with only the microphone correlating positively with the perception of the virtual session. Both the repeated watching of pre-recorded videos and the use of devices to interact in the sessions reflect that more participative and engaged students have a better impression of the virtual sessions, corroborating the relationship between the use of ICT resources with higher motivation and academic performance in mathematics (Gilar-Corbi et al., 2019; Gómez et al., 2020; Hammoudi, 2019; Hu et al., 2018; Lipnevich et al., 2016; Sharp & Hamil, 2018).

## Conclusions

During the first period of lockdown when face-to-face education was impossible, different methodological proposals were deployed, among which FC stands out for its asynchronous design outside the classroom (theory) and synchronous sessions (virtual), focused on resolving doubts and completing tasks. This study focused on the teaching of mathematics in secondary education, showing the positive impact of FC on the learning process. The findings of this research indicate that the implementation of FC in an online context improves the academic performance of students in this particular subject. We found that the longer the duration of the study, the more efficient this method became. In addition, the positive perceptions of FC reinforce the idea of its usefulness for teaching mathematics in an online context, something that was not always evident in face-to-face training. As for the use of technology in the virtual sessions, satisfaction decreases as the project progresses, which may be caused by online training fatigue during the pandemic. Factors such as the parents' educational level, the family environment and the type of device used to attend the virtual sessions, with a significant positive correlation, or the effort and motivation towards the subject, which could have a significant negative correlation, become predictive factors of the students' performance and perceptions.

As to the limitations of this study, factors to be taken into consideration include the size of the sample and its non-randomness. This makes it difficult to generalize the results and, for future studies, it will be necessary to increase the number of participants and to carry out non-purposive sampling. The duration of the research should also be noted, since the FC method gains in efficiency if it is applied to a wider range of subjects. This is another aspect to be considered for future studies. Other subjects could be added to the study to avoid the negative attitudes to and difficulties in learning mathematics. In addition, if this subject is studied further, it may be interesting to address different educational stages (primary or higher education) that have also experienced the change from face-to-face teaching to an online format linked to the pandemic. We have tried to ascertain the predictors of ICT as used in virtual sessions and to associate these with the physical, social and psychological, consequences caused by lockdown and other restrictions implemented during COVID-19, in order to determine the impact of this global phenomenon on the aptitude and predisposition of students to learn in an online environment.

## Declarations

Prior consent to participate in the study was requested from the students, considering the Helsinki Declaration.

The authors declare that they have no competing interests.

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# Online Credit Recovery School-Level Enrollment: Intended and Unintended Consequences

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## **Abstract**

Prior to the COVID-19 pandemic, online credit recovery (OCR) was the most popular use of distance learning in high schools in the United States. With high course failure rates during the height of the COVID-19 pandemic, high schools have turned to OCR to help students recover lost credit. This study examined the potential consequences of increasing OCR enrollment at the school level using administrative data from North Carolina and found that increasing OCR enrollment is associated with higher rates of passing previously failed courses but with diminishing returns after about three-quarters of students who failed courses enrolling in OCR. Consistent OCR enrollment increases over four years is associated with higher graduation rates. Contrary to prior research, this study finds no evidence that school-level OCR enrollment increases are associated with lower test score proficiency rates. Using pre-pandemic data to help inform post-pandemic decision making, the results suggest that increasing OCR enrollment might address increased pandemic-induced course failure rates by expanding opportunities to re-earn course credit, but this would not necessarily translate to higher graduation rates.

*Keywords:* Online credit recovery, high schools, test scores, course failure, administrative data, fixed effects

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While the rapid shift to online learning during the COVID-19 pandemic was extremely disruptive, it was not the first time most high schools in the United States used distance learning. Over the last 20 years, high schools have increasingly turned to online credit recovery (OCR) for students who fail traditional courses and need credit remediation (Watson & Gemin, 2008). OCR potentially provides cost savings and efficiency by allowing students to rely on software instead of a traditional instructor to remediate credit (Heinrich & Darling-Aduana, 2021). As course failure rates have increased in the wake of pandemic schooling (Borter & O'Brien, 2021; St. George, 2020; Thompson, 2020), educational leaders are likely considering whether to scale OCR to meet growing demand for course remediation. This study provides evidence on the effects of increasing OCR enrollment at the school level.

Decisions about appropriate OCR enrollment levels will be especially complex post-pandemic because many students failed courses in which they had no access to the traditional face-to-face format (*National Trends in School Openings Since January 2021*). However, many OCR tradeoffs are well known to school leaders. Mainly, pervasive criticism from the media, academics, and the NCAA has focused on whether OCR helps students to graduate high school without acquiring the appropriate academic knowledge (Kohli, 2017; Loewenberg, 2020; Sproull, 2018). Using pre-pandemic data to help inform post-pandemic decision making, I investigate both potential benefits and negative side effects of increasing OCR enrollment to assess whether it could narrow opportunity gaps by providing access to credit recovery or whether it exacerbates opportunity gaps already widened by the pandemic if the online courses are of low quality (Goldberg, 2021).

## Literature Review

### Why Schools Use Online Credit Recovery

Beginning in 2010-11, the U.S. Department of Education (ED) required high schools to report their graduation rates and required states to hold high schools accountable for their graduation rates (*No Child Left Behind High School Graduation Rate Non-Regulatory Guidance*, 2008). At the same time, states competed for significant federal funds through Race to the Top, which offered large financial incentives to states that developed accountability systems that heavily sanctioned low-performing schools as determined by test scores and high school graduation rates (*Overview Information; Race to the Top Fund; Notice Inviting Applications for New Awards for Fiscal Year 2010; Notice*, 2010). As federal-level school accountability mandates placed greater emphasis on graduation rates, school districts responded by offering credit recovery options along with other reforms, including expanded access to OCR.

Due to evidence indicating that failure to accumulate credits in a timely manner is a major barrier to high school graduation (see Allensworth & Easton, 2005; Bowers, 2010; Mac Iver & Messel, 2013), educational policymakers may view OCR as a means to remove this barrier in response to accountability pressure to increase graduation rates. The hypothesis is that students are less likely to drop out of high school (and, therefore, more likely to graduate) if they can more easily obtain credits for required courses they failed, i.e., without the constraints of the typical face-to-face (F2F) course (Murin et al., 2015; Watson et al., 2008). While F2F was the traditional method for credit recovery, OCR represented a shift to distance education away from the traditional F2F strategy of repeating the failed course after school, during the summer, or during the following school year. In 2013, Connecticut became the first state to mandate that high schools offer OCR to all students who fail a course if the school has a dropout rate of eight

percent or higher, representing a shift in the locus of decision-making about credit recovery from local districts to the state (Murin et al., 2015).

OCR is a very popular tool for school districts. In the 2009-10 school year, before the ED required that high schools be held accountable for their graduation rates, nationwide enrollment in OCR was estimated at over 1.1 million (Queen & Lewis, 2011). In surveys from Iowa, Wisconsin, and New York, high school leaders reported that their most common use of distance learning was for OCR (Clements, Stafford, et al., 2015; Clements, Zweig, et al., 2015). During the 2015-16 school year, 72 percent of high schools reported offering credit recovery, and one in 10 high schools enrolled 20 percent or more of the student body in credit recovery (Tyner & Munyan-Penney, 2018). Also in the 2015-16 school year, schools in North Carolina were as likely to enroll students in OCR as F2F credit recovery for the first time (Viano, 2021). The most recent OCR enrollment estimates come from the federal Civil Rights Data Collection from 2017-18. Based on author calculations, about 60% of high schools at that time offered credit recovery to an average of 78 students per school. While press outlets have reported that districts greatly expanded OCR to respond to high course failure rates during the first two years of the COVID-19 pandemic (Gross, 2021; Belsha, 2022), no estimates of actual recent enrollments are available at this time.

### **The Effects of Online Credit Recovery**

Despite large enrollments nationally, a policy mandate in Connecticut, and evidence of high utilization in at least one state, only recently has evidence begun to emerge on the effects of OCR on students (Carr, 2014; Heppen et al., 2016; Stallings et al., 2016). Recently, several studies have investigated, with mixed results, how students individually fare when enrolled in OCR compared to F2F credit recovery courses. This includes two experiments in Chicago and Los Angeles where students who failed Algebra I (both cities) or English 9 (Los Angeles only) were randomly assigned to take OCR or F2F credit recovery over the summer. Immediately after taking the OCR/F2F course, students randomly assigned to OCR sometimes had a lower likelihood of passing the credit recovery course (Chicago experiment and English 9 in the Los Angeles experiment) with lower exam scores in the Chicago experiment than those randomly assigned to F2F (Heppen et al., 2016; Rickles et al., 2023). The Chicago experiment took place in 2011 and 2012, allowing for analysis of longitudinal outcomes but, in this experiment, OCR did not lead to differential outcomes later in high school like high school graduation and grade point average (Rickles et al., 2018).

Quasi-experimental research has found that OCR students were more likely to pass the course, had lower test scores, and were more likely to graduate from high school than F2F credit recovery students (Hart et al., 2019; Heinrich et al., 2019; Stallings et al., 2016; Viano & Henry, 2023). At the same time, these students were less likely to enroll in a four-year university and had lower earnings as young adults (Heinrich & Cheng, 2022; Heinrich & Darling-Aduana, 2021). These studies use a variety of adjustments to regression models to try to account for complex selection bias in student selection into OCR. The main challenge when establishing whether OCR causes differential student outcomes is the likelihood of strategic OCR enrollment approaches by school administrators (Viano, 2021). While it appears that OCR students are more likely to earn course credit but have lower test scores than similar F2F credit recovery students, this might reflect the fact that administrators assign highly motivated but lower achieving students to OCR courses who would have had the same test scores and graduation rates if they had been assigned to a F2F course.

Compared to the quasi-experimental studies, experiments on OCR have not as definitively found OCR to effectively increase high school graduation probability while decreasing test scores, so it remains unclear what results schools are getting from using online learning for credit recovery. Since OCR remains popular (Tyner & Munyan-Penney, 2018), it is possible that school leaders continue to use OCR because they observe positive trends school-wide that they attribute to OCR. However, prior research has not examined OCR enrollment effects from a school-level perspective.

## Conceptual Framework

At its most basic level, OCR is a popular use of distance learning in high schools to allow students the option of retaking failed courses online instead of F2F. As described above, schools are incentivized to use OCR to increase credit accumulation to raise graduation rates. Within the context of this study's framework, two outcomes are the intended consequences of successful OCR enrollment: students will pass more classes that they previously failed, and they will be more likely to graduate high school as OCR enrollment rates increase. However, critics are skeptical that these positive gains come for free (see Carr, 2014). Specifically, several studies indicate that the population of students who fail courses in high school would be particularly ill-suited to succeed in an online learning environment (Viano, 2018a). Students who fail courses in high school, often labeled as *at-risk* students, are more likely to have lower technological and online skills than students who do not fail courses in high school (Judge, 2005; Kuhlemeier & Hemker, 2007; Oliver et al., 2009; Valadez & Duran, 2007). Also, students who fail one class are more likely to have failed other courses as well, perhaps indicating multiple skill deficits that could make it challenging to succeed on a complicated online platform (Bowers & Sprott, 2012; Judge, 2005; Roderick, 1994). As summed up by Huett and colleagues in a review of knowledge about K-12 online learning, "We fear that distance education may become little more than a 'dumping ground' for credit recovery...the exact opposite population the research says tends to thrive in the distance environment" (Huett et al., 2008, p. 64).

Prior research has confirmed some of these concerns about OCR student experiences. Studies of OCR students enrolled in the North Carolina Virtual Public Schools (NCVPS) report challenges with reading comprehension, navigating the online platform, and motivation (Lewis et al., 2014, 2015). Students simultaneously appreciated that courses were self-paced while disliking the challenges related to time management (Lewis et al., 2014). Another study of high school students in an online course offered by a university found that OCR students were more likely to seek help with their course from a parent while non-OCR students in the online course were more likely to go to teachers or peers (Oviatt et al., 2018). This strategy could undermine student performance if OCR students seek assistance with content the parent is not familiar with (Oviatt et al., 2018). While schools across the country turn to OCR as a way for students to earn course credits, there are significant reasons to doubt that an online learning approach would be successful with the population of students who fail courses in high school.

Further, the negative effects of interventions designed to quickly meet accountability targets are well documented (see Balfanz et al., 2007; Dee et al., 2013; Jennings & Bearak, 2014). As an intervention implemented to respond to federal accountability pressure to increase high school graduation rates, OCR has the potential to introduce unintended negative side-effects like lower test scores. OCR could lead to lower end-of-course exam scores if OCR courses are low-quality and/or students learn less in OCR courses than if they had repeated the F2F (Fong et

al., 2014; Heinrich et al., 2019; Heppen et al., 2016). While research has examined these connections at the student level, scaling to the school level would help to understand broader consequences of schools' decisions about OCR enrollment levels.

## Purpose and Research Questions

This study represents the first known attempt to quantify the impact of offering OCR at the school level on outcomes like graduation rates and exam proficiency rates. Prior OCR research has not investigated whether student-level associations scale. Educational leaders are likely making broader decisions about how many OCR licenses to purchase, computer labs to devote to OCR, and staff to supervise OCR. In other words, educational leaders also benefit from information on the appropriate level of OCR enrollment. While it might be tempting to assume that prior evidence scales to the school level, this would not necessarily be expected based on prior evidence on treatment effect heterogeneity (Olsen, 2017). Specifically, OCR might be associated with positive outcomes, on average, with diminishing returns when scaled to the point where schools are unable to provide the same level of support (e.g., teacher assistance, high-quality software), or, conversely, scaled too small for supports to be provided. Correspondingly, I address the following research question using administrative data from the state of North Carolina: to what extent is increasing OCR enrollment at the school level associated with the intended consequences of increased passing rates of previously failed courses and high school graduation rates and the unintended consequence of lowered proficiency rates on end of course exams?

## Methods

### Data and Sample

The data for this project come from an administrative database maintained by the Education Policy Initiative at the University of North Carolina at Chapel Hill (EPIC) including all public schools in North Carolina (NC). I include datasets on course rosters/grades and school demographics/performance for the 2012-13 through 2016-17 school years. I only include OCR enrollment in core courses required to graduate from high school (i.e., English, mathematics, science, and social studies; see *High School Graduation Requirements*, n.d.). Schools are the unit of analysis.

There are about 600 schools with high school-level grades in NC. Of these, about 400 are traditional high schools with grades 9-12 while the other 200 schools contain other grades in addition to 9-12 (*Facts and Figures 2015-16*, 2016). The schools' racial makeup ranges from 100 percent white to 99 percent non-white, with the median school having 54 percent white students, 28 percent Black students, and 12 percent Hispanic students. The percentage of economically disadvantaged students ranges from zero to 100 percent, with the median school having half of the student body classified as economically disadvantaged. Overall, NC contains many high schools with a diverse array of racial and socioeconomic demographics.

Schools in NC have two options for OCR: publicly run NCVPS or privately run online course providers. This is a very common configuration of OCR options nationally; at least 40 states have a state-run virtual school and privately provided courses are ubiquitous (Watson et al., 2008). NCVPS courses are available across the state, and schools pay per course enrollment, between \$310 and \$510 (*North Carolina Virtual Public School*, n.d.). Private providers have contracts with schools/districts to provide OCR, usually charging per course or based on the number of students logged in at one time. Schools in NC during 2012-13 through 2016-17 school



years tended to offer OCR during the school day as part of the students’ schedule with an in-class monitor, although this was not a state requirement (Viano, 2018b). While it would be useful to include the OCR provider type (i.e., NCVPS or private) or the actual provider (e.g., an indicator for the company), this information is not available in secondary data, and private providers have been unwilling to share information on their clients (i.e., school districts) with researchers (Stallings et al., 2016).

**Measures**

I include mean values on the independent variables, outcomes, and covariates in Table 1. These values help to communicate the typical demographics of high schools in NC during this time. In addition, the mean values are meant to aid in interpretation of the findings on the average OCR enrollment and the outcomes. In other words, the models predict the change in outcomes in response to changes in the independent variable which can be interpreted in reference to the mean values in Table 1.

**Table 1**  
*Descriptive Statistics*

	Mean
<i>Key Independent Variable</i>	
Percent of Students Who Failed Courses Enrolled in OCR	18.434 (0.310)
<i>Outcomes</i>	
High School Graduation Rate	85.917 (0.277)
EOC Proficiency Rate	48.778 (0.430)
Passing Rate of Failed Courses (# Passed Courses that Were Previously Failed/# Failed Courses*100)	12.737 (0.684)
<i>Covariates</i>	
Enrollment (in 100s)	8.334 (0.121)
Percent of Black Students	27.658 (0.451)
Percent of Hispanic Students	12.777 (0.187)
Percent of LEP Students	2.900 (0.064)
Percent of SPED Students	12.963 (0.180)
Percent of Gifted Students	16.260 (0.216)
Percent Economically Disadvantaged	49.985 (0.407)
Course Failure Rate (# of Failed Courses / # of Initial Course Enrollments)	0.074 (0.001)
Observations	2561

*Note.* Standard errors in parentheses. OCR—online credit recovery, EOC—end of course exam, LEP—limited English proficient, SPED—receives special education services.

### **Online Credit Recovery Enrollment**

I define OCR enrollment as the percent of students who failed a core, required F2F course and subsequently enrolled in OCR. This is a measure of how often schools assign OCR to the target population, i.e., students who lost course credit. On average, schools assign 18.4% of students who previously failed courses to OCR (see Table 1). This percentage increased throughout this time with the median school assigning 9.9% of students who failed courses to OCR in 2012-13 to 18.9% in 2016-17.

### **Dependent Variables**

The study includes three dependent variables. (1) The passing rate of previously failed courses represents the number of courses students passed in OCR or F2F each school year divided by the number of courses students failed in the current or previous school year. While I term this the passing *rate*, this more closely resembles a *ratio* that can be above 1 if schools assign OCR/F2F for courses failed more than a year prior (data limitations only allow the calculation of the number of failures with a one-year lag). (2) Graduation rates are the state's official four-year cohort graduation rate, indicating the percent of first-time ninth graders who graduate within four years. (3) The end-of-course exam (EOC) proficiency rate is the percent of students in the school who scored proficient on the Math I, Biology, and English II EOCs (the only subjects high school students are tested on in NC).

### **Empirical Framework**

I assess the effect of changes in OCR enrollment and the outcomes using the following model:

$$(1) y_{st} = \beta_0 + \beta_1 PercOCR_{st} + \mathbf{X}_{st}\boldsymbol{\beta}_k + \delta_s + \gamma_t + \varepsilon_{st}$$

where  $y_{st}$  represents one of the three outcomes, standardized by year, for each school  $s$  in year  $t$ . The variable  $PercOCR_{st}$  represents the student-level OCR enrollment measure (divided by 10 to ease interpretation). I also fit models with lagged versions of  $PercOCR_{st}$  to examine whether the associations between the OCR enrollment and the outcomes are cumulative over time. Based on an F test, I fit the passing rate outcome with quadratic and trinomial terms of  $PercOCR_{st}$ , but I determined that linear models better fit (and did not meaningfully change the findings of) the graduation and EOC proficiency rate outcomes. The model includes a vector of time-varying covariates,  $\boldsymbol{\beta}_k$ , including school enrollment, demographics (percent Black, Hispanic), percent of limited English proficient students, percent of students with disabilities, percent gifted, and percent economically disadvantaged. I include the course failure rate for initial course enrollments as a covariate to account for the association between the preponderance of course failures and the outcomes, independent of OCR enrollment. See Table 1 for a full list of covariates included in this vector.

This model exploits changes over time within schools in their levels of OCR enrollment due to the school fixed effects,  $\delta_s$ , which subtract the group mean of each variable in the model. The school fixed effect restricts the comparisons to within-school, such that each coefficient represents the effect of a one unit increase within school on the outcome. This eliminates between school variation that might affect the outcome like neighborhood crime levels or availability of afterschool activities. To distinguish these changes from annual trends, like changes in graduation rates over time, I include a year fixed effect,  $\gamma_t$ . Thereby,  $\beta_1$  represents the

associated difference in the outcome for each 10-percentage point increase, within school, in OCR enrollment.

### **Limitations**

The ideal method for assessing the impact of school-level OCR enrollment would be to randomly assign different OCR enrollment levels to schools. Given that this is impossible to do using secondary data and the likely reticence of school leaders to forego autonomy on course assignment across the whole school, I attempt to isolate the effect of changes in OCR enrollment as much as possible. This modeling strategy has inherent limitations and does not truly approximate the causal interpretation afforded by random assignment in several ways. First, the school fixed effect is helpful in that it removes between-school variation, but it also means that I can only assess changes in outcomes associated with changes in OCR enrollment over time. If a school was already using OCR strategically to raise graduation rates but did not change OCR enrollment levels during this time, then this strategic use would be undetected in this model. Second, it is possible the estimates include omitted variable bias if schools tend to implement other interventions alongside changes in OCR enrollment that affect the outcomes. In this case, it would appear that OCR enrollment changes are affecting the outcomes while actually, this other, unobserved intervention is causing the outcomes. I minimize this risk through the covariates and the year fixed effect, but it remains present in any quasi-experimental design.

## **Results**

### **Passing Rate of Previously Failed Courses**

The results from the school and year fixed effects model with the outcome of the passing rate of previously failed courses (standardized) are in Table 2. This model, with standardized passing rate as the outcome, includes the quadratic and trinomial terms for OCR enrollment since an F test determined the linear, quadratic, and trinomial terms are jointly significant. These results show that for each 10-percentage point increase in OCR enrollment, the passing rate of failed courses is predicted to increase with a 0.128 coefficient on the linear term, although the negative coefficient (-0.009) on the quadratic percent OCR variable indicates that there are diminishing returns to this positive effect.

**Table 2**

*School and Year Fixed Effects Models with Full Covariates Estimating the Association Between Within-school Changes in the Percent of Students who Failed Courses Enrolled in OCR and the Standardized Passing Rate*

	(1) Passing Rate
PercOCR <sub>st</sub>	0.128*** (0.036)
PercOCR <sup>2</sup> <sub>st</sub>	-0.009 (0.007)
PercOCR <sup>3</sup> <sub>st</sub>	0.0003 (0.0001)
School Year 2013-14	-0.062 (0.045)
School Year 2014-15	-0.077 (0.050)
School Year 2015-16	-0.090 (0.066)
School Year 2016-17	-0.093 (0.075)
Enrollment (in 100s)	0.002 (0.010)
Percent of Black Students	0.009 (0.006)
Percent of Hispanic Students	-0.003 (0.006)
Percent of LEP Students	0.014 (0.012)
Percent of SPED Students	0.012 (0.007)
Percent of Gifted Students	0.022 (0.022)
Percent Economically Disadvantaged	-0.0002 (0.001)
Course Failure Rate	0.761 (0.408)
Constant	-0.982 (0.674)
Observations	2561
R <sup>2</sup>	0.09

*Note.* Standard errors in parentheses, are clustered by school. All outcomes are standardized by year. PercOCR<sub>st</sub> is divided by 10 such that each unit increase corresponds to a 10-percentage point increase in the percent of students who failed courses enrolled in OCR.

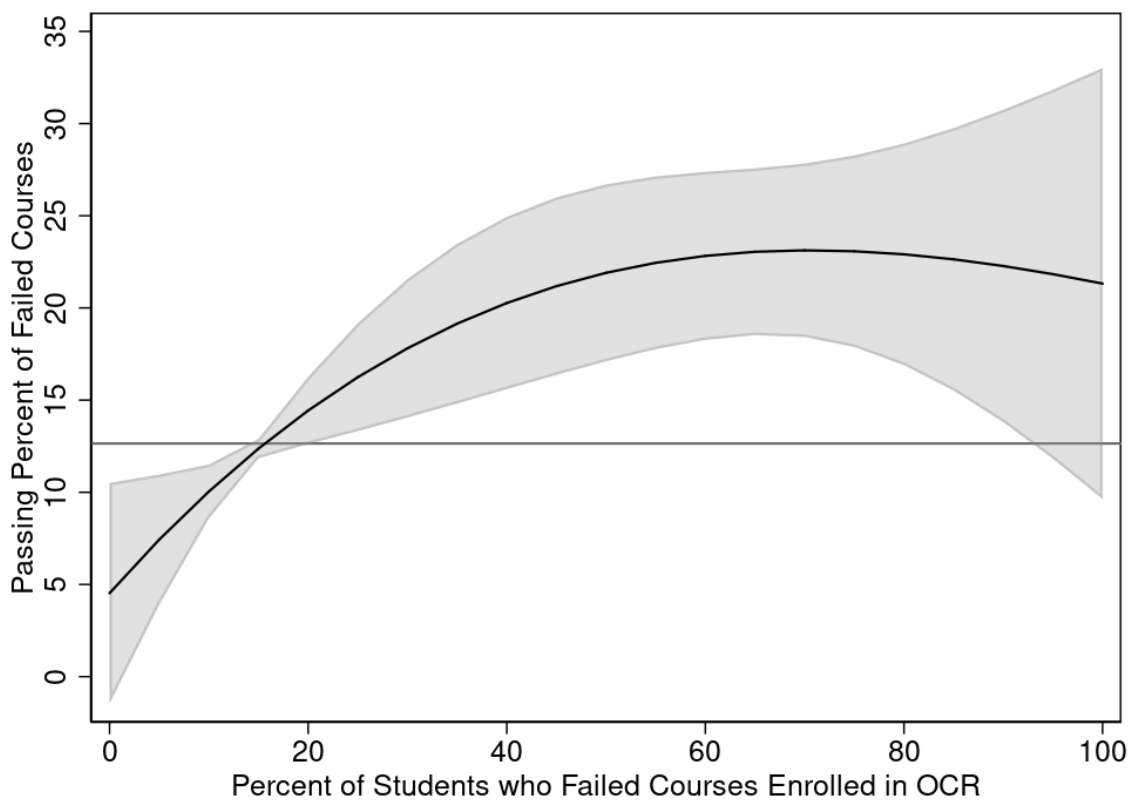
\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

To ease interpretation given the higher order variables, I predict the passing rate of previously failed courses across the typical range of OCR enrollment in Figure 1 with the unstandardized version of the outcome. The black line shows the predicted value surrounded in grey by the 95% confidence interval. The horizontal line represents the average passing rate of

previously failed courses across schools in the sample. Figure 1 shows the positive association between OCR enrollment and the passing rate with higher OCR enrollments associated with higher passing rates of previously failed courses. The slope decreases across values of OCR enrollment due to the negative quadratic term. According to the first derivative of this model, the first turning point in this trinomial is around 72.5%. This turning point is shown visually on Figure 1 where the curve starts to trend downwards (the other turning point would occur above 100%). This indicates that the passing rate is predicted to increase with higher OCR enrollment until about three-quarters of students who fail courses are assigned to OCR, with diminishing returns thereafter.

**Figure 1**

*Predicted Values for the Passing Rate Outcome from Table 2 with the 95% Confidence Interval*



**Test Score Proficiency**

To examine potentially unintended consequences on EOC proficiency rates, the results with this outcome (standardized) are in Table 3. These results are mostly null such that I fail to find a significant relationship between OCR enrollment and EOC proficiency rates. OCR enrollment could have a delayed effect on EOC proficiency rates. Students might be taking non-EOC OCR courses, so the negative effects on EOC proficiency rates would occur downstream, as students enter EOC courses less prepared if they had learned little in OCR. To examine this potential lagged effect of OCR enrollment, I estimate models in Table 3, columns 2-4, assessing whether increases in OCR enrollment rates over one (column 2), two (column 3), or three (column 4) years are associated with changes in EOC proficiency. The row labeled *Combined*

*PercOCR Coefficients* represents the cumulative effect of increasing OCR enrollment 10-percentage points (i.e., one unit change on the coefficient) every year for one, two, or three years, respectively. This combined coefficient in column 2 is -0.0003, indicating that a 10-percentage point increase in OCR enrollment in the current year and the previous year is associated with a very small, not statistically significant decrease of -0.0003 standardized units on EOC proficiency rates. I find no evidence in this table that OCR enrollment changes are associated with decreased EOC proficiency rates.

**Table 3**  
*School and Year Fixed Effects Models with Full Covariates Estimating the Association Between Within-school Changes in the Percent of Students who Failed Courses Enrolled in OCR and the Standardized EOC Proficiency Rate*

	(1) EOC Proficiency Rate	(2) EOC Proficiency Rate	(3) EOC Proficiency Rate	(4) EOC Proficiency Rate
PercOCR <sub>st</sub>	-0.0002 (0.006)	0.002 (0.006)	0.013 (0.008)	0.023 (0.013)
PercOCR <sub>s(t-1)</sub>		-0.002 (0.006)	-0.008 (0.008)	0.002 (0.012)
PercOCR <sub>s(t-2)</sub>			0.004 (0.007)	0.004 (0.015)
PercOCR <sub>s(t-3)</sub>				0.002 (0.010)
<i>Combined PercOCR Coefficients</i>	-0.0002 (0.006)	-0.0003 (0.009)	0.009 (0.017)	0.031 (0.032)
School Year 2013-14	-0.13*** (0.015)			
School Year 2014-15	-0.09*** (0.020)	0.034* (0.015)		
School Year 2015-16	-0.15*** (0.023)	-0.027 (0.019)	-0.08*** (0.015)	
School Year 2016-17	-0.16*** (0.025)	-0.035 (0.022)	-0.09*** (0.022)	0.001 (0.017)
Enrollment (in 100s)	-0.014 (0.010)	-0.011 (0.011)	-0.011 (0.014)	-0.015 (0.020)
Percent of Black Students	-0.02*** (0.004)	-0.02*** (0.005)	-0.015** (0.005)	-0.014* (0.006)
Percent of Hispanic Students	0.006 (0.004)	-0.0001 (0.004)	0.006 (0.008)	0.009 (0.008)
Percent of LEP Students	-0.023* (0.009)	-0.019* (0.009)	-0.014 (0.009)	-0.018 (0.010)
Percent of SPED Students	-0.005 (0.004)	-0.005 (0.004)	-0.002 (0.005)	0.001 (0.005)
Percent of Gifted Students	0.010** (0.003)	0.011*** (0.003)	0.018* (0.008)	0.017* (0.007)
Percent Economically Disadvantaged	-0.001 (0.001)	-0.002* (0.001)	-0.002 (0.001)	0.001 (0.002)

Course Failure Rate	-0.70*** (0.165)	-1.50*** (0.322)	-1.54*** (0.373)	-1.74*** (0.414)
Constant	0.625** (0.216)	0.711*** (0.208)	0.367 (0.323)	0.073 (0.361)
Observations	2561	1968	1440	930
R <sup>2</sup>	0.10	0.12	0.12	0.11

Note. Standard errors in parentheses, are clustered by school. All outcomes are standardized by year. PercOCR<sub>st</sub> is divided by 10 such that each unit increase corresponds to a 10 percentage point increase in the percent of students who failed courses enrolled in OCR.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

### High School Graduation Rates

To test whether schools strategically increase their OCR enrollment rates to increase their graduation rates, I present the results from the school and year fixed effect models in Table 4. As shown in column 1, I do not find evidence that increases in OCR enrollment are associated with significant increases in high school graduation in the year the increase occurred. However, I do find evidence that consistent increases over time in OCR enrollment lead to increases downstream in high school graduation. As shown in column 4 of Table 4, a 10-percentage point increase in OCR enrollment over four years is associated with a 0.187 standard deviation increase in the graduation rate. In other words, if schools continually assign more students who failed courses to OCR every year, then after four years they would be predicted to have higher graduation rates.

**Table 4**

*School and Year Fixed Effects Models with Full Covariates Estimating the Association Between Within-school Changes in the Percent of Students Who Failed Courses Enrolled in OCR and the Standardized Cohort Graduation Rates*

	(1) Graduation Rate	(2) Graduation Rate	(3) Graduation Rate	(4) Graduation Rate
PercOCR <sub>st</sub>	0.009 (0.009)	0.018 (0.012)	0.009 (0.017)	0.056 (0.032)
PercOCR <sub>s(t-1)</sub>		0.005 (0.013)	0.018 (0.019)	0.057 (0.031)
PercOCR <sub>s(t-2)</sub>			0.017 (0.015)	0.055 (0.038)
PercOCR <sub>s(t-3)</sub>				0.019 (0.020)
<i>Combined PercOCR Coefficients</i>	0.009 (0.009)	0.023 (0.018)	0.044 (0.031)	0.187* (0.086)
School Year 2013-14	0.010 (0.025)			
School Year 2014-15	-0.0002 (0.031)	-0.005 (0.028)		
School Year 2015-16	-0.056 (0.037)	-0.083* (0.036)	-0.082* (0.033)	
School Year 2016-17	0.201*** (0.044)	0.153*** (0.042)	0.185*** (0.044)	0.267*** (0.040)

Enrollment (in 100s)	-0.023 (0.017)	-0.027 (0.015)	-0.029 (0.021)	-0.037 (0.050)
Percent of Black Students	-0.001 (0.009)	0.003 (0.011)	-0.009 (0.016)	-0.042** (0.016)
Percent of Hispanic Students	0.008 (0.010)	0.009 (0.010)	-0.010 (0.015)	-0.006 (0.026)
Percent of LEP Students	-0.021 (0.023)	-0.024 (0.029)	-0.027 (0.042)	0.051 (0.028)
Percent of SPED Students	-0.002 (0.011)	-0.011 (0.015)	-0.021 (0.021)	-0.034 (0.029)
Percent of Gifted Students	-0.004 (0.004)	0.002 (0.004)	0.003 (0.007)	-0.014 (0.015)
Percent Economically Disadvantaged	-0.001 (0.001)	-0.002 (0.002)	-0.003 (0.003)	0.009** (0.003)
Course Failure Rate	-0.769 (0.473)	-0.481 (1.119)	-0.147 (1.654)	-1.466 (1.739)
Constant	0.373 (0.397)	0.357 (0.444)	1.055* (0.514)	1.322 (0.829)
Observations	2561	1968	1440	930
R <sup>2</sup>	0.07	0.08	0.13	0.26

*Note.* Standard errors in parentheses, are clustered by school. All outcomes are standardized by year. PercOCR<sub>st</sub> is divided by 10 such that each unit increase corresponds to a 10-percentage point increase in the percent of students who failed courses enrolled in OCR.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## Discussion and Conclusion

As educational leaders consider how to structure credit recovery post-pandemic, the findings support the potential of increasing OCR enrollment to address large increases in course failure rates during the pandemic with the caveat that the last year of data was the 2016-17 school year, three years before the beginning of the pandemic. The results mirror prior studies that found, at the student-level, OCR enrollment was associated with increased likelihood of recovering course credits compared to F2F, such that the individual-level effects appear to scale to the school level (Hart et al., 2019; Heinrich et al., 2019; Viano, 2021). I did not find evidence to support OCR being the only way students should recover course credits, with diminishing returns to increased OCR enrollments after about three-quarters of students who failed courses enrolled in OCR.

I found little evidence that the increased credit accumulation from higher OCR enrollments translated into higher graduation rates, at least in the short term. This result more closely matches findings from experimental studies which found that OCR did not lead to higher rates of high school graduation, as opposed to prior quasi-experimental work which found significant relationships (Hart et al., 2019; Heinrich & Darling-Aduana, 2021; Rickles et al., 2018; Stallings et al., 2016). This could also reflect that the prior associations between high school graduation probability and OCR were not high enough to lead to significant increases in school-level graduation rates. Similarly, negative evidence on lower test scores of OCR courses compared to F2F might not have impacted proficiency rates if the higher test scores of F2F students were still below proficiency. In other words, if F2F credit recovery is associated with higher test scores than OCR but with averages still below test score proficiency cutoffs, then these higher scores would not translate into changes in proficiency rates. This hypothesis is



supported by findings reported elsewhere that OCR and F2F credit recovery students have average standardized assessments scores well below the mean (Viano & Henry, 2023). The null findings on the relationship between OCR and test score proficiency could be reassuring for educational leaders concerned that increasing their use of distance learning through OCR enrollment would harm school-level performance as would have been indicated by prior research on OCR assignment at the student-level (Heinrich et al., 2019; Heppen et al., 2016; Viano & Henry, 2023).

Overall, these results encourage educational leaders to carefully consider resources appropriated to using OCR to recover credits students lost during the pandemic. While OCR might be effective at initially solving an obvious problem caused by the COVID-19 pandemic, higher course failure rates, I did not find evidence that OCR will provide a comprehensive strategy to lessen the impact of high course failure rates on graduation rates.

### **Declarations**

The author declares that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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