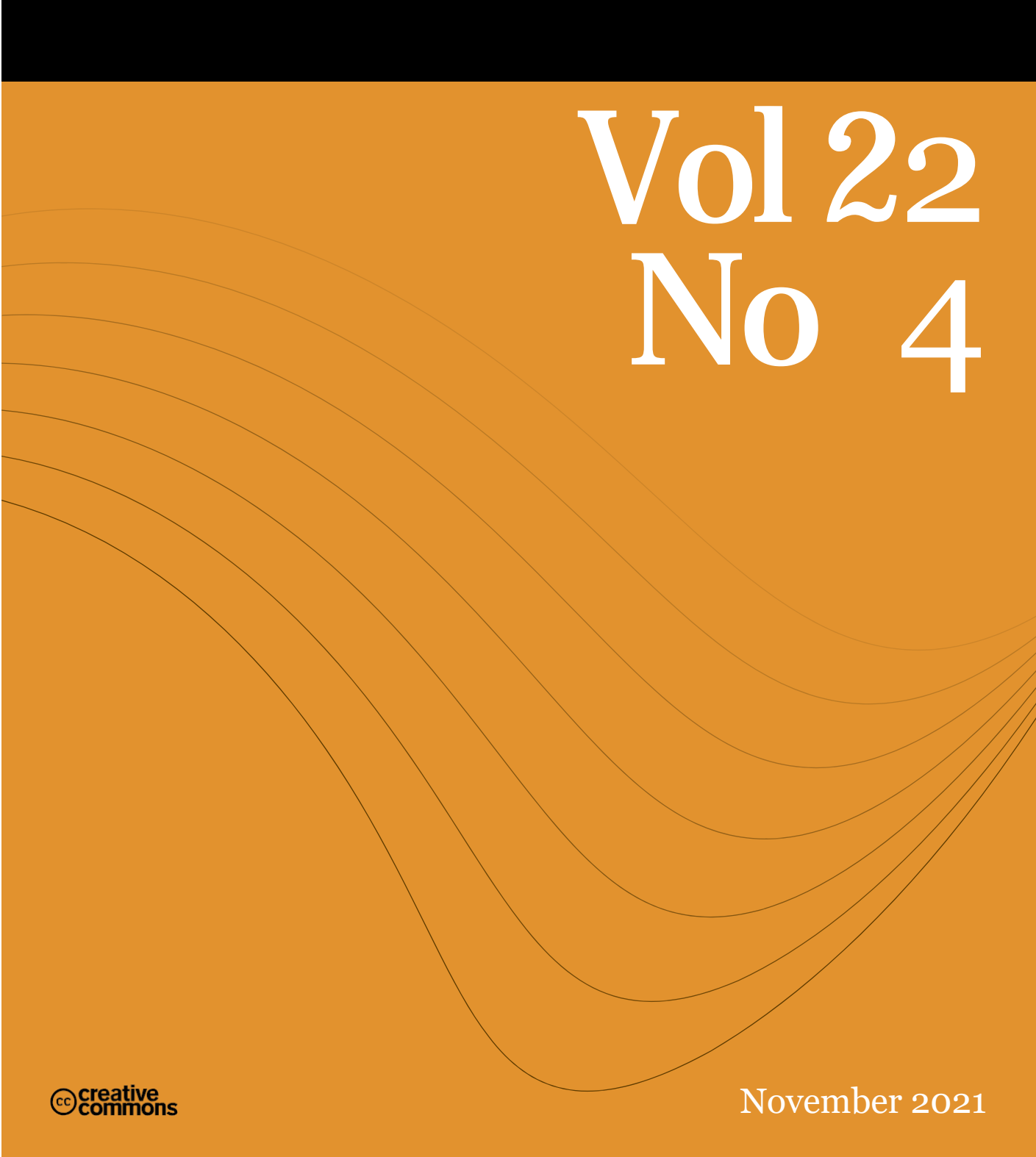




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## Editorial – Volume 22, Issue 4

Dietmar Kennepohl

Associate Editor, Athabasca University

Welcome to the last issue of the year. I would like to start with some good news. You should know that *IRRODL* has very recently been awarded the Directory of Open Access Journals (DOAJ) Seal. DOAJ is a community-curated online directory that indexes and provides access to high quality, open access, peer-reviewed journals. Only around 10% of journals indexed in DOAJ have been awarded the Seal. There are seven criteria which a journal must meet to be eligible for the DOAJ Seal. These relate to best practice in long term preservation, use of persistent identifiers, discoverability, reuse policies, and authors' rights. Those who already know *IRRODL* will find this as no surprise, but we think it is also nice to have the formal acknowledgement.

While we are recognizing milestones, I also wanted to alert you to a hidden gem written by David Lane and Claire Goode as a *Technical Note* entitled: *Open for All: The OERu's Next Generation Digital Learning Ecosystem*. It describes important work done by the OER Foundation to establish the infrastructure and “glue” for its resources and is the winner of the first OE Global Open Infrastructure Award. Congratulations!

Being aware of this one brilliant gem, I leave you now to unearth your own precious stones provided for you in this issue.

In our first paper, **Munir, Anwar, and Kee** examine the relationship between fear of COVID-19 and students' social presence in online learning reporting on and comparing the mediating role of student psychological motivation and cognitive problem-solving skills of students in Malaysia and Pakistan.

The community of inquiry (CoI) instrument was revisited by **Yang and Su** for construct revalidation by examining four competing models (unidimensional, correlated-factor, second-order factor, and bifactor) using confirmatory factor analysis. The study offers a more refined understanding of the underlying factors contained within the CoI instrument.

**Nketekete and Mojalefa** take a managerial perspective in their investigation of how open and distance learning (ODL) reform was directed at the National University of Lesotho. A critical analysis of policy and implementation, identifying short comings, is provided along with key actionable recommendations to mend and re-energize the current and future situation. This case study in the Lesotho context, provides valuable insight for those considering their own ODL change management.

In the search for solutions to the issues brought about by COVID-19 in education, the next article analyzes the affective fields that emerged from the discursive textual analysis of public-school students' survey responses in Brazil. The affective fields allowed authors **Comelli, da Costa, and dos Santos Tavares** to

consider the friends–home–teachers tripod as fundamental to overcoming the phenomenon of affective fatigue that has been identified.

**Xavier** and **Meneses** explore the balance between student persistence and dropout that can come with increased flexibility. This case study draws on the knowledge of professors the Open University of Catalonia who are experienced e-learning designers for their own courses to pinpoint risks and opportunities that may enhance learning design and educational practices to foster student success.

Further on the theme of student persistence, **Rudhumbu** investigates determinants of students' behavioural intentions to continue with technology-mediated distance education in universities in Zimbabwe during COVID-19 and beyond. This quantitative study reveals factors significantly associated with the behavioural intentions to persist and has implications for both future policy and practice.

In the following study on institutional open educational resources (IOER) in Vietnam, **Truong, Denison,** and **Stracke** acknowledge the benefit high-quality educational materials at the lowest cost, but note it is complicated and limited by many contextual difficulties. This study found that IOER development is constrained by five categories of challenges, many of which are not identified in the literature.

**Morgan, Childs, Hendricks, Harrison, DeVries,** and **Jhangiani** collaboratively examine how five higher education institutions in Canada have progressed with their open education initiatives comparing the similarities and differences between their approaches and the evolution of their initiatives. The study employs an institutional self-assessment tool and how it is applied to open education practices at an institutional level is discussed.

**Pulist** then goes on to present us with an excellent book review of *25 Years of Ed Tech* by Martin Weller (Athabasca University Press). The book provides not only a solid historical pedagogical perspective but some personal insight from Weller on the use of technology as a tool in the hands of educational practitioners.

In this *Technical Note*, **Lane** and **Goode** describe an OE Global award-winning comprehensive collection of open-source technologies (Next Generation Digital Learning Ecosystem) which have supported thousands of learners in the past year by providing infrastructure for accessing OERu consortium courses.

Finally, we are provided a *Literature Review* by **Flavin** and **Bhandari** analyzing 99 articles published on virtual learning environments (or learning management systems) in higher education in the years 2014–2018. The review describes the most frequent foci of research, as well as areas that have been under-researched in this five-year window.



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## Online Learning and Students' Fear of COVID-19: Study in Malaysia and Pakistan

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### Abstract

The COVID-19 pandemic has forced millions of students to stay indoors and adapt to the new normal, namely distance learning at home, placing online learning in the spotlight. However, students' motivation for online learning and its effectiveness in skill development during the COVID-19 pandemic has not been widely studied. This study examined the relationship between students' fear of COVID-19 and students' social presence in online learning while investigating the parallel mediating role of student psychological motivation and cognitive problem-solving skills related to online learning. The participants were 472 university students in Malaysia and Pakistan. An online data collection technique using Google Forms was employed. Faculty members of the universities were asked to share the survey with their students. Moreover, using a snowball sampling technique, students were requested to share the survey with their friends. SPSS Statistics (Version 21) was employed to do preliminary data analysis, AMOS (Version 21) software was used to conduct confirmatory factor analysis using a maximum likelihood estimation, and Hayes' PROCESS model was used to examine proposed hypotheses. The results show that only cognitive problem solving mediates the relationship between fear of COVID-19 and students' social presence in online learning in Malaysian samples. In Pakistan, cognitive problem solving and psychological motivation mediate the relationship between fear of COVID-19 and students' social presence in online learning. The study found that developing cognitive problem-solving skills and providing psychological motivation could enhance their engagement with online learning.

*Keywords:* fear of COVID-19, social presence, cognitive problem-solving skills, psychological motivation, online learning, Pakistan, Malaysia

## Introduction

The COVID-19 pandemic has hit the education industry due to the prevailing lockdown measures in some countries. Lockdown and movement restrictions have caused unprecedented challenges for students due to the abrupt transition to online learning. Students have been forced to stay indoors and adapt to online learning. To capture the immediate economic effects of the pandemic, UK universities alone, for example, incurred an estimated cost of £790 million due to the COVID-19 pandemic, and universities resorted to online teaching and learning until the advent of a successful vaccine (Daniel, 2020). The pandemic has increased the importance of online teaching and learning in both developed (Dost et al., 2020) and developing countries (Dashtestani, 2020). This has resulted in a pedagogical shift to increase students' psychological motivation and cognitive problem-solving skills (CPSS) in order to improve sustainable engagement in online learning (Lee et al., 2019). Students with a higher perceived social presence in an online environment experience a greater degree of learning satisfaction and engagement (Grieve et al., 2016).

The pandemic has had a significant effect on students' lives. Public health measures such as social distancing, movement restrictions, and lockdown are necessary to minimize the spread of COVID-19. These measures have put students under psychological distress (Hasan & Bao, 2020), and some are experiencing fear of COVID-19, depression, anxiety, and stress (Kassim et al., 2021). Apart from the devastating health consequences, the pandemic affects students' physical and mental well-being (Zolotov et al., 2020).

Fear of COVID has been reported in different countries. An Iranian study on 717 Iranians measured their fear at 3.9 on a scale of 5 (Chang et al., 2020). A Bangladeshi study on 8,550 individuals reported similar results, measuring their fear at 3.1 out of 5 (Sakib et al., 2020). The findings have revealed that the fear of COVID-19 differs in terms of its intensity and scale across countries. One study argued that cultural differences (Pramukti et al., 2020) could be playing a significant role in students' perceptions of fear of COVID-19.

Although rigorous research has been done on the online environment for teaching and learning, how fear of COVID-19 influences students' online learning is a research gap at almost all education levels (Al-Marroof et al., 2020), but especially at higher education. Our research addressed two questions:

1. What effect does students' perceived fear of COVID-19 on students' social presence in online learning?
2. How do psychological motivation and cognitive problem-solving skills mediate the relationship between fear of COVID-19 and students' social presence in online learning?

To investigate this assumption, we selected two countries of Asia (Malaysia and Pakistan) having similar experiences during the pandemic to see how students experience fear of COVID-19 and how it has affected their social presence in online learning. Moreover, we examined how their psychological motivation related to online learning and the CPSS they developed during online learning mediated between their fear of COVID-19 and their social presence in online learning.

## Theoretical Background

This study is based on constructivists' theory, emphasizing that knowledge is constructed based on learners' interpretations of experiences in the world (Jonassen & Rohrer-Murphy, 1999). It suggests

that learning is an active process and that all knowledge is unique to each individual focused on knowledge construction, critical thinking, and problem-solving. The community of inquiry (COI) framework is structuring the process of learning in an online environment. It elaborates on the essential elements of a successful online learning experience in higher education. The cognitive presence outlines the process of learning. Teaching covers the design of the course and guidance, and it also influences the social presence learning experience (Stenbom, 2018). It is observed that CPSS learned online give students opportunities to solve real-life problems, whereas psychological motivation determines the satisfaction level of students' online learning. The social constructivism approach argues that all learning results from social interaction. Thus, a students' social presence during online learning helps them learn as they collaborate with peers under their teachers' instructions (Stenbom, 2018). This approach towards learning refines their ability to solve problems (Amin & Mariani, 2017), organize information, and make decisions (McWhirter & Shealy, 2020). These skills are significant in higher education, and applicable to becoming a successful professional (Songkram et al., 2015).

## Literature Review

### Online Learning and Fear of COVID-19

Fear of COVID-19 has become a threat to physical and mental health for human beings worldwide (Huang et al., 2020). It has extended or caused several other fears, e.g., loss of life, career, education, and fear of adopting technologies for online learning (Al-Marroof et al., 2020). The pandemic situation has forced educational institutes to abruptly switch from traditional on-campus to online modes of teaching and learning, and this has instigated fears among students as the unavailability of resources was one of the critical factors, especially for those who had no experience using these resources for online learning (Al-Marroof et al., 2020). The intensity of this fear can be estimated by the reports on student suicide in different countries (Mamun & Griffiths, 2020). Such reports demonstrated several fears associated with the situation that made it difficult for students to cope. However, these reports also encouraged us to determine the impact of fear of COVID-19 on students' social presence and examine how it influences the quality of virtual interactions and outcomes (Bickle et al., 2019).

### Social Presence and Online Learning

Social presence is an essential component of students' satisfaction with online learning (Shea et al., 2001). It is described as "the degree to which a person is perceived to be a 'real person' in his/her technologically mediated communication or virtual environments" (p. 383), and the level of social presence influences the quality of virtual interactions and outcomes (Bickle et al., 2019). This aspect is considered a prominent indicator of students' motivation since, when they are engaged with instructors and peers, their responses are being valued, their queries are being addressed, and they feel more engaged and motivated (Woods & Baker, 2004).

The prevailing situation has increased the importance of quality education and created a debate among academics about how to improve the quality of online education to improve the efficiency of students' learning, as well as their motivation and satisfaction in a situation like COVID-19. The researchers have considered social presence to be an emotional aspect of students' motivation (Stodel et al., 2006) and satisfaction (Shapiro et al., 2017), generally expressed in classroom discussions.

The COVID-19 pandemic has caused several challenges for online education, put a question mark on the online technological resources, and made effective online learning an uphill task. Limited research is available on how fear of pandemics like COVID-19 influences students' social presence in online learning. The study becomes particularly important in a situation of extreme fear of COVID-19 when stress, anxiety, and phobias become more intense because of decreased social interaction due to protocols such as social distancing, lack of emotional support, and physical isolation, and further cast adverse psychological effects on students (Elmer et al., 2020). This research gap becomes more critical to explore when we see it in the context of the constructivist point of view that students first construct knowledge by interacting with peers and then adopt the knowledge (Romero et al., 2014). The following hypothesis was developed to address the first research question.

- H<sub>1</sub>: Students' fear of COVID-19 is positively related to students' social presence in online learning

### **Students' Cognitive Problem-Solving Skills**

In cognitive psychology, the term problem-solving refers to the mental process that people go through to discover, analyze, and solve problems. It is argued (Noordegraaf-Eelens et al., 2019) that it is the mission of all educational institutions, no matter what level, to impart knowledge and develop cognitive problem-solving skills. Preparing learners with CPSS has become one of the components of quality teaching and the quality of any school depends on how well it has developed cognitive problem-solving skills in its learners (Borghans et al., 2015).

Cognitive problem-solving skills are also imperative to success in a career (Romero et al., 2014). CPSS assists learners in making independent decisions and solving problems (Zoller & Pushkin, 2007). They allow individuals to adapt to new situations and solve new problems by applying their knowledge (Masalimova et al., 2019). Therefore, it has become imperative for educational institutions, especially those of higher education, to prepare students to face contemporary situations, regulate their emotions, and demonstrate self-determination. This paper argues that students' CPSS will better equip them to handle transitions and life changes, and perform smoothly with resilience.

Several research studies on the significance of CPSS, but how it mediates between an extreme and new situation, such as the COVID-19 pandemic and students' social presence in online learning, is unknown. During the fearful situation of the pandemic, students have coped with COVID-19-related stress differently. Some students have adjusted or coped with the stressors well and demonstrated effective social presence in online learning, while others have been fearful and exhibited ineffective social presence. Seeing this gap in research, the following hypothesis was developed to address the second research question.

- H<sub>2</sub>: Cognitive problem-solving skills mediate the relationship between fear of COVID-19 and students' social presence in online learning.

### **Students' Psychological Motivation and Online Learning**

Psychological motivation in online learning is one of the core components of academic engagement and encourages students to achieve some goals (Oudeyer et al., 2016). The education sector is considered a driving force that leads students to learn (Martin, 2008) and achieve academic targets (Liu et al., 2012). A large body of research is available on traditional learning environments (Bekele, 2010), and there is evidence that the transition from traditional to remote learning during the COVID-19 pandemic was

successful (Basilaia & Kvavadze, 2020). However, minimal literature is available on the quality and effectiveness of online learning, improving student learning outcomes (Baber, 2021), and no research is available on how fear of the pandemic affects students' motivation in online learning.

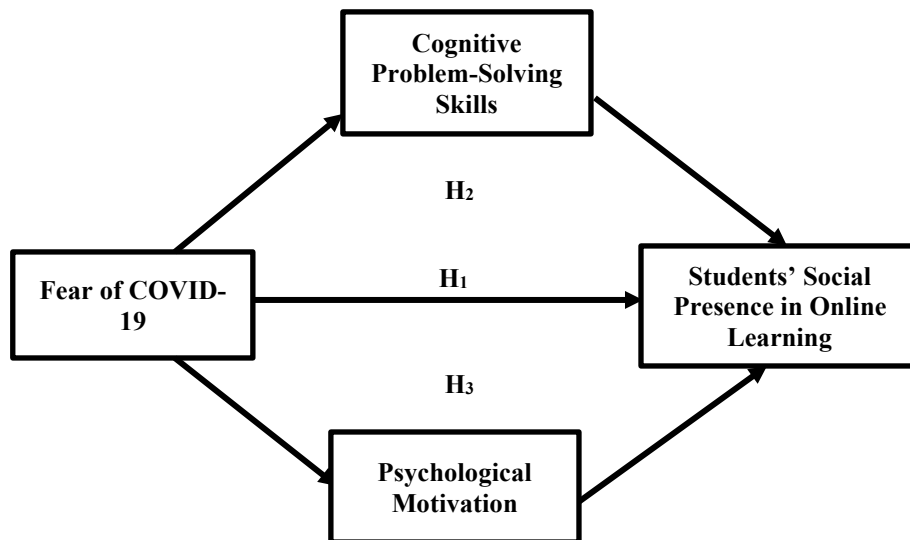
Anxieties and stress are also explored as challenges for effective online learning (Adedoyin & Soykan, 2020; Mubarak et al., 2020), but how this inner force mediates between the extreme fear of a pandemic and students' social presence at the higher education level presents a gap in the research. Therefore, to address the research gap and second research question, the following hypothesis was developed.

- H<sub>3</sub>: Psychological motivation mediates the relationship between fear of COVID-19 and students' social presence in online learning.

The theoretical framework is shown in Figure 1.

**Figure 1**

*Theoretical Framework*



## Methodology

### Sample

A quantitative descriptive correlational research design was applied in this study. The data were collected online using Google Forms in both countries because students were physically unavailable on campus. The authors contacted faculty members of their universities and asked them to share the survey with their students. Moreover, a snowball sampling technique was used; students were requested to share the survey with their friends. The sample consisted of 214 student responses from Malaysia's universities and 258 student responses from Pakistan's universities. In Malaysia, the majority of participants were undergraduate and second-year female students (158 female, 73.8%) with a mean age of 22.82 ( $SD = 8.91$ ), while in Pakistan, the majority were master's and second-year male students (130 male, 50.4%) with a mean age of 24.47 ( $SD = 5.24$ ). Students were informed of the purpose of the study,



and their participation was entirely voluntary. They were assured that responses were used for academic research purposes. Students were asked to complete the online survey via Google Forms.

## Measures

The study used established scales, written in English, in both studies. The measures are defined below and all items in the survey are shown in Appendix 1.

*Students' social presence in online learning (SPOL)* was measured using 14 items developed by Strong (2012). This variable measures students' comfort level in online course discussions. A sample item is: "computer-mediated communication is an excellent medium for social interaction." Responses ranged from 1 (*never*) to 5 (*often*).

*Psychological motivation (PM)* was measured using six items from a scale developed by Lee et al. (2019). This variable measures student interest in online classes. A sample item is: "online classes are very useful to me," measured, again, on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

*Cognitive problem-solving skills (CPSS)* were measured using five items (Lee et al., 2019). This variable measures a student's current level of skills developed during online learning. The sample item of CPSS is: "I can deeply analyze thoughts, experiences, and theories about the knowledge I have learned in my online classes." The data was again collected using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

*Fear of COVID-19 (FCoV)* was measured by seven items (Ahorsu et al., 2020). A sample item of this scale is: "I am most afraid of COVID-19." The responses were collected on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

## Results

Table 1 shows that 63% of the Malaysian and 51% of the Pakistani students were fearful about COVID-19. In general, it may be said that the participants in both countries have been strongly affected by the pandemic.

**Table 1**

*Analysis of Fear of COVID-19 Experienced by University Students of Pakistan and Malaysia*

Item	Pakistan (%)	Malaysia (%)
I am most afraid of COVID-19.	51.2	63.1
It makes me uncomfortable to think about COVID-19.	55.7	44.9
My hands become clammy when I think about COVID-19.	29.2	15.4
I am afraid of losing my life because of COVID-19.	38.3	48.6

When watching news and stories about COVID-19 on social media, I become nervous or anxious.	61.5	33.1
I cannot sleep because I am worried about getting COVID-19.	21.1	6.1
My heart races or palpitates when I think about getting COVID-19.	31.8	16.3

Note.  $N = 214$  Malaysia;  $N = 258$  Pakistan.

In fact, participants showed, in general, above average fear of COVID-19. For instance, as reported in Table 1 55.7% Pakistani and 44.9% Malaysian students felt uncomfortable thinking about the virus. When considering the impact of the virus, 38.3% of Pakistan's and 48.6% of Malaysian students felt COVID-19 was life-threatening. When comparing the two groups overall, students in Malaysia showed a greater level of fear of COVID-19 (63.1%), and Pakistani students were more fearful when watching COVID-19-related news on social media (61.5%). The possible reasons students were fearful could be related to their less privileged socioeconomic backgrounds, the threat of family income loss, being located in a COVID-19 red zone, limited access to digital resources, and the high cost of Internet connectivity.

## Study 1: Malaysia

### Descriptive Statistics and Correlation

Table 2 presents the reliability, mean, and standard deviation for each study variable. The results of bivariate correlations show that FCoV was not correlated with mediator PM ( $r = 0.10, p > 0.01$ ), but positively correlated with CPSS ( $r = 0.18, p < 0.01$ ). Moreover, it was not correlated with the SPOL ( $r = 0.03, p > 0.01$ ). PM is positively and significantly associated with CPSS ( $r = 0.75, p < 0.01$ ) and SPOL ( $r = 0.24, p < 0.01$ ). Moreover, CPSS was significantly correlated with SPOL ( $r = 0.30, p < 0.01$ ). Furthermore, SPOL had no significant relationship with the control variables age and gender.

**Table 2**

*Cronbach's Alpha, Means, Standard Deviations, and Correlations for the Study Variables*

Variable	Cronbach's $\alpha$	$M$	$SD$	1	2	3	4	5	6
1. Gender <sup>a</sup>	—	—	—	—					
2. Age	—	22.82	8.91	-0.07	—				
3. FCoV	0.89	2.73	0.88	0.13	-0.08	—			
4. PM	0.94	2.90	0.97	0.01	0.01	0.10	—		
5. CPSS	0.91	3.21	0.79	0.07	-0.06	0.18**	0.75**	—	
6. SPOL	0.83	3.47	0.81	0.09	-0.12	0.03	0.24**	0.30**	—

Note.  $N = 214$ . <sup>a</sup>Gender coded 1 = men, 2 = women; FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL = social presence in online learning. \* $p < .05$ . \*\* $p < .01$ .

## Convergent Validity and Discriminant Validity

Table 3 shows that the theoretically proposed measurement model (four-factor) has plausibly good fit indices as compared to alternative models. All these indices meet the satisfactory limit (Hu & Bentler, 1999).

**Table 3**

### *CFA-Model Fit Indices for Study Variables*

Measurement Model	$\chi^2$	<i>df</i>	$\chi^2/df$	CFI	NFI	GFI	TLI	RMSEA
Four-factor model (hypothesized model: FCoV, PM, CPSS, & SPOL)	331.26	220	1.51	0.97	0.91	0.89	0.96	0.05
Three-factor model (PM, CPSS combined FCoV & SPOL)	930.16	223	4.17	0.80	0.74	0.65	0.76	0.12
Two-factor model (combined PM & CPSS, combined FCoV & SPOL)	1094.25	225	4.86	0.74	0.70	0.62	0.71	0.14
One-factor model (combined FCoV, PM, CPSS, & SPOL)	1490.70	226	6.60	0.62	0.59	0.54	0.58	0.16

*Note.* CFI = comparative fit index; NFI = normed fit index; GFI = goodness of fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL= social presence in online learning.

Table 4 presents statistics related to reliability and validity. Factor loadings are all greater than 0.5, average variance extracted (AVE) of all constructs is greater than 0.50, and composite reliability (CR) is greater than 0.70 for all constructs. In addition, the AVE of each construct is greater than its matching squared correlation coefficient between pairwise latent variables and not equal to 1. Thus, the results fulfill the criteria of composite reliability, as well as convergent and discriminant validity for the measurement model (Fornell & Larcker, 1981).

**Table 4**

### *Overall Reliability and Validity of the Constructs*

Variable	CR	AVE	MSV	MaxR(H)	1	2	3	4
1. CPSS	0.90	0.69	0.62	0.90	<b>0.83</b>			
2. FCoV	0.88	0.55	0.04	0.89	0.20	<b>0.74</b>		
3. SPOL	0.89	0.54	0.10	0.90	0.32	0.05	<b>0.74</b>	
4. PM	0.94	0.73	0.62	0.94	0.79	0.08	0.27	<b>0.86</b>

*Note:* The squared root estimate of AVE are in bold; CR = composite reliability; AVE = average variance extracted; MSV = maximum shared variance; MaxR(H) = maximum reliability; FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL = social presence in online learning.

## Hypotheses Testing

The SPSS PROCESS macro model 4 was used for hypothesis testing (Hayes & Preacher, 2013). As shown in Table 5, results of FCoV were positively and significantly related to CPSS ( $\beta = 0.17, t = 2.77, p = 0.00$ ) and not related to PM ( $\beta = 0.11, t = 1.46, p = 0.15$ ). The CPSS was positively related to the SPOL ( $\beta = 0.27, t = 2.76, p = 0.01$ ) when controlling for FCoV, whereas PM had no association with SPOL ( $\beta = -0.04, t = 0.45, p = 0.65$ ). The results of FCoV were not related to students' SPOL ( $\beta = 0.02, t = 0.44, p = 0.67$ ), rejecting H1.

**Table 5**

*Regression Results for Parallel Mediation in Malaysia*

Variable	$\beta$	SE	t	p
Direct and total effects				
Step 1				
SPOL regressed on FCoV	0.02	0.06	0.44	0.67
Step 2				
CPSS regressed on FCoV	0.17	0.06	2.77	0.00
PM regressed on FCoV	0.11	0.08	1.46	0.15
Step 3				
SPOL regressed on CPSS (after controlling for FCoV)	0.27	0.10	2.76	0.01
SPOL regressed on PM (after controlling for FCoV)	0.04	0.08	0.45	0.65
Step 4				
SPOL regressed on FCoV (after controlling for CPSS and PM)	-0.02	0.06	-0.36	0.72
Bootstrap results for the indirect effect				
	Value	SE	95% CI	
			LL	UL
The indirect effect of FCoV on SPOL via CPSS	0.04	0.03	0.01	0.12
The indirect effect of FCoV on SPOL via PM	0.00	0.12	-0.11	0.43

*Note.* FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL = social presence in online learning; CI = confidence interval.

The results indicate that only CPSS fully mediated the relationship between FCoV and students' SPOL (H<sub>3</sub>). As a result, H<sub>2</sub> was accepted. In contrast, the results indicate that PM did not mediate the relationship between FCoV and students' SPOL. As a result, H<sub>3</sub> was rejected.

## Study 2: Pakistan

### Descriptive Statistics and Correlation

Table 6 presents the reliability, mean, and standard deviation for each study variable. The results of bivariate correlations show that FCoV was positively correlated with mediators PM ( $r = 0.18, p < 0.01$ ) and CPSS ( $r = 0.21, p < 0.01$ ). PM is positively and significantly associated with CPSS ( $r = 0.69, p < 0.01$ ) and students' SPOL ( $r = 0.54, p < 0.01$ ). Moreover, CPSS is significantly correlated with the dependent variable, students' SPOL ( $r = 0.59, p < 0.01$ ). Furthermore, SPOL has no significant relationship with the control variable age but has a positive and significant relationship with gender ( $r = 0.26, p < 0.01$ ).

**Table 6**

*Cronbach's Alpha, Means, Standard Deviations, and Correlations for the Study Variables*

Variable	Cronbach's alpha	M	SD	1	2	3	4	5	6
1. Gender <sup>a</sup>	—	—	—	—					
2. Age	—	24.47	5.24	-0.10	—				
3. FCoV	0.90	2.95	0.99	0.18**	-0.01	—			
4. PM	0.93	2.46	0.84	0.07	0.28**	0.18**	—		
5. CPSS	0.88	3.37	0.80	0.12	0.27**	0.21**	0.69**	—	
6. SPOL	0.85	3.49	0.96	0.05	0.26**	0.18**	0.54**	0.59**	—

Note.  $N = 258$ . <sup>a</sup>Gender coded 1 = men, 2 = women. FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL = social presence in online learning.

\* $p < .05$ . \*\* $p < 0.01$ .

### Convergent Validity and Discriminant Validity

Table 7 shows that the theoretically built measurement model (four-factor model) established a noticeably better representation of our data, with good fit indices compared to alternative models. It meets the criteria successfully (Hu & Bentler, 1999).

**Table 7**

*CFA-Model Fit Indices for Study Variables*

Measurement model	$\chi^2$	df	$\chi^2/df$	CFI	NFI	GFI	TLI	RMSEA
Four-factor model (hypothesized model: FCoV, PM, CPSS, & SPOL)	336.69	180	1.87	0.95	0.90	0.89	0.95	0.06

Three-factor model (PM, CPSS, combined FCoV & SPOL)	645.65	183	3.53	0.86	0.81	0.80	0.84	0.10
Two-factor model (combined FCoV, SPOL & combined PM, & CPSS)	860.27	185	4.65	0.80	0.75	0.73	0.76	0.12
One-factor model (combined FCoV, SPOL, PM,& CPSS)	1308.04	186	7.03	0.66	0.62	0.61	0.61	0.15

*Note:* CFI = comparative fit index; NFI = normed fit index; GFI = goodness of fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL = social presence in online learning.

In Table 8, the convergent validity is shown: factor loadings are all greater than or equal to 0.5, average variance extracted (AVE) of all constructs is also greater than 0.50, and composite reliability (CR) is greater than 0.70 for all constructs. In addition, the AVE of each construct is greater than its matching squared correlation coefficient between pairwise latent variables and not equal to 1. Thus, the results fulfill the criteria of composite reliability, as well as convergent and discriminant validity for the measurement model (Fornell & Larcker, 1981).

**Table 8**

*Overall Reliability and Validity of the Constructs*

Variable	CR	AVE	MSV	MaxR(H)	1	2	3	4
1. CPSS	0.93	0.69	0.57	0.93	<b>0.83</b>			
2. FCoV	0.80	0.51	0.43	0.95	0.61	<b>0.71</b>		
3. SPOL	0.89	0.57	0.05	0.96	0.20	0.20	<b>0.75</b>	
4. PM	0.88	0.60	0.57	0.97	0.75	0.66	0.23	<b>0.77</b>

*Note:* The square root of AVE is shown in bold. CR = composite reliability; AVE = average variance extracted; MSV = maximum shared variance; MaxR(H) = maximum reliability; FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL = social presence in online learning.

### Hypotheses Testing

The SPSS PROCESS macro model 4 was used for hypothesis testing (Hayes & Preacher, 2013). As shown in Table 9, results revealed that FCoV was positively and significantly related to CPSS ( $\beta = 0.17, t = 3.40, p = 0.00$ ) and PM ( $\beta = 0.15, t = 2.93, p = 0.00$ ). The CPSS ( $\beta = 0.49, t = 5.94, p = 0.00$ ) and PM ( $\beta = 0.29, t = 3.72, p = 0.00$ ) were positively and significantly related to students' SPOL.

The FCoV was positively and significantly associated with students' SPOL. The direct effect of COVID-19 on SPOL was insignificant after controlling for CPSS and PM. A bias-corrected bootstrapped test with 5,000 was also run.

**Table 9**

*Regression Results for Parallel Mediation in Pakistan*

Variable	$\beta$	SE	t	p
Direct and total effects				
Step 1				
SPOL regressed on FCoV	0.17	0.06	2.86	0.00
Step 2				
CPSS regressed on FCoV	0.17	0.05	3.40	0.00
PM regressed on FCoV	0.15	0.05	2.93	0.00
Step 3				
SPOL regressed on CPSS (after controlling for FCoV)	0.49	0.08	5.94	0.00
SPOL regressed on PM (after controlling for FCoV)	0.29	0.08	3.72	0.00
Step 4				
SPOL regressed on FCoV (after controlling for CPSS and PM)	0.04	0.05	0.91	0.36
Bootstrap results for the indirect effect				
	Value	SE	95% CI	
			LL	UL
The indirect effect of FCoV on SPOL via CPSS	0.08	0.03	0.03	0.15
The indirect effect of FCoV on SPOL via PM	0.04	0.02	0.01	0.10

*Note.* FCoV = fear of COVID-19; PM = psychological motivation; CPSS = cognitive problem-solving skills; SPOL = social presence in online learning.

The results confirmed mediation of CPSS 90% CI [0.03, 0.15] and PM [0.01, 0.10] because it did not report zero among the lower and upper limits. Moreover, CPSS and PM fully mediated the relationship between FCoV and SPOL.

## Discussion

The COVID-19 pandemic has led to negative emotions, such as fear, and the transition to online learning has caused challenges such as lower levels of academic engagement and social interaction, negatively affecting the psychological state of students (Al-Marouf et al., 2020). This study aimed to investigate the impact of Malaysian and Pakistani students' fear of COVID-19 on SPOL while examining the mediating role of CPSS and PM related to online learning. Fear of COVID-19 is important to study while studying online learning.

As the fear of COVID-19 is a new area of research (Ahorsu et al., 2020; Kassim et al., 2021; Perz et al., 2020), we cannot contrast or corroborate the findings directly with study variables, but we can

approximate the findings with existing literature. These findings are consistent with existing literature because the fear of COVID-19 has been associated with the students' well-being (Hasan & Bao, 2020; Kassim et al., 2021).

In study 1 (Malaysia),  $H_1$  was not significant, and the results demonstrate that Malaysian students have more resilience than is often assumed (Lee et al., 2021), and that the robust IT infrastructure in Malaysian universities is helping them overcome barriers in online learning (Dhawan, 2020). In study 2 (Pakistan),  $H_1$  was significant and it is aligned with a qualitative study conducted in Indonesia that showed students started to get bored with online learning during COVID-19 (Irawan et al., 2020), and that a lack of robust IT infrastructure could be a problem, too (Dhawan, 2020). The  $H_2$  was accepted in both studies 1 and 2, and results suggest that cognitive problem-solving skills equip students with the skills to translate their acquired knowledge to solve their routine life problems (Bayrak & Bayram, 2011).

Similarly, Bayrak and Bayram (2011) found that cognitive problem-solving skills refine students' abilities to make effective decisions, resolve conflicts, and organize information. Online learning assists with the development of cognitive problem-solving skills and students rationalize their knowledge to solve academic problems, which eventually improves students' presence in online learning.  $H_3$  was insignificant in study 1, whereas it was accepted in study 2. Study 2 results validate the existing findings as students who acquire the knowledge to reflect on their learning are motivated when they have quality interaction with instructors and peers as this increases their satisfaction when facing a real-life problem (Hostetter & Busch, 2006).

## Implications

The findings of this study do not provide generalizations about remote learning in either Pakistan and Malaysia, but are significant because they provide a deeper understanding of the state of student motivation and coping mechanisms during a pandemic. This study provides a guideline for universities in Malaysia and Pakistan to effectively engage and ensure students' social presence in an online learning environment when facing an uncertain situation such as a pandemic. The study's results emphasize that students' online learning success and active learning are highly dependent on motivation and cognitive skills. Hence, it is recommended to have a robust IT infrastructure and create a well thought out IT-integrated curriculum to develop students' cognitive problem-solving skills and improve psychological motivation.

## Conclusion

The COVID-19 pandemic forced educational institutions to launch a paradigmatic shift in teaching and learning. This study aimed to examine the relationship between COVID-19 fear, students' CPSS, motivation, and students' social presence in online learning in two countries of Asia: Malaysia and Pakistan. The study's findings are significant because they illustrate the psychological impact of the COVID-19 pandemic on students' online learning. The findings highlighted that CPSS is the stimulus behind Malaysian students' interest in online learning. For Pakistani students, psychological motivation and cognitive problem-solving skills positively affect students' manifestation of online learning during the pandemic at the higher education level of learning.



In future studies, it would be interesting to extend this work and explore larger samples after the post-COVID-19 era. It would be relevant to investigate students' motivation and coping mechanisms among culturally diverse learners. Online learning has become an important part of the higher education system in many countries and future scholars can carry out research on students' social presence in online learning from the perspective of their engagement.

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## Appendix 1

Here are the items surveyed in each category of variable.

### Students' Social Presence in Online Learning

1. The instructor facilitated discussions in the course.
2. I felt comfortable interacting with other participants in the online course.
3. I felt comfortable participating in the course discussions.
4. I felt comfortable conversing through this text-based medium.
5. Computer-mediated communication is an excellent medium for social interaction.
6. The instructor created a feeling of an online community
7. I was able to form distinct individual impressions of some course participants even though we communicated only via a text-based medium.
8. The introductions enabled me to form a sense of online community.
9. Discussions using the medium of computer-mediated communication tend to be more impersonal than face-to-face discussions.
10. I felt my point of view was acknowledged by other participants in the course.
11. I felt comfortable introducing myself in the online course.
12. Computer-mediated communication is more impersonal than video teleconference discussions.
13. Computer-mediated communication is more impersonal than audio teleconference discussions.
14. Messages in the online course were impersonal.

### Psychological Motivation

1. Online classes enhance my interest in learning.
2. I am motivated to study when I take an online class.
3. Online classes are useful to me.
4. It is interesting to take online classes.
5. After taking an online lesson, I look forward to the next one.
6. I am satisfied with the online class I am taking.

### **Cognitive Problem-Solving Skills**

1. I can derive new interpretations and ideas from the knowledge I have learned in my online classes.
2. I can deeply analyze thoughts, experiences, and theories about the knowledge I have learned in my online classes.
3. I can judge the value of the information related to the knowledge learned in my online classes.
4. I tend to apply the knowledge I have learned in online classes to real problems or new situations.
5. I try to approach the subject of my online class with a new perspective.

### **Fear of COVID-19**

1. I am most afraid of coronavirus-19.
2. It makes me uncomfortable to think about coronavirus-19.
3. My hands become clammy when I think about coronavirus-19.
4. I am afraid of losing my life because of coronavirus-19.
5. When watching news and stories about coronavirus-19 on social media, I become nervous or anxious.
6. I cannot sleep because I am worried about getting coronavirus-19.
7. My heart races or palpitates when I think about getting coronavirus-19.





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# A Construct Revalidation of the Community of Inquiry Survey: Empirical Evidence for a General Factor Under a Bifactor Structure

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## Abstract

The study revisited the community of inquiry (CoI) instrument for construct revalidation. To that end, the study used confirmatory factor analysis (CFA) to examine four competing models (unidimensional, correlated-factor, second-order factor, and bifactor models) on model fit statistics computed using parameter estimates from a statistical estimator for ordinal categorical data. The CFA identified as the optimal structure the bifactor model where all items loaded on their intended domains and the existence of the general factor was supported, essentially evidence of construct validity for the instrument. The study further examined the bifactor model using mostly model-based reliability measures. The findings confirmed the contributions of the general factor to the reliability of instrument scores. The study concluded with validity and reliability evidence for the bifactor model, supported the model as a valid and reliable representation of the CoI instrument and a fuller representation of the CoI theoretical framework, and recommended its use in CoI-related research and practice in online education.

*Keywords:* community of inquiry, teaching presence, social presence, cognitive presence, bifactor model, construct revalidation

## Introduction

### The CoI Theoretical Framework

The community of inquiry (CoI) theoretical framework was first laid out by Garrison et al. (2000). The framework identified elements critical for understanding the dynamics of an online learning experience and for structuring and supporting the process of online teaching and learning as well as related research (Kozan & Caskurlu, 2018; Olpak & Kiliç Çakmak, 2016; Shea & Bidjerano, 2009).

The CoI framework consisted of three interconnected constructs of collaborative constructivist learning: (a) teaching presence (TP); (b) social presence (SP); and (c) cognitive presence (CP). Here, the term presence referred to fidelity: how real were the learning and the environment where it occurred (Dempsey & Zhang, 2019). The greater the presence, the greater the fidelity, and accordingly the more realistic the learning experience was perceived to be. Each presence overlapped with the other two and all three combined within a community of inquiry (Diaz et al., 2010; Kovanović et al., 2018; Kozan, 2016; Shea & Bidjerano, 2009). Finally, each presence was further conceptualized to be multidimensional with multiple categories represented by multiple indicators (Caskurlu, 2018; Garrison et al., 2000; Olpak & Kiliç Çakmak, 2016).

### *Cognitive Presence*

Cognitive presence was described as a developmental model articulating the dynamics of a worthwhile educational experience (Garrison et al., 2010). It referred to the extent to which students in a community of inquiry were able to construct meaning through sustained communication and reflected the process of inquiry and learning (Bangert, 2009; Garrison et al., 2000). When operationalizing CP, Garrison et al. (2000) used the practical inquiry (PI) model reflecting the critical thinking process for creating CP (Olpak & Kiliç Çakmak, 2016). They expanded the PI model into a cycle of four phases (subconstructs) in the inquiry process which the CoI framework subsumed as categories: (a) triggering event, (b) exploration, (c) integration, and (d) resolution.

### *Social Presence*

Social presence has focused on important issues that mold social climate in the online learning community and on the level of recognition (e.g., ability of learners to identify with the community, purposeful conversation in a trusting environment, development of interpersonal relationships) among learners during the process of communication (Garrison & Arbaugh, 2007; Kovanović et al., 2018). SP played an important role in creating an online learning environment that encouraged critical thinking (Bangert, 2009; Garrison et al., 2000). Studies have consistently shown that SP had a strong influence on students' satisfaction with online courses and with the instructor, and their perception of learning in online courses (Caskurlu, 2018). Finally, SP consisted of three subconstructs that the CoI framework subsumed as categories: (a) affective expression, (b) open communication, and (c) group cohesion.

### *Teaching Presence*

Teaching presence referred to designing, facilitating, and directing of cognitive and social processes by the instructor to create meaningful personal learning and valuable learning outputs, and also focused on learner ratings of those actions by the instructor (Olpak & Kiliç Çakmak, 2016; Shea & Bidjerano, 2009).

There has been a growing recognition of the importance of TP for successful online teaching and learning, especially when critical thinking and discourse were required (Garrison et al., 2000). A community of inquiry provided important support to critical thinking and meaningful learning. After combining all elements of this community, TP should have served to facilitate critical discussion and learning in this environment. Finally, TP consisted of three subconstructs that the CoI framework subsumed as categories: (a) design and organization, (b) facilitating discourse, and (c) direct instruction.

### **The CoI Instrument and its Validation**

The CoI framework was operationalized by Arbaugh et al. (2008) through developing and validating a CoI instrument which consisted of three subscales, each of which addressed one of the three presence constructs/factors in a domain. Each CoI item measured the extent to which an online course characteristic was present. Their results supported the instrument as being a valid, reliable, and efficient measure of the CoI framework. In their study, the Cronbach's  $\alpha$  for TP was .94, that for SP .91, and that for CP .95.

Since the development of the CoI instrument, its refinement has been constantly called for and therefore continuous over the past 10 plus years in various online settings (Arbaugh, et al., 2008; Dempsey & Zhang, 2019; Kozan & Caskurlu, 2018; Kozan & Richardson, 2014). In many refinement studies, the original correlated, three-factor structure of the instrument was largely recovered and revalidated through either exploratory, confirmatory, or both statistical methods (Kovanović et al., 2018).

### ***Exploratory Approach***

Under an exploratory approach, the validation study typically implemented either an exploratory factor analysis (EFA) or a principal component analysis (PCA) with an oblique rotation to allow the extracted factors measuring latent constructs to be correlated. Among such studies were Swan et al. (2008), Shea and Bidjerano (2009), Díaz et al. (2010), Garrison et al. (2010), and Kovanović et al. (2018).

Swan et al. (2008) and Garrison et al. (2010) both conducted a PCA of the CoI responses ( $n = 287$  master's and doctoral students and  $n = 205$  master's students, respectively) with an oblimin rotation; the results supported a three-factor solution congruent with Garrison et al. (2000). Similar results were obtained in Shea and Bidjerano (2009) with  $n = 2,159$  online students. Instead of a PCA, they used an EFA under principal axis factoring with an oblimin rotation.

Díaz et al. (2010) used an enhanced version of the CoI instrument that provided a second way of rating each item and conducted a PCA with an oblimin rotation of the data from 412 students. The enhanced instrument evaluated both the extent to which an online course characteristic existed (i.e., the first rating responses to the original CoI item statements) and the importance of that characteristic, as based on the second rating responses. A new score was created by multiplying the two sets of ratings. After analyzing the multiplicative scores under the PCA, the three CoI factors were successfully recovered.

Finally, Kovanović et al. (2018) proposed tweaks to the original factor structure. They used an EFA under principal axis factoring with an oblimin rotation to analyze a large sample of 1,487 students in a massive open online course setting. They largely recovered the original three-factor structure. In their analysis, item

28 in the CP subscale cross-loaded on the SP subscale. Fortunately, the removal of this item had only a minor impact on the loadings of the other items and the overall model statistics.

### ***Confirmatory Approach***

Under a confirmatory approach, the validation study typically implemented a confirmatory factor analysis (CFA) to assess the original correlated-factor model. Among such studies were Caskurlu, (2018), Dempsey and Zhang (2019), Kozan (2016), and Ma et al. (2017).

Kozan (2016) applied a CFA to validate the CoI instrument using the responses from 338 participants who were mostly online master's students. Kozan used a slightly adapted version of the survey, and the CFA model that contained the three-factor structure was successfully revalidated without any re-specification.

Ma et al. (2017) added to the CoI instrument a new, learning presence proposed by Shea and Bidjerano (2010) and measured by an additional set of 14 items. The sample was 325 undergraduate students in a blended learning environment. Their findings supported the fit of the four-factor model after two rounds of CFA which led to the deletion of one item.

Caskurlu (2018) conducted a CFA to investigate the factor structure of each individual presence using a dataset of 310 participants, and established that each presence itself was multidimensional and thus a higher-order construct. The analysis was run separately for each individual subscale without examining the dimensionality of the instrument as a whole.

Dempsey and Zhang (2019) revalidated the CoI instrument using a dataset from 579 online MBA students. They experimented with multiple structures: (a) the original three-factor structure, (b) a 10-factor structure by allowing each of the three presences to be multidimensional, and (c) a higher-order factor model with three lower-order factors. The study concluded the higher-order factor model provided the best fit to the data.

### ***Both Exploratory and Confirmatory Approaches***

There are also validation studies which used both an EFA/PCA and CFA (Bangert, 2009; Kozan & Richardson, 2014; Olpak & Kiliç Çakmak, 2016; Yu & Richardson, 2015). Such studies typically had a large sample which was randomly split into two subsets with each one still being large enough for either an EFA/PCA or CFA. Then, one random subset was analyzed to explore and discover the underlying factor structure of the instrument, and the finding was next further assessed under CFA using the second random subset.

Bangert (2009) used a sample of 1,173 undergraduate and graduate students enrolled in fully online and blended courses to validate the CoI instrument. One half of the sample was randomly selected to conduct a PCA with an oblique rotation which was followed by a CFA using the remaining half of the sample. The EFA process largely recovered the original three-factor solution. Next, this recovered factor structure was confirmed by CFA with all fit statistics being satisfactory.

Kozan and Richardson (2014) collected their data from master's and doctoral students who were either fully online, or face-to-face but also taking online courses. They had 219 participants for EFA and 178

participants for CFA. During EFA, they selected the three-factor solution from the promax rotation. Next, the CFA process experimented with multiple models using the second dataset and the final model exhibited a good fit. Except for several correlated errors, this final model concurred with the CoI framework.

Yu and Richardson (2015) collected data from 995 undergraduate online students and split them into two approximately equal subsets. During the EFA (promax rotation) process, they experimented with two models before and after removing two items, and ended up selecting the second, three-factor model where each item loaded on its intended subscale under the CoI framework. In the CFA, the fit of the 32-item model was confirmed with excellent values on model fit statistics.

Olpak and Kiliç Çakmak (2016) collected the data from 1,150 students enrolled in online courses and randomly split them into two equal groups. Under EFA, they successfully recovered the original three-factor structure. Then, in the CFA, the fit of the three-factor model was assessed multiple times and was confirmed to be excellent after, per the modification indices, allowing several item error covariances to be freely estimated.

In the end, a more complete summary of research on the validation of the CoI instrument was found in Kozan and Caskurlu (2018) and Stenbom (2018) which provided systematic reviews of such studies.

### ***Issues with Existing Validation Work***

Many CoI refinement studies have shared similar limitations. A primary limitation has been that the correlated-factor model most studies have universally relied on cannot fully describe the CoI framework by Garrison et al. (2000). Furthermore, there is room for improvement in the estimation method by which the estimates of model parameters have been derived.

First, the correlated-factor model has addressed only part of the CoI framework. Although it explicitly allowed the presences to be correlated in pairs, it did not include an intersection of all three presences. Such an inadequacy was unfortunate because the literature has repeatedly emphasized the importance of the interaction of all three presences which represents an online learning or educational experience (Caskurlu, 2018; Diaz et al., 2010; Garrison et al., 2000; Garrison & Arbaugh, 2007; Garrison et al., 2010; Kozan, 2016; Kozan & Richardson, 2014; Olpak & Kiliç Çakmak, 2016; Swan & Ice, 2010).

The literature has recommended the examination of competing models when applying CFA to scale validation (Gignac & Kretzschmar, 2017; Rodriguez et al., 2016b). There are several competing models for handling multidimensional data: (a) M1: unidimensional, single-factor model; (b) M2: correlated-factor model; (c) M3: second-order factor model; and (d) M4: bifactor model (Chen et al., 2012; Gignac & Kretzschmar, 2017; Reise, 2012; Reise et al., 2010; Reise et al., 2007; Rodriguez et al., 2016a, 2016b).

Figure 1 demonstrates the implication of each competing model for the CoI framework. First, corresponding to Figure 1a which consisted of a single circle, the single-factor model consisted of one and only one latent factor underlying all CoI items to model their shared variance. The factor shed light on the general factor in the bifactor model which documented a general CoI construct measuring students' online educational experience (Garrison et al., 2000; Reise, 2012). Second, corresponding to Figure 1b which consisted of three separate circles overlapping in pairs but did not include an intersection of all three circles, both the

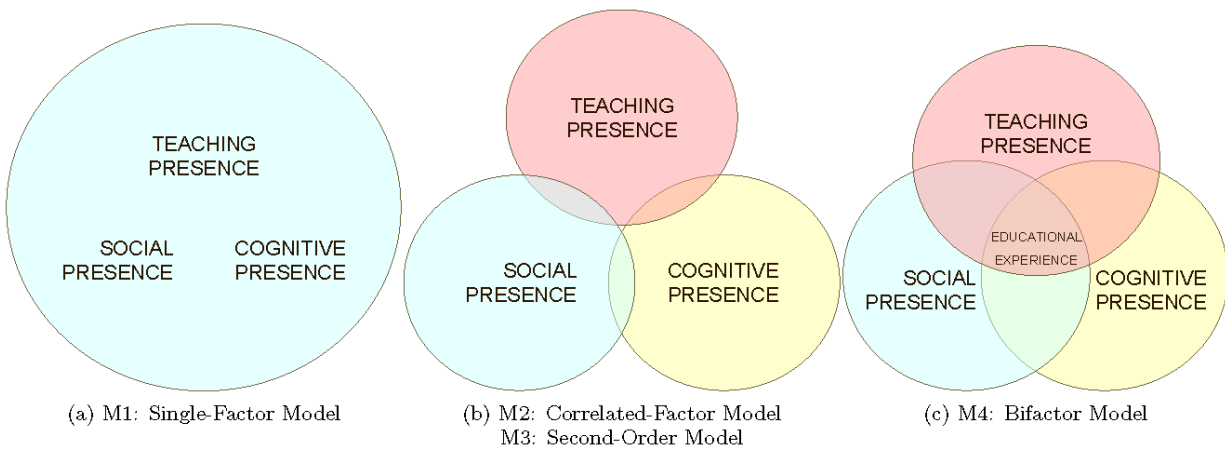
correlated-factor and the second-order models allowed each pair of presences to be correlated either explicitly (M2) or implicitly (M3). However, neither model had a factor underlying all items, therefore both lacked the area in the CoI framework shared by all three presences which represented an online educational experience.

Finally, corresponding to Figure 1c which consisted of three separate circles overlapping in pairs and an intersection of all three circles, the bifactor model incorporated both the overlap of each pair of presences and the intersection of all three presences into the general factor underlying all items, thus indicating the bifactor structure was more aligned with the CoI framework than were the other models.

Even though it could be of interest to further distinguish the pairwise correlations between presences from the interaction of all three presences, doing so would have caused additional complications to the bifactor model. Should any pair of presences be correlated, this would suggest the existence of additional, unmodeled general factors. Also, many statistics (e.g., model-based reliability statistics) used in this study would have been challenging to implement, and any improvement in model fit would have been offset by losses in model interpretability (Reise, 2012). Therefore, this study specified the bifactor model in the usual way consistent with the literature where the general and the presence domain factors were all uncorrelated with each other, without attempting to separate the overlap between each pair of presences from the intersection of all three presences by introducing additional pairwise correlations between presences (Chen et al., 2012; Reise, 2012; Rodriguez et al., 2016a, 2016b).

**Figure 1**

*Alignment of the CoI Theoretical Framework and Four Competing Models*



Second, previous validation studies routinely used statistical methods unable to factor into consideration the rating scale structure of the CoI item responses (i.e., ordinal categorical data). They treated the responses as if they were continuous. Such a practice has been known to have undesirable consequences: inflated  $\chi^2$  statistic, under-estimate of the standard error, and so on (Byrne, 2010; Kline, 2016). These problems were exacerbated when the number of categories was small (four/five categories or less) and/or the data exhibited serious skewness and kurtosis (outside range of -1.00 to +1.00 for skewness, -1.50 to +1.50 for kurtosis). Generally, to properly address the rating scale structure of such data as the CoI

responses, the robust weighted least squares (WLS) method and its variants have been recommended (Rosseel, 2012).

## Purpose of Study

To address the inadequacies/limitations, this study began with a CFA to construct-revalidate the CoI instrument by examining the four competing models (DiStefano & Hess, 2005). After estimating the four models and identifying the one providing the optimal fit as evidence of construct validity, the study computed more statistics for the optimal structure to complement the construct-revalidation results from the CFA.

Therefore, the study proposed and addressed the following two research questions:

1. How well does each of M1 through M4 fit the CoI data as measured by commonly used model fit statistics?
2. What are the psychometric properties (e.g., validity, reliability) of the optimal model as identified above?

When addressing the two questions, the study factored into consideration the rating scale structure of the CoI responses.

## Methods

The CoI survey in this study consisted of 34 five-point Likert items (see Table 1; Arbaugh et al, 2008): 1 for *strongly disagree*, 2 for *disagree*, 3 for *neutral*, 4 for *agree*, and 5 for *strongly agree*. The 34 items make up three subscales: (a) teaching presence (13 items); (b) social presence (9 items); and (c) cognitive presence (12 items).

**Table 1**

*Community of Inquiry Survey Items*

Item	Item statement	Subscale
01	The instructor clearly communicated important course topics.	TP
02	The instructor clearly communicated important course goals.	TP
03	The instructor provided clear instructions on how to participate in course learning activities.	TP
04	The instructor clearly communicated important due dates/time frames for learning activities.	TP
05	The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.	TP

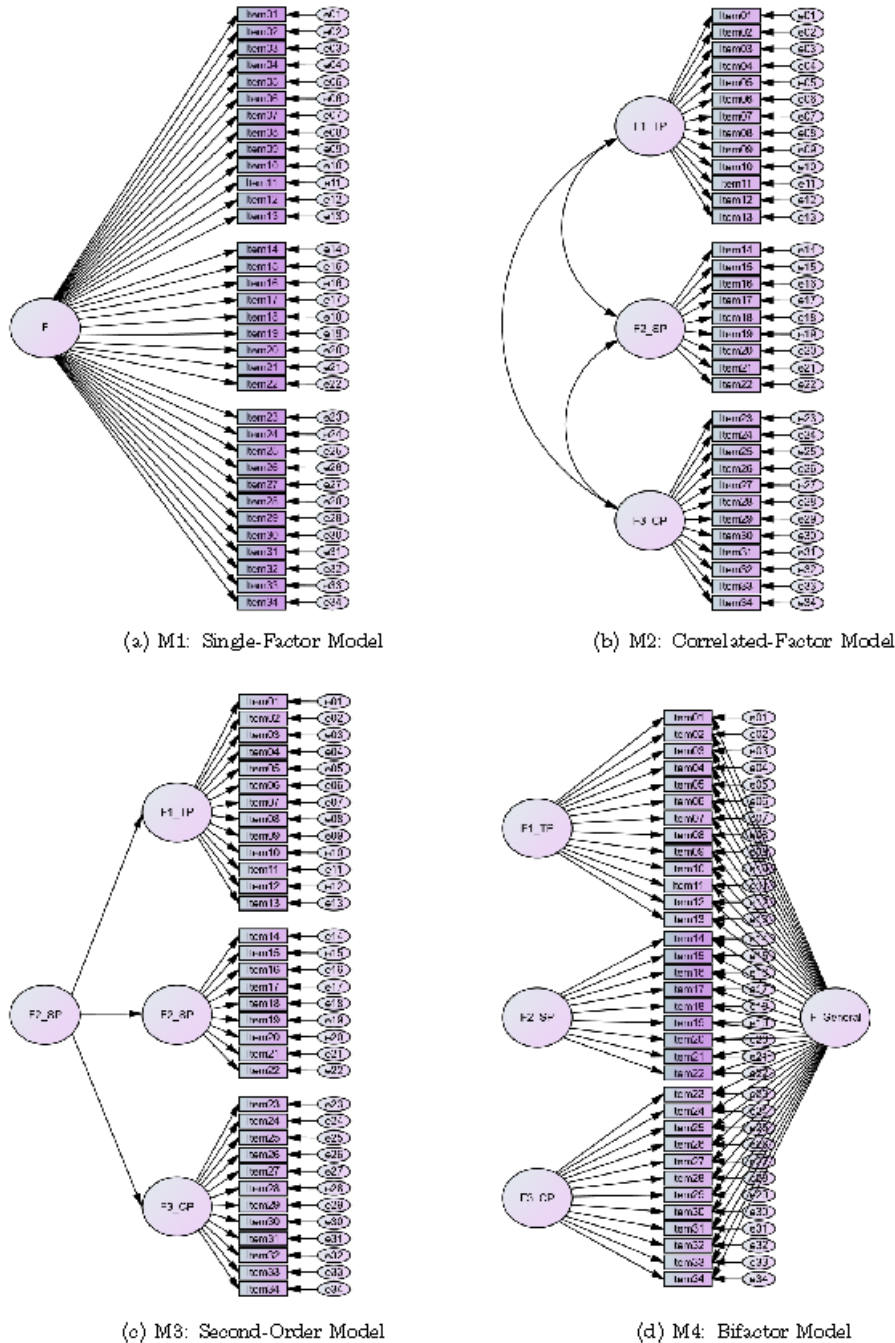
06	The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.	TP
07	The instructor helped to keep course participants engaged and participating in productive dialogue.	TP
08	The instructor helped keep the course participants on task in a way that helped me to learn.	TP
09	The instructor encouraged course participants to explore new concepts in this course.	TP
10	Instructor actions reinforced the development of a sense of community among course participants.	TP
11	The instructor helped to focus discussion on relevant issues in a way that helped me to learn.	TP
12	The instructor provided feedback that helped me understand my strengths and weaknesses.	TP
13	The instructor provided feedback in a timely fashion.	TP
14	Getting to know other course participants gave me a sense of belonging in the course.	SP
15	I was able to form distinct impressions of some course participants.	SP
16	Online or Web-based communication is an excellent medium for social interaction.	SP
17	I felt comfortable conversing through the online medium.	SP
18	I felt comfortable participating in the course discussions.	SP
19	I felt comfortable interacting with other course participants.	SP
20	I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	SP
21	I felt that my point of view was acknowledged by other course participants.	SP
22	Online discussions helped me to develop a sense of collaboration.	SP
23	Problems posed in this course increased my interest in course issues.	CP
24	Some course activities piqued my curiosity.	CP
25	I felt motivated to explore content-related questions.	CP
26	I utilized a variety of information sources to explore problems/issues presented in this course.	CP
27	Brainstorming and finding relevant information helped me resolve content-related questions.	CP
28	Online discussions were valuable in helping me appreciate different perspectives.	CP
29	Combining new information from a range of sources helped me answer questions raised in course activities.	CP
30	Learning activities in this course helped me construct explanations/solutions.	CP
31	Reflecting on course content and discussions helped me understand fundamental concepts in this class.	CP
32	I can describe ways to test and apply the knowledge created in this course.	CP
33	I have developed solutions to course problems that can be applied in practice.	CP
34	I can apply the knowledge created in this course to my work or other non-class related activities.	CP



Figure 2 shows the four competing models for the CoI instrument: (a) single-factor model (Figure 2a); (b) correlated-factor model (Figure 2b); (c) second-order factor model (Figure 2c); and (d) bifactor model (Figure 2d). To estimate the four models, the study used the *lavaan* package in R which offered a WLS estimator for handling ordinal categorical data (Rosseel, 2012).

**Figure 2**

*CoI Dimensionality Analysis Under Four Competing Models Using CFA*



After securing the required Institutional Review Board approval, the study obtained a convenience sample from the participating university in the southeastern US. The sample had a total of 909 graduate students taking online courses in the fall semester of 2014. In January 2015, these 909 students were invited by e-mail to participate in the study through Qualtrics.

To address the common, low response rate issue with online surveys, the study contacted research participants multiple times by e-mail. In the beginning, a massive pre-study notification e-mail was sent to all 909 students, informing them of an upcoming solicitation to participate in a research project on their online learning experiences in Fall, 2014. After the data collection started, additional e-mails followed to remind the participants of responding to the survey. This continued until the data collection came to an end in April 2015.

After addressing the missingness in the responses through listwise deletion, there were 238 participants left who provided complete responses to all 34 CoI items, which led to a student-item ratio of about 7:1, satisfying the criterion that, for stable results, the sample size should be at least six times the number of items (Mundfrom et al., 2005).

## Results

Based on the descriptive statistics of the responses, nearly 40% of the CoI items had skewness statistics outside the acceptable range of -1.00 to +1.00, and five items had kurtosis values above the acceptable upper limit of +1.50. It was justified for this study to apply the robust WLS method, instead of treating the categorical responses as if they were continuous (Byrne, 2010; Kline, 2016). The CFA results are found in Tables 2 through 4.

Table 2 presents model fit statistics. All four models demonstrated an adequate fit on CFI, TLI, and AGFI because they were all extremely close to the upper limit of 1.00 for a perfect fit. M4 performed the best on all three fit measures. Regarding SRMR, only M4 and M2 were lower than the threshold of .080 for a good fit. Out of the two models, M4 had the lower SRMR of .051. Regarding RMSEA, M4 had the lowest value of .080 and the lower bound of .074 for its 95% confidence interval was lower than the threshold of .08 for an adequate fit (Byrne, 2010; MacCallum et al., 1996; West et al., 2012). Notably, the thresholds used here for deciding whether a model fit was adequate have been traditionally designed for the normal-theory maximum likelihood estimation with continuous data. By contrast, this study implemented a WLS estimator with ordinal categorical data. Although there are known methodological issues related to the application of these traditional thresholds to a research context like this, the practice has been widely accepted in the literature and will continue until better alternatives are proposed and established (Xia & Yang, 2019).

Evidently, out of the four models, the bifactor structure showed the best fit as assessed by highest values of CFI, TLI, and AGFI as well as lowest values of SRMR and RMSEA. Next, a Satorra-Bentler scaled  $\chi^2$  difference test was run to compare the bifactor structure with each of the other competing structures nested

within the bifactor model. The results indicated the bifactor model was statistically significantly better in fit than each competing structure.

**Table 2**

*Results of Confirmatory Factor Analysis of Four CoI Models*

Competing models	X <sup>2</sup> (df)	CFI	TLI	AGFI	SRMR	RMSEA	RMSEA	
							Lower	Upper
Bifactor (M4)	1151.733 (459)	.998	.997	.995	.051	.080	.074	.086
Second-Order factor (M3)	14750.688 (527)	.957	.954	.943	.164	.337	.333	.342
Correlated-factor (M2)	1835.662 (524)	.996	.996	.993	.060	.103	.098	.108
One-Factor (M1)	5844.610 (527)	.984	.983	.977	.116	.206	.202	.211

Table 3 contains the standardized estimates of the bifactor structure. For most items (particularly, CP items), the common variance was explained more by the general factor than by the corresponding subscale domain factor: items 9 (.854 by general vs. .295 by domain), 22 (.825 by general vs. .390 by domain), 23 (.923 by general vs. .115 by domain), and so on. Only several SP items loaded approximately equally on both the general factor and the domain factor: items 17 (.660 by general vs. .644 by domain), 18 (.681 by general vs. .623 by domain), and 20 (.595 by general vs. .630 by domain). Finally, sets of items with high loadings on a subscale may indicate overrepresentation of the content. The fact that items 17, 18, 19, and 20 (all dealing with how comfortable the participant feels about online communication) had high loadings of .644, .623, .712, and .630 on the SP subscale may indicate redundancy from too much content similarity. It is important for a subscale to reflect a conceptually, relatively narrow psychological trait but the construct should not be a mere artifact of asking the same question repeatedly in slightly different ways (Reise, 2012).

**Table 3**

*Bifactor Model Standardized Parameter Estimates for CoI*

Item	$\lambda_{\text{General}}$	$\lambda_{\text{TP}}$	$\lambda_{\text{SP}}$	$\lambda_{\text{CP}}$	var(e)
01	.779	.569			.069
02	.754	.583			.091
03	.710	.547			.197
04	.662	.568			.239
05	.790	.477			.149
06	.860	.414			.090
07	.826	.364			.186
08	.831	.428			.127
09	.854	.295			.184
10	.816	.341			.218
11	.884	.330			.110
12	.797	.355			.240
13	.673	.443			.351
14	.680		.483		.305
15	.633		.495		.355

16	.602	.449		.436
17	.660	.644		.150
18	.681	.623		.148
19	.616	.712		.114
20	.595	.630		.249
21	.733	.504		.208
22	.825	.390		.167
23	.923		.115	.135
24	.887		.205	.172
25	.864		.177	.222
26	.800		.210	.316
27	.849		.135	.261
28	.908		-.370	.038
29	.880		.054	.223
30	.934		.136	.109
31	.921		.294	.065
32	.882		.412	.053
33	.852		.372	.135
34	.879		.328	.119

Table 4 presents multiple statistics measuring primarily the reliability of the CoI instrument scores under the bifactor model (Reise, 2012; Rodriguez et al., 2016a; 2016b). Among them are model-based reliability measures, measures of construct reliability, and dimensionality.

**Table 4**

*General Factor and Domain Factor Score Reliability Estimates*

Statistics	TP (13 items)	SP (9 items)	CP (12 items)	General
$\alpha$	0.969	0.937	0.968	0.979
$\omega$	0.984	0.966	0.984	0.992
$\omega_H$	0.234	0.388	0.036	0.914
ECV	0.095	0.101	0.029	0.775
H	0.778	0.819	0.478	0.988
Factor Determinacy	0.962	0.966	0.951	0.994
$\omega$ , if general factor deleted	0.234	0.387	0.036	0.078
% reduction in reliability, if general factor deleted	76.2	59.9	96.3	92.2

**Model-Based Reliability Statistics**

**Coefficient  $\omega$**

Coefficient  $\omega$  for the scale represented the proportion of the variance in the scale total score that was attributable to all sources of common variance (i.e., variance from all common factors: general factor and all domain factors). A high score on the scale  $\omega$  statistic indicated a highly reliable multidimensional structure that reflected variation on the weighted combination of all common factors. Here, the  $\omega$  statistic

for the total score was .992, indicating as high as 99.2% of the scale total score variance was due to all common factors.

Coefficient  $\omega$  for the subscale measured the proportion of the subscale total score variance that was attributable to both the general factor and that domain factor. A high value on the subscale  $\omega$  statistic indicated a highly reliable multidimensional structure consisting of both the general factor and the domain factor. Here, the subscale  $\omega$ 's were .984 for TP, .966 for SP, and .984 for CP, suggesting that 96.6% to 98.4% of the subscale total score variance was due to the general factor plus the domain factor.

### **Coefficient $\omega_H$**

Coefficient  $\omega_H$  for the scale represented the proportion of the scale total score variance that was due to the general factor only. A high score on the scale  $\omega_H$  statistic indicated the scale total score predominantly reflected the general construct and allowed users to interpret the scale total score as a sufficiently reliable measure of the general factor. Here,  $\omega_H$  was .914, indicating as high as 91.4% of the scale total score variance was attributed to the general factor after accounting for all domain factors.

Coefficient  $\omega_H$  for the subscale measured the proportion of the subscale total score variance that was attributed to the domain factor only. A high value on the subscale  $\omega_H$  statistic indicated the subscale total score predominantly reflected the domain construct and allowed users to interpret the subscale total score as a sufficiently reliable measure of the domain factor. Here, the subscale  $\omega_H$ 's were .234 (TP), .388 (SP), and .036 (CP), suggesting the subscale total scores mostly did a poor job of reflecting the domain factor and therefore each score was mostly due to the general factor, instead of the domain factor.

### **Construct Reliability**

Construct reliability H represented the proportion of variability in the latent construct explained by its indicator items. A high score on the H statistic indicated the construct was well represented by its indicator items. Here, H = .778 for TP, .819 for SP, .478 for CP, and .988 for the general factor. An H statistic should be at least .70 (or higher) in order for the corresponding latent construct to be adequately represented by its indicators. Therefore, with an H of .988, the general factor was nearly perfectly represented by its 34 indicators and the subscale domains of TP and SP were also represented adequately by their respective indicators. Finally, the domain of CP was not specified reliably given its low H value of .478, indicating the CP domain was not reliably measured by its indicators, and that its results could be unstable and thus not be replicable across studies.

### **Dimensionality of Col**

The explained common variance (ECV) statistic for the general factor measured the proportion of the common variance explained by both the general and all domain factors which was attributed to the general factor only, and assessed the relative strength of the general factor among all common factors (i.e., essentially measuring the degree of unidimensionality). Here, the general factor ECV statistic was .775, suggesting 77.5% of the common variance across items was explained by the general factor and the remaining 22.5% was spread across the three domain factors. Because the ECV statistic was lower than .85, the instrument was not adequately unidimensional to justify the use of a one-factor model.

Finally, the ECV statistic for an individual item (i.e., IECV) assessed the proportion of item common variance that was explained by the general factor. The closer an IECV was to 1, the stronger the item measured the general construct. If an IECV was greater than .50, the item reflected the general construct more than a domain construct. Here, the IECV statistics ranged from .417 (item 19) to .996 (item 29). The average IECV was .773 with a standard deviation of .161. Two out of the 34 items had an IECV below .50: .417 for item 19 and .477 for item 20, and they measured the domain construct more than they did the general construct. The other 32 items all had an IECV greater than .50 and therefore measured the general construct more than they did the domain construct. Further, eight items had an IECV above .90, indicating they were very strong measures of the general construct.

## Discussion

The study conducted a construct-validation of the CoI instrument under CFA followed by further evaluation of the optimal model using primarily model-based reliability measures. The bifactor model identified as being optimal provided a fuller representation of the CoI framework modeling the intersection of all three presences as well as the overlap of each pair of presences. Here, two research questions were proposed and addressed and evidence of construct validity for the instrument was identified.

Regarding the first research question on the fit of each model to the data, the study examined the four competing structures based on commonly used model fit indices. The bifactor structure (M4) was unanimously the optimal one as measured by all five model fit statistics; the other three failed on either one (M2) or two (M1 and M3) of the five criteria. Besides, the CFA results identified items 17, 18, 19, and 20 which may be further examined for content redundancy.

Regarding the second research question on the psychometric properties of the optimal model, the study investigated M4 using primarily model-based reliability measures. Various  $\omega$  and  $\omega_H$  statistics provided support for the general factor and demonstrated that the bifactor structure was highly reliable. This finding was echoed by that from various ECV/IECV statistics that showed the general factor played a more important role than did the domain factors in the bifactor model. Finally, the three H statistics for the scale and TP and SP subscales indicated that they were each adequately measured by its indicator items. By contrast, with an H statistic of only .478, the measurement of CP needs more scrutiny.

The finding about CP has both methodological and substantive implications. First, the CP items were probably not measuring cognitive presence effectively. After adjusting for the general factor, the CP factor could hardly continue to exist (Chen et al., 2012). Therefore, the CP items should probably be revised, with the support of subject matter experts, to cover cognitive presence more in-depth. Second, the CP factor scores measuring students' level of cognitive presence should be used carefully. Given high loadings on the general factor but low loadings on the CP factor, it is the general factor scores alone that should be reported (DeMars, 2013) and the domain factor scores could be misleading (Reise et al., 2010; Reise et al., 2007). If policy considerations mandate the reporting of the CP factor scores, users should be reminded that it is the general factor scores that are reliable and meaningful.

The study had limitations which can be grounds for future research. First, the study did not investigate the invariance of the bifactor structure across different groups as specified by common covariates of interest (e.g., gender, course discipline). A future extension could examine if the same bifactor structure continues to hold across those groups (e.g., Dempsey and Zhang, 2019). Second, the study did not test hypotheses on the structural relationships among the common factors of the bifactor model. Another future extension could examine these relationships (e.g., Kozan, 2016). Finally, the study did not assess the predictive validity of the common factors of the bifactor model. Still another future extension may evaluate their predictive validity measured by the associations between the common factors and one or more outside criterion variables such as students' satisfaction with online learning, their academic achievements, and so on (e.g., Rockinson-Szapkiw et al., 2016).

## Conclusion

The study conducted a construct revalidation of the CoI instrument for a more refined understanding of its underlying factor structure. The study identified empirical evidence supporting the bifactor model as the optimal structure for providing a reliable and valid representation of the CoI instrument and a fuller representation of the CoI theoretical framework. Therefore, the study recommended the application of the bifactor model to CoI-related research and practice in online education.

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# Exploring Open and Distance Learning Reform at the National University of Lesotho: A Managerial Perspective

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## Abstract

This study investigated how open and distance learning (ODL) reform was managed within the Institute of Extramural Studies (IEMS), at the National University of Lesotho (NUL). The reform was introduced during the 2017/18 academic year with first-year programmes in three departments: (a) Adult Education; (b) Business and Management Development; and (c) Research, Evaluation, and Media. The study employed interviews and analysis of institutional documents as data collection techniques. Interviews were held with eight programme coordinators, four department heads, and the director of IEMS. Purposive sampling was used to select the participants to the study given their strategic position in the management and implementation of the reform. Qualitative content analysis was used to interpret the data. The findings suggested that the ODL programmes were introduced without a policy and comprehensive plan. The implementation faced several challenges such as finance, as well as infrastructural and human resources. Evidence from the literature has suggested that compared to face-to-face strategy, ODL as an educational strategy requires special resources, support, and funding. Thus, curricular materials should be adapted for the ODL context, taking into account students' characteristics. The study found that these pertinent requirements were not considered, and implementation continued as if the reform still constituted face-to-face or campus-based instruction.

*Keywords:* implementation, learning, open and distance learning, open learning

## Introduction

Worldwide, open and distance learning (ODL) is becoming an established strategy in the field of education (Nyoni, 2014; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2002). Like other institutions across the globe, the National University of Lesotho (NUL) sees ODL as a viable strategy for “opening up opportunities to higher education and developing human resource” (NUL, n.d. p. 10). In its strategic plan of 2015–2020, the NUL sees the significance of ODL strategy for opening up access to the university, leading to higher enrolment in different educational programmes. Opening up access to its programmes would improve cost-effectiveness due to economies of scale.

As a concept, ODL connotes a spatial relationship between a learner and teacher (student and tutor) engaged in a learning enterprise, whereby the two are separated by geographical distance. Cant et al. (2013) defined ODL “as a learning situation where the student is geographically separated from the lecturer” (p. 5673). According to these authors, such an arrangement posed challenges to institutions of learning as they promoted the acquisition of knowledge and skills. These challenges may have originated from the fact that it is not only the physical or geographical space that exists between students and tutors, but psychological and communication gaps as well (Benson & Samarawickrema, 2009; Limtrairut & Marshall, 2020; Stein et al., 2005). ODL tutors have confronted the challenge of closing these gaps to enhance effective learning (Cant et al., 2013; Santally et al., 2012). The NUL sees ODL as opening access to students wherever they are. Adopting UNESCO’s definition of ODL, NUL (n.d., p.6) put it as follows:

the terms open learning and distance education represent approaches that focus on opening access to education and training provision, freeing learners from the constraints of time and place, and offering flexible learning opportunities to individuals and groups of learners.

To effectively implement its ODL strategy, the university developed a policy on open and distance learning in dual mode, in order “to inform and support distance learning programmes at NUL” (NUL, n.d. p.14). Green (1994) acknowledged that there was “no single definition of policy to mirror the full range of ordinary usage” (p. 1). This has led experts in the field to adopt broad perspectives regarding the term policy in order to accommodate different ideas on the concept. Guba (1984) has suggested three different typologies, namely, policy-in-intention, policy-in-action, and policy-in-experience. Tyack and Cuban (1995) as cited by Looney (2001, p. 154) identified three different aspects of policy—“policy talk, policy action, and policy implementation”. From the analysis, it appears that policy-in-intention and policy talk represent policy as documented, expressing official position of an institution. These aspects could be equated with what Brownson et al., (2009, p. 1578) referred to as “small p policies” which constitute organisational guidelines, internal agency decisions, or memoranda. Thus, the ODL policy at NUL constituted the organisational guidelines related to ODL strategy being introduced there. These were therefore, general statements that guided the organisation’s decision making (Smit & Cronje, 1997). Ball (1994; cited by Looney, 2001, p. 154) referred to these as policy text, in that policy is the management tool that guides decision making.

At NUL, the implementation of ODL policy was placed under the Institute of Extra Mural Studies (IEMS). IEMS is an integral part of NUL, founded in 1960 as the extension arm of the university responsible for “bringing the university to the people” (Tlelase, 1986, p. 1). In describing its role, in 1981 the then Vice-Chancellor described IEMS as a “catalytic agent which excites, educates, creates, develops, and moves on

toward innovative ways of helping the people to help themselves” (Setsabi, 1983, p. i).

In the 2017/18 academic year, IEMS started transforming its programmes into ODL mode, starting with first-year courses. These programmes were Diploma in Management, Bachelor of Arts in Business and Entrepreneurship, Diploma in Mass Communication, Diploma in Adult Education, and Bachelor of Education in Adult Education.

This study explored how ODL reform processes have been managed at NUL. The exploration was aligned with the university’s ODL policy and other course or programme development processes. This study was guided by a main research question:

- How have ODL reform processes been managed by the IEMS?

This main question was addressed by examining the following operational questions:

- What policies are in place for the implementation of ODL?
- Who are the key players in the implementation of the ODL programme?
- How do they collaborate in the process?
- What are their intended, perceived, and actual roles in the process?
- What guides decision making in the process?

## Literature Review

### ODL as an Education Strategy

The introduction of ODL fulfils a number of goals. These goals justify the popularity of ODL as a significant strategy in education provision compared to face to face-to-face conventional learning or campus pedagogy. The improvement of access has been identified as the main goal for adopting an ODL strategy (Aluko, 2011; Braimoh, 2003; Makhanya et al., 2013; Nage-Sibande et al., 2011; Yasmin, 2013). Yasmin (2013) observed that the potency of ODL in improving accessibility to education lies in its flexibility, as it provides an opportunity to people who could not attend school as the result of distance, life conditions, as well as financial and academic constraints. Melton (2002, p. 6) elaborated the issue of accessibility in that it “opens up education to students wherever they might be located and increases access to education by removing unnecessary barriers.” Leeds (2013) described openness as a key factor of accessibility. Nyabanyaba (2013) further observed the potential of ODL in improving access to education by vulnerable and marginalised people such as people with special disabilities. Gilliet (2012) also argued that ODL opens up opportunities to education by special groups such as people with disabilities, refugees, and prison inmates.

Melton (2002) identified the second goal of ODL as its responsiveness to student’s needs. Students are free to determine their own goals; responsiveness helps them recognise their potential, thus encouraging

lifelong learning (Melton, 2002). UNESCO (2002) observed that, due to its flexibility, ODL provides students opportunities to combine their work and study, since students can always tailor their learning programme according to their needs. Thus, studying need not interfere with their work as may be the case with face-to-face conventional education.

The third goal of ODL is its flexibility in allowing the design of highly structured self-study materials, incorporating multimedia tools to facilitate learning (Melton, 2002). Online systems or learning platforms have been successfully employed in ODL to further enhance flexibility in delivering educational programmes. Conventional face-to-face tuition requires that students physically attend classes and lectures, while ODL institutions offering instruction through different platforms such as print materials, online, and e-learning platforms allow greater flexibility in terms of time and space (Romero & Usart, 2014). While flexibility may be inherent in ODL tuition, self-regulation and time management techniques by students are crucial (Romero & Usart, 2014). Melton (2002) further observed that effective learner support is enhanced when it accounts for learners' local contexts and conditions. Related to the accessibility factors, an ODL strategy is regarded as highly cost-effective, in terms of optimizing student numbers, due to decentralised student support systems (Melton, 2002). It has been noted that high-quality materials and systems are critically important for the success of ODL.

### **The Need to Manage ODL Strategy**

Despite ODL's plausible goals, Yasmin (2013) contended that improved access to education was not automatic; ODL should be coupled with processes such as teaching, assignment completion, making use of student support services, and taking examinations. ODL has been regarded as an educational innovation intended to address the issues of access to education (Mukama, 2018). As such, it requires change management strategies to ensure that it achieves its goals. Such strategies should recognise the complexity of change and its multiple dimensions (Fullan, 1991; McRoy & Gibbs, 2009). According to McRoy and Gibbs (2009) change required strong leadership able to

communicate the desired vision, model the roles that will lead to effective implementation, and possess the managerial skills to deal with aspects of change such as barriers and fear, as well as being endowed with the ability to recognize and engage with informal power agents who may resist the change process. (p. 687)

McRoy and Gibbs (2009) further acknowledged the difficulty of undertaking changes within university contexts, as such changes are normally undertaken under the pressure of budgets and unclear objectives. However, it has been observed that changes guided by policy frameworks have been effectively implemented (Ghavifekr et al., 2013; Mischke, 2010). According to Ghavifekr et al. (2013), the role of leaders in change management was easier when changes were vision- and policy-driven, as they enhanced organizational performance and promoted successful implementation of the change.

While the benefits of ODL are acknowledged worldwide, it is generally observed that institutions "are still failing to recognise particular key planning and implementing steps which could make the difference in successful and sustainable distance education initiatives" (Minnaar, 2013, p. 82). Minnaar's (2013) research, using template analysis, provided insight on successful implementation of ODL, which may be

instructive to the Lesotho context. From the analysis of a database on ODL literature, Minnaar (2013) provided a framework that can assist in understanding the management and implementation process of ODL. The following are the key points in this framework.

- Strategy for ODL planning and implementation must be mandated by the government.
- A move towards ODL means redefining the institution as a whole; comprehensive planning is essential. Such planning involves a SWOT analysis, gap analysis, and functional analysis to establish the feasibility and criteria for planning. Different aspects need to be considered, including hardware, software, distance delivery technologies, technical staff, and academic support for staff (Knipe et al., 2002; Levy, 2003).
- Basic requirements include instructional development support staff, administrative support, student services, financial plans, costing, as well as staff development and training (Brammoh & Lekoko, 2005, cited by Minnaar, 2013, p.89).
- Enabling policies should be in place to provide the framework for decision making and operations, and to enhance the quality of programmes. These policies include board, collaborations, course offerings, curricula, support, staff training, conflict management, profit sharing, as well as control of resources and certification (Brammoh & Lekoko, 2005, cited by Minnaar, 2013, p.89).
- An ODL institution needs human resource policies on compensation, evaluation and course evaluation, promotion, performance management, and intellectual freedom.
- Different policies are required to address staff support, staff development/training, skills training, course/programme support, local facilities, and leave aspects (Gellman-Danley & Fetzner, 1998; Simonson & Bauck, 2003, cited by Minnaar, 2013, p.89).
- Legal policies should be included to guide staff on aspects such as intellectual property, plagiarism, liability, educational technology, and labour relations.
- ODL institutions need student policies to regulate aspects such as registration, resources, training and tutoring, assessment, and student support services. Technical policies, including ICT issues, Internet, and contractual agreements, are crucial for the smooth running of ODL. ODL also needs fiscal policies on some student issues as well as state funding and contracts.

## Methodology

The study was exploratory, intended to gain insight into how ODL programmes were implemented or managed by IEMS. A number of reforms have been undertaken by the NUL but no studies have been undertaken to investigate the implementation processes of such reforms. This study provides an opportunity to gain insight on how reforms are managed by the NUL. Therefore, the current study was the first to address the management processes of ODL implementation by the university.



Purposive sampling was used to select the participants to the study given their strategic position in managing and implementing the reform. Qualitative content analysis was used to interpret the data.

Purposive sampling was appropriate because of the limited number of primary data sources available to contribute to the study. Specifics of the purposive sample were linked to the nature of participants' strategic positions in implementing the ODL strategy. Face-to-face interviews were held with eight programme coordinators, four department heads, and the director of IEMS. Programme coordinators were directly involved in ODL implementation, while the Director of IEMS, as head of the institution, was responsible for leadership direction of the ODL policy and implementation process. The interviews were open, guided by the research questions. Each interview was recorded and later transcribed. Qualitative content analysis was used to interpret and analyse data.

In addition, institutional documents related to NUL's ODL policy were analysed using a content analysis technique and triangulated with interview data.

## Findings

The operational research questions were used to organise and present the findings of the study.

### Policy Framework

This section answers the operational research question: *What policies are in place for the implementation of ODL?* Data related to this question came from interviews and document analysis. It was observed that the ODL policy was developed mainly to guide the processes of implementing ODL. The policy, titled *Policy for Open and Distance Learning in Dual Mode* stated that it will "provide guidelines for the development of the ODL systems and structures based on the principles of flexibility, accessibility and student-centeredness" (NUL, n.d., p. 14). The policy further stated that "its purpose is to guide decision and actions taken by administrators, academics, researchers, management, support and professional staff in providing services and support for ODL learners" (NUL n.d. p.15). However, interviewees indicated that they never consulted the ODL policy during implementation. For instance, one participant, a programme coordinator, stated that "I am not aware that the policy is in place and that we were expected to adhere to it." However, the director was aware that the policy was a guiding tool towards ODL implementation. It was further observed that the policy was approved after the processes of implementing ODL had started. Though couched in general terms, the policy indicated the basic processes to be followed in implementing ODL. A key section of the policy provided for the systems that had to be in place for effective ODL implementation, including (a) academic systems, (b) teaching and learning processes, (c) delivery channels, (d) information and communication technologies, (e) learner support systems, and (f) administrative systems. According to comments by participants in the study, the requirements prescribed by the policy were not adhered to for example, no special investment was made in information and communication technologies to support ODL. In addition, even though ODL requires more support to students to mediate transactional distance, there were no learning support systems in place.

Some of the critical success factors in ODL implementation including legal policies (Minnaar, 2013) and

human resource policies (Gellman-Danley & Fetzner, 1998; Simonson & Bauck, 2003; as cited by Minnaar, 2013) were neither covered by the ODL policy nor considered during implementation. The policy did not specifically address human resource issues, legal issues, technical issues, and others. It emerged from interviews that the part-time staff appointed for ODL streams had reduced contact periods, and subsequently, their remunerations were reduced. Despite relentless complaints from staff members, this was not addressed, to the extent that each department used its own discretion. It further emerged that ODL students were still subjected to the same assessment policy as those studying face-to-face. For instance, students were required to repeat the whole year if they had not passed the minimum credit hours and, in some cases, some were discontinued from the programmes.

### **Key Stakeholders in ODL**

To understand the management processes inherent in ODL implementation, it was important to identify and collect data about the key stakeholders. Data was collected from documents and interviews, and was guided by the operational question: *Who are the key players in the implementation of the ODL programme?* It has been observed that the policy for ODL was developed mainly to guide the processes of implementing ODL and identified the stakeholders to be involved in the implementation. These stakeholders were the University Council, Senate and executive management, Director of IEMS, Pro-Vice-Chancellor, Institute registrar, learners, programme coordinators, ODL coordinator, academic staff, online and face-to-face tutors, markers, material designer/developer, and counsellors.

Programme coordinators who were members of an ODL steering committee provided information on the role and membership of the committee. It emerged from the interviews that most interviewees were not familiar with the policy document. However, the director's responses reflected the content of the policy document. This might be the fact that the director requested to be given time to study the policy. It emerged from the interviews that the interviewees did not know the policy document.

### **Collaboration Among Stakeholders**

Effective collaboration is very important for the successful implementation of an innovation. It was, therefore, important to establish whether there was any collaboration among stakeholders. Data collection was guided by the third operational research question: *How do they (stakeholders) collaborate in the processes?*

From the interviews, it emerged that IEMS established the ODL steering committee consisting of programme coordinators. For the first two years (2017/18 to 2018/19) the steering committee was chaired by the director of IEMS. Subsequently, an ODL coordinator was appointed at the start of the 2019/20 academic year.

Participants, with the exception of the director, did not respond beyond the operational activities of the ODL steering committee, and it was evident that they were not familiar with the ODL policy. Analysis of the ODL policy document revealed that it recognised the importance of collaboration among various stakeholders. Further, the policy identified overall institutional roles and also roles at different managerial levels, in addition to specific structures. The role of the NUL as an institution was well-articulated in the ODL policy, as was the role of IEMS as an institution within NUL. The ODL policy made IEMS the custodian

of ODL initiatives at NUL, tasked with overall management, coordination, and support of ODL implementation.

Key personnel identified by the ODL policy included the distance learning coordinator as well as online and face-to-face tutors. The ODL policy clearly articulated the roles of these personnel. It also identified different operational levels important to successful policy implementation. First, the policy identified institutional accountability which rested with the NUL. Second, it identified faculty-level accountability which related to different faculties of the university. Third, it identified departmental-level accountability which pointed to the programmes and courses offered through ODL. Fourth, it identified academic-level accountability which related to the design and development of materials, as well as the appointments of the relevant staff and their development. Fifth, it identified administrative-level accountability which was mainly concerned with support to both academics and learners by administrative staff members. Lastly, it addressed learner-level accountability which mainly outlined the roles and responsibilities of learners within the ODL system. Thus, the policy outlined the roles and responsibilities of each structure, which indicated how collaboration may be achieved.

### **Roles of Stakeholders**

In order to examine different stakeholders' roles, it was necessary to establish whether stakeholders understood their intended and actual roles. Perceived roles indicated how stakeholders translated their intended roles, as established by the policymakers. Actual roles are the enactment of the perceived and represent the actual implementation. The level of implementation was thus indicated by gaps or congruency among intended, perceived, and actual roles. Data collection was guided by the operational research question: *What are their intended, perceived, and actual roles in the processes?*

The policy outlined the intended roles of the university as an institution, IEMS as a part of the university, the faculties, the departments, specific officers (e.g., director), tutors and coordinators, and learners. The perceived roles of all stakeholders were determined from the interview data; however, only the ODL steering committee roles were referred to. Respondents did not identify the perceived roles of other stakeholders. From the interviews, the actual roles of the steering committee were identified as timetable preparation for ODL contacts classes and coordinating different departments. Since the interviewees were not conversant with the ODL policy, it was particularly challenging to establish gaps or congruence among different roles. This was further complicated by the fact that there was no comprehensive plan to implement ODL. From the interviews, it became clear that the ODL implementation process was not supported by any budget.

### **The Basis for Decision Making**

Knowledge of what factors informed decision making in the process of ODL implementation indicates whether the implementation went according to the plan or policy as intended. Data on the bases for decision making was solicited through the final operational research question: *What guides decision making in the processes?*

From analysis of the policy document, it was clear that the policy itself was to be a guiding tool for decision making processes on ODL implementation. For instance, the policy stated that it will "provide guidelines for the development of the ODL systems and structures based on the principles of flexibility, accessibility

and student-centeredness” (NUL n.d., p. 14). The policy further stated that its purpose was to guide decision and actions taken by administrators, academics, researchers, management, support and professional staff in providing services and support for ODL learners (NUL n.d., p. 15).

However, from the interviews, the ODL policy as the basis for decision making was only mentioned by the director. It was understandable given that he had been given an opportunity to study the policy before responding to the questions. The director mentioned the importance of NUL’s Senate and management, NUL statutes and ordinances, and dialogue in the decision-making process. Generally, the interviewees showed a little understanding of the importance of policy in guiding implementation.

## Conclusions and Recommendations

This study’s main research question was: *How have ODL reform processes been managed by IEMS?* This required an understanding of management processes.

Participants rarely referred to the existing policy, which was supposed to be used as the basis of planning implementation of ODL. It would appear that the level of engagement was at the low level of management, namely the ODL steering committee, while top and middle management were not visible. From an organisational perspective, the situation of loose coupling manifested itself.

One would argue that the policy document might not have served any purpose other than reflecting the visionary position of the university towards adopting the worldwide recognised strategy of ODL. The policy itself provided the basic or essential elements necessary for the effective implementation of ODL strategy. Significantly, key strategies emerging from the literature do not appear to have been considered in the process of implementation as well as in policy formulation. This may be indicative of a lack of effective management of the reform and may eventually lead to the unsuccessful implementation of the project.

Based on our findings, it may be strategically significant to re-energise collaboration from all levels of university leadership through an action-oriented plan. In particular, such a plan should address all the shortcoming which have been observed. This requires four key actions.

First, the university administration, specifically the principal officers such as the Vice-Chancellor, the Pro-Vice-Chancellor, deans of faculties, and other senior personnel within the university administration must be engaged. This should be done to ensure maximum cooperation among the authorities. Second, all necessary enabling policies such as staffing and human resources, budgeting, ICT and e-learning policy, marketing and other pertinent policies need to be put in place. Third, since effective implementation is content-specific, it is important to understand the unique characteristics and constraints of open and distance education within the Lesotho context. Finally, stakeholders, specifically the ODL coordinator and other programme coordinators, should familiarise themselves with the ODL policy.

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# “I Don’t Know if I Can Handle It All”: Students’ Affect During Remote Education in the COVID-19 Pandemic in Brazil

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## Abstract

The COVID-19 pandemic has impacted society in different areas. In education, several reports show the deleterious effects of the disease on the physical and mental health of students, family members, and teachers around the world. Also, in Brazil, affect studies indicate the prevalence of anxiety, stress, and depression among students. The present research, of a qualitative nature, explores what it means, under the lens of affect and from the student’s perspective, to experience remote education during the COVID-19 pandemic. An online questionnaire of 41 closed- and open-ended questions was given to 363 students from a public school in southeastern Brazil. This article analyzes the affective fields that emerged from the discursive textual analysis of the students’ responses ( $n = 100$ ). Four affective fields were categorized: friends, classes, home, and teachers; intersecting emotions, attitudes, values, beliefs, and motivation. In general, students expressed more negative than positive affect but a positive disposition toward face-to-face classes. Boys focused their affect more on classes, while girls on teachers. The affective fields allow us to consider the friends–home–teachers tripod as fundamental to overcoming the phenomenon of affective fatigue that has been identified.

*Keywords:* affective field, affective fatigue, discursive textual analysis, face-to-face class



## Introduction

In January 2020, about a month after the emergence of pneumonia cases without a defined cause in Wuhan, China, a team from the National Health Commission of that country identified the genome of beta coronavirus (2019-nCoVs) in the group of patients (Tan et al., 2020). The World Health Organization (WHO, 2020a) then named the disease COVID-19, severe acute respiratory syndrome caused by coronavirus 2 infection, or SARS-CoV-2. Then, when the virus spread to reach 114 countries, with 118,000 cases and more than 4,000 deaths, in March 2020, the WHO (2020b) declared the disease a pandemic. COVID-19's impacts have been felt in different ways around the world. The biggest one, arguably, is the loss of life; according to the WHO (2021) on May 25, 2021, in its weekly epidemiological update, 3,449,189 people died from the disease; 451,424 of those were in Brazil.

COVID-19 in Brazil is a multidimensional problem, as it permeates aspects that are sometimes neglected, such as the burden of the disease in the prison population (Crispim et al., 2021); care for pregnant women and puerperal women (Souza & Amorim, 2021); and the increased risk of domestic violence against children, adolescents, and women (Marques et al., 2020). The pandemic accentuates structural social inequality (Boschetti & Behring, 2021), causes job insecurity (Souza, 2021), increases the specific risk of economic activity (Salles, 2021), and consequently precipitates the fear that the country will return to the famine map (Bernardes et al., 2021).

In these interconnected dimensions, education is a whole chapter. The suspension of face-to-face classes made the possibility of making the educational process an intrinsic factor of the perceived educational inequalities explicit, given the conditions of the offer, access, and performance of educational activities. Thus, in a country that already faces rising unemployment in a semi-paralyzed government (Malta Campos & Vieira, 2021), the crisis in Brazilian education policies is being consolidated by the union of two processes: an intentional precariousness of education (Costa et al., 2021) and the conjunctural aspect brought about by the pandemic. Fundamentally, the result of this sum amplifies a crisis that is political, economic, social, and sanitary (Saviani, 2020).

This article emerges from discussions held at the meetings of the Research Group on Public Policies in Education of the master's program in teaching practices at the Metropolitan University of Santos (UNIMES) on the impacts of COVID-19 on school communities, which started the trajectory of activities in emergency remote education (ERE) (Hodges et al., 2020).

## COVID-19 Impacts on Student Affect

It is necessary to understand the different consequences of COVID-19 for children and adolescents, with particular attention paid to the aspects that involve education, as one of the significant changes in students' routine has been the abrupt transition to ERE. Larsen et al. (2021), with research data with 442 Norwegian students, points out that the majority (78%) missed their friends and were concerned about the possibility of becoming infected and infecting others with the virus. They report that students felt lonelier and had difficulty concentrating. Tang et al. (2021) describe a study with 4,391 students from Shanghai, China: a quarter of the students had anxiety symptoms, about 20% had depression, and more than 650 students had symptoms of stress. As in the Norwegian study, students who perceived the isolation situation as more positive had less psychological distress and were more satisfied with life. Loades et al. (2020) reviewed 63 studies from countries on all continents to analyze the impact of

loneliness on children and adolescents isolated because of COVID-19. With information from 51,576 students, they found a relationship between loneliness and mental health problems, pointing out, as a predictor of related future problems, the length of time that students experienced loneliness.

Psycho-emotional impacts on students in Brazil have also been investigated. In 977 higher education students, Vieira et al. (2020) identified changes in mood, less satisfaction with life, and the emergence of anxiety and distress. Enes and Bicalho (2021) observed discouragement and concern with income, in addition to complaints about homesickness for face-to-face meetings. Marin et al. (2021) analyzed 14 studies on psychosocial aspects, concluding that the pandemic led to increased depression rates. Esteves et al. (2021) researched the prevalence of moderate to severe symptoms of stress, depression, and anxiety in 208 students.

Research on basic education in Brazil shows similar results. Santos and Mendonça (2021) report that students expressed not feeling motivated for classes, feeling the absence of friends and the "coziness of the classroom" (p. 124). Dutra et al. (2020) and Zimer et al. (2020) identify students' feelings of lack of colleagues. Students most declared frustration, sadness, and fear in Reis et al.'s study (2020). With data from approximately 11,000 students, the Conselho Nacional de Juventude survey (2020) shows that almost half of those students affirmed that the emotional aspects of the pandemic had hindered their studies. According to the research, anxiety, boredom, and impatience are the most common negative feelings, while feeling welcomed comes in as the most positive one.

## Affect

Affect is an internal system of representation (Goldin & Kaput, 1996). Representations are highly structured personal or cultural systems that can be understood as symbolic schemes or representational acts. The internal representations are unobservable and need to be inferred and refer to the mental configurations of the individuals. Therefore, affect is a specific representation system and companion of other elements, such as imagery, verbal/syntactic, planning, and executive control. According to DeBellis and Goldin (2006), the interaction between these systems communicates meanings to the subject, and through externalizations, their configurations can communicate meanings to others.

From Radford's (2015) point of view, in a socio-historical reading and of physiological non-reductionism, affect is understood "beyond physio-psychological responses, evaluations, and judgments dimensioned by moral aspects of a specific context—as culturally established, historically influenced, and delimited element that makes up an internal system of representations intrinsically and inextricably linked to cognition" (Comelli, 2020, p. 43).

Together with the presented perspectives, Schindler and Bakker's (2020) holistic position was adopted to deal with affect. It breaks away from the isolated interpretation of affective constructs, seeing them in an interrelated way. This entails considering affect as an *affective field*, as a fluid phenomenon in which the various dimensions are related internally (e.g., emotions to each other) and externally (as beliefs connecting with values). With a similar approach, Comelli (2020) suggests that affect also be analyzed from a multi-affect perspective. Considering the lack of standard definitions for affective constructs (Hannula, 2019; Hart, 1989), mediated by Schindler and Bakker (2020), as well as the authors they use as a reference, this research will consider the following definitions:

Emotions are feelings such as happiness, fear, or anger in a particular situation that are temporary and unstable ... ; Attitudes are stabilized affective responses within certain situations

or rather a psychological tendency towards an object or entity ... ; Beliefs are students' views of some aspect of the world ... beliefs about problem solving; Self-efficacy is a student's own assessment/judgment of her capabilities to execute specific behaviors in specific situations ... ; Interest is a preferred engagement of a person (student) with a certain entity, which can be more or less situational or enduring ... ; Motivation is the ensemble of reasons and influences why students engage in any pursuit ... ; Value is the appreciation or perceived importance of objects, contents, and actions. (Schindler & Bakker, p. 307)

## Methodology

The research seeks to understand aspects of the impact of the COVID-19 pandemic on teaching and learning in basic education, emphasizing issues involving information and communication technologies. Among other aspects, it aims to understand how students and teachers manage their educational tasks, assess their difficulties, perceive the technical problems faced, and view and express their affect during the pandemic period.

The data focuses on the dimensions of students' affect from an urban Brazilian public school in the municipality of Santos, state of São Paulo. It corresponds to a section of a more extensive and ongoing investigation named Perceptions of Students and Teachers About Remote Education in the Pandemic (PERSONAE).

Conducted by the Research Group on Public Policies in Education of the master's program in teaching practices at the Metropolitan University of Santos, PERSONAE focuses on subjects from a metropolitan region with a total population of 1,881,706 inhabitants, where, on average, 97.6% of students aged 6 to 14 are enrolled in school, and an average gross domestic product (GDP) per capita of approximately US\$6,000.00 per year (Instituto Brasileiro de Geografia e Estatística, 2021).

The work stages carried out at PERSONAE followed a perspective of collaborative research—interaction between the components of the research group plus the sharing of meanings, information, skills, resources, and objectives for completing the agreed-upon tasks (Bukvova, 2010; Sonnenwald, 2007). Online discussion meetings were held by videoconference, with Google tools used for the production and collective analysis of materials and data.

Of a qualitative nature (Ritchie et al., 2013), this research subscribes as a *paradigm* concept, the “set of basic beliefs (or metaphysics) that deals with ultimates or first principles” (Guba & Lincoln, 1994, p. 107). Although there are crossings between paradigms, the philosophy adopted is a constructivist one: it is (a) ontologically relativist, being it that reality is taken as a social, experiential, and contextual construction of researchers and participants; (b) epistemologically subjectivist, because of the interaction between researchers, research, researched, and phenomenon, the reality is established as a human creation; and (c) methodologically interpretive (hermeneutics/dialectic), as it seeks to explore a phenomenon from the position of interpreters of the data and the meanings attributed to the information (Creswell, 2007; Guba & Lincoln, 1994). Of phenomenological inspiration, we consider Zahavi's (2019) position, which assures that “at its core, phenomenology is a philosophical endeavor. Its task is not to contribute to or augment the scope of our empirical knowledge, but rather to step back and investigate the nature and basis of this knowledge” (p. 259). Thus, the research adheres to the criticism of scientism, recognizing the subjects as embodied beings and inserted in society, history,

culture, and nature. It is about assuming intersubjectivity, that "there are aspects of myself and aspects of the world that only become available and accessible through the other" (Zahavi, 2018, p. 67).

Given the strands, the paradigm, and the approach presented, we seek to answer the following question: What does it mean, under the lens of affections and from the student's perspective, to experience remote education during the COVID-19 pandemic?

## Participants

The participants in this study come from an urban public school in Santos, located in São Paulo, Brazil. According to information obtained at the school, 363 students—175 girls (48.2%) and 188 boys (51.8%) between 11 and 17 years of age—were part of the institution. The data production was carried out employing a voluntary sample, in a non-probabilistic sample, carried out for convenience (one of the researchers taught at the participating institution). Data were obtained from 100 students. Differences are observed in the representativeness of the respondent students to the reality of the participating institution: girls make up about 48% of the school's students but represented 57% of the participants (see Table 1).

**Table 1**

*Sample Description—Age and Gender Identity by Grade*

Grade	Gender identity	Sample ( <i>n</i> = 100)				School ( <i>N</i> = 363)	
		Age		<i>n</i>	%	<i>n</i>	%
		<i>M</i>	<i>SD</i>				
6	Girl	11.72	0.81	19	63.3	49	46.7
	Boy	11.91	0.83	11	36.7	56	53.3
	Subtotal	11.80	0.81	30	30.0	105	28.9
7	Girl	12.60	0.63	15	48.4	41	39.0
	Boy	12.87	0.74	15	48.4	64	61.0
	Not declared	13.00	-	1	3.2	-	-
	Subtotal	12.74	0.68	31	31.0	105	28.9
8	Girl	13.56	0.53	9	47.4	36	52.9
	Boy	13.50	0.53	10	52.6	32	47.1
	Subtotal	13.53	0.51	19	19.0	68	18.7
9	Girl	14.71	0.47	14	70.0	49	57.6
	Boy	14.67	0.52	6	30.0	36	42.4
	Subtotal	14.70	0.47	20	20.0	85	23.4
All	Girl	12.98	1.33	57	57.0	175	48.2
	Boy	13.02	1.12	42	42.0	188	51.8
	Not declared	13.00	-	1	1.0	-	-
	Total	13.00	1.23	100	100.0	363	0

Considering the subtotal percentages of students per grade, the research is close to portraying the distribution of the number of students in the school. For example, 19% of students from the sample are

in eighth grade; they represent 18.7% of students at the school. The table shows the average age ( $M$ ) and its standard deviation ( $SD$ ) by grade, by gender within the grade, and the sample as a whole (All). The ages of the participating boys and girls (in addition to the subjects who did not want to declare their gender identity) range from 11 to 15 years old ( $M = 13.0$  years,  $SD = 1.23$ ).

## Research Instrument

A questionnaire was produced on Google Forms with 41 open- and closed-ended questions, divided into four sections: first, sociodemographic characteristics: age, gender identification, and grade; second and third, resources and conditions for teaching and learning in homes and school, before and during the pandemic; and fourth, the affective field.

## Procedures

After approval from the school management team, data collection was carried out between December 3 and December 17, 2020. Structured in a Google Form, the questionnaire was posted as an invitation in the Google Classroom of the 11 student rooms. The form contained the description, objectives, and destination of the data and results. Participants voluntarily and anonymously completed the form. A code is assigned to each respondent, as configured: individual number (1 to 100), gender (M for male and F for female), age (11 to 15), and grade (from 6 for the sixth grade to 9 for the ninth grade).

## Data Analysis

Demographic variables were categorized by gender identity, age, and grade. The closed questions referring to structural aspects of the school and pedagogical teaching were tabulated, and for demographic data, descriptive statistics were performed. The answers to the open questions analyzed in this article were edited without changing the general meaning or structure of the texts (access at: <https://drive.google.com/file/d/1vpIr3mBMK425ue43H6DqVaxHyeTCLeGI/view?usp=sharing>).

Affect was identified according to the constructs of the theoretical framework and tabulated—initially and for didactic purposes—according to an arbitrary gradient of affective intensity: positive, negative, neutral, and intersecting affect. For text analysis, discursive textual analysis (DTA) was adopted. Based on the rigor and in-depth reading of the texts produced, DTA allows the analysis and synthesis of textual materials “to describe and interpret them in order to achieve a more complex understanding of the phenomena and discourses from which they were produced” (Moraes & Galiazzi, 2007, p. 114). This technique is a qualitative and self-organized process. Understanding of textual productions that express the participants' comments was based on three components: deconstruction of texts in units of analysis (unitarization); creation of a relationship between the units, forming sets of categories (categorization); and production of the explanatory text of what was understood about the phenomenon from the previous components (meta-text).

## Results and Discussion

Students were asked to express the affect that came to mind when reflecting on the period of remote education in the pandemic. Through their words, decoded by different affective expressions, it was possible to voice those going through this ordeal. The following excerpt summarizes internal conflicts, questions of self-esteem, self-concept, and doubts about human resilience based on the voice of a student:

When I think that there is no certainty about the moment we are experiencing, I feel terrible; there is a lump in the throat and an immense desire to cry. ... I do my best every day, but I still feel like a bad student. *I don't know if I can handle it all* [emphasis added]. (50F14-8)

Not recognizing one's own ability to resist is part of the picture of several negative feelings identified among students. Table 2 shows the relative frequency of identified expressions according to an arbitrary positive–negative gradient in general distribution. As each student represents an answer, when a student answered, "I feel kind of left and sad because of this difficult phase" (9M13-8), we counted this expression as negative affect.

**Table 2**

*Distribution of Affect in the Positive–Negative Gradient Among Girls and Boys*

Position on the gradient	Girls (n = 57)			Boys (n = 42)			Not declared (n = 1)			Total (N = 100)	
	n	% gender	% sample	n	% gender	% sample	n	% gender	% sample	n	%
Negative	39	68.4	39.0	25	59.5	25.0	-	-	-	64	64.0
Positive	7	12.3	7.0	8	19.1	8.0	-	-	-	15	15.0
Intersected	6	10.5	6.0	5	11.9	5.0	-	-	-	11	11.0
Neutral	1	1.8	1.0	2	4.8	2.0	-	-	-	3	3.0
Do not know/not manifested	4	7.02	4.0	2	4.8	2.0	1	100.0	1.0	7	7.0

Among both girls (68.4%) and boys (59.5%), negative affect, such as feeling sad or afraid, was considerably more present. In general, in 64% of the responses, there was an expression of negative affect, which corresponds to a little more than four times the number of positive responses. Although they have a small representation in the answers, the neutral statements (3%) stand out. Those who either did not speak up or said that they did not know made up 10% of the data. How is it possible to ignore the importance of the statement, "It is a wave of feelings that cannot be explained" (70F14-9)? Far from not meaning anything, the words of this female student can represent affective confusion; this incapacitates her to both understand and express herself clearly. When projecting her ideas, the student seemed to be saying that there was something powerful happening inside of her during this pandemic, and she was having difficulties understanding what it is. This expression, which can be difficulty in dealing with emotions and feelings as well as the very shame in expressing oneself, can also be found in the records—"I prefer not to speak" (36F11-6) and "I can't think of anything now" (44F13-6)—of some other students.

Table 3 shows the frequencies of the eight main terms/words that directly express affect-cognitive elements (the student who did not express their gender identity was excluded from this analysis because they did not express themselves through a sentence/text). Sadness-related data were the most present (18.2%), followed by confusion (12.1%), fear (9.1%), and happiness (9.1%). These data are consistent with those present in Table 2.

**Table 3**

*Distribution of Affect-Cognitive Terms Among Girls and Boys*

Terms	Girls (n = 57)			Boys (n = 42)			Total (N = 99)	
	n	% gender	% sample	n	% gender	% sample	n	%
Sadness	10	17.5	10.1	8	19.0	8.1	18	18.2
Confusion	8	14.0	8.1	4	9.5	4.0	12	12.1
Fear	7	12.3	7.1	2	4.8	2.0	9	9.1
Happiness	4	7.0	4.0	5	11.9	5.1	9	9.1
Anger	4	7.0	4.0	4	9.5	4.0	8	8.1
Terror/horrible	5	8.8	5.1	-	-	-	5	5.1
Anxiety	3	5.3	3.0	1	2.4	1.0	4	4.0
Discouragement	3	5.3	3.0	-	-	-	3	3.0

Fear (12.3%) and feeling horrible (8.8%) had a more significant weight among girls. Boys did not express feeling lousy and discouraged. On the other hand, happiness was the second most cited item among boys (11.9%), while for girls, this position is occupied by confusion (14.0%). Although it is not a matter of saying that girls were able to reflect better on their affect, the data show that they wrote longer texts, in addition to using more direct terms and expressing more affective elements. Girls used, on average, 15.6 words to present their ideas (average of 72.2 characters), while boys positioned themselves using, on average, 10.3 words (average of 50.7 characters). Although they have the same cognitive and potential resources for composing texts, girls have been considered better at spelling (recovery and production of letters), composition (production of words to express ideas), and organization (translation of ideas) than boys (De Smedt et al., 2018).

### Affective Fields

Response excerpts (units of analysis) were grouped into four categories or affective fields. Table 4 shows the total number of units of analysis (TUA) produced in total (N = 44) and considering girls (n = 28, 63.6%) and boys (n = 16, 36.4%) in relation to the categories.

**Table 4**

*Distribution of Units of Analysis by Category and Among Girls and Boys*

Category	Girls			n	Boys		TUA	
	n	% gender	% TUA		% gender	% TUA	n	%
Friends	7	25.0	15.9	3	18.8	6.8	10	22.7
Classes	7	25.0	15.9	9	56.3	20.5	16	36.4
Home	6	21.4	13.6	2	12.5	4.5	8	18.2
Teachers	8	28.6	18.2	2	12.5	4.5	10	22.7
Total	28	100.0	63.6	16	100.0	36.4	44	100.0

Note. TUA = total units of analysis.

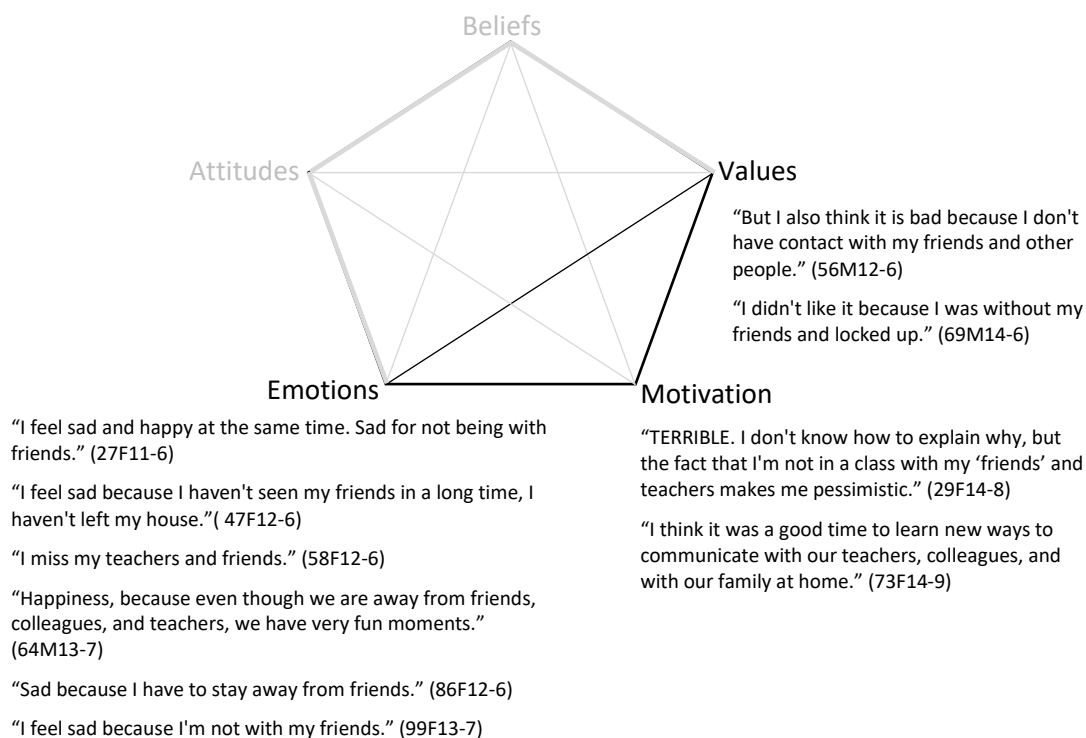
Although they correspond to 57.0% of the participants, the girls weighed in proportionally more in the analysis, probably because they expressed themselves in slightly more detailed texts. Girls, in general, seemed not to express their affect in a more direct way to a category. The difference between the number of units of analysis coming from the girls' statements in each category is small. Comparatively, they seem to have been more inclined to talk about their teachers than about home. On the other hand, boys directed their expressions of affect to classes; 56.3% of the categorized units were directed to this theme.

### Students' Affective Field Concerning Friends

When expressing their ideas and directing them to friends, students mainly brought up emotions, motivations, and values (Figure 1). Students expressed the importance and value of friends as a factor of support for getting through the pandemic period. The regulation of affect, in particular, emotions and motivations, has an essential foundation in this element. Friends are needed during COVID-19 (Larsen et al., 2021). They are both the benchmark for students affirming their sadness ("not being with friends" [27F11-6]) and for saying that, despite being distant from those they appreciate, they have had "very fun moments" (64M13-7).

Figure 1

Representation of Students' Affective Field Concerning Friends



On the other hand, the emotionally positive moments students experienced may have allowed them to be inclined to consider that "it was a good time to learn new ways to communicate" (73F14-9), even though all the nostalgia gave them reasons to feel "TERRIBLE" (29F14-8). The absence of contact with their closest relations points to *affective fatigue* during the period—sadness was an emotion identified in many responses (Table 3). Friends help students socialize emotions and develop affective repertoires, thus allowing positive thoughts and feelings to be internalized if there is adequate support (Klimes-



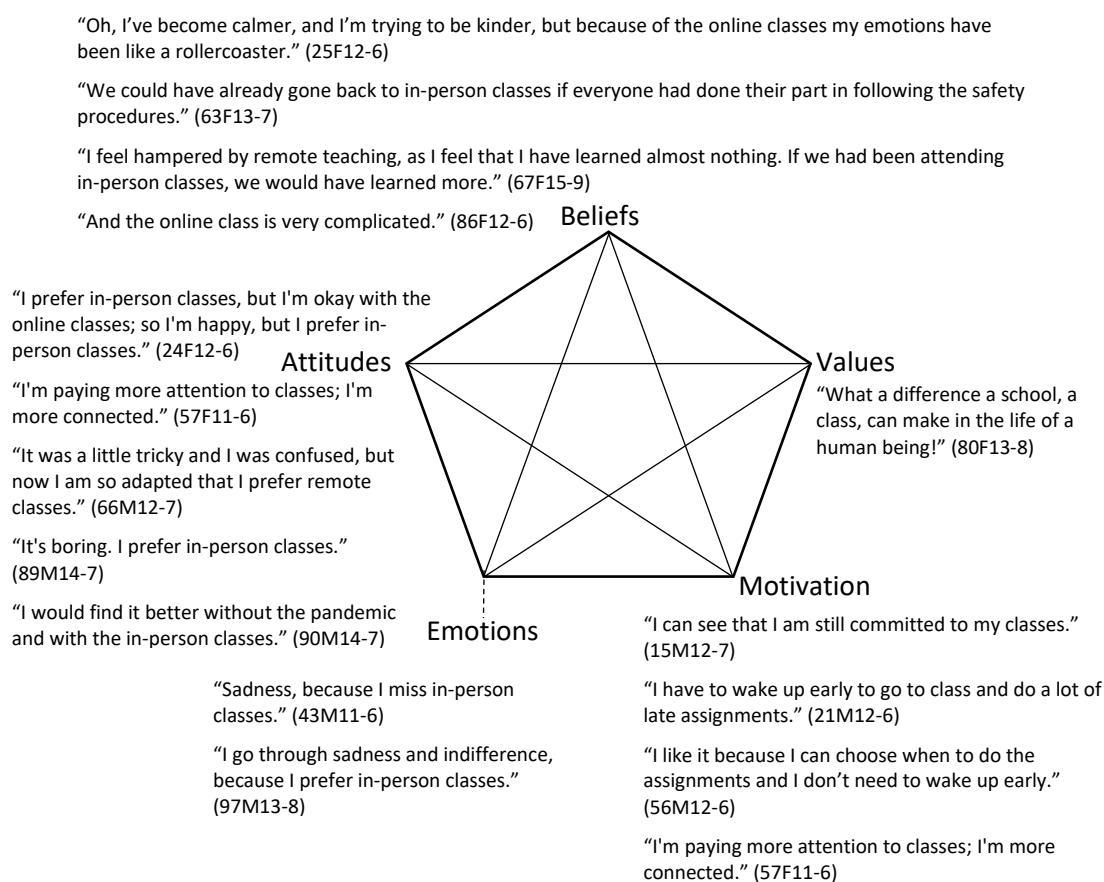
Dougan et al., 2014). Failure to exercise these possibilities is a negative factor brought on by the pandemic.

### **Students' Affective Field Concerning Classes**

Most units of analysis are categorized in the affective field of the classes. Furthermore, this shows a full field of affect (Figure 2).

**Figure 2**

#### *Representation of Students' Affective Field Concerning Classes*



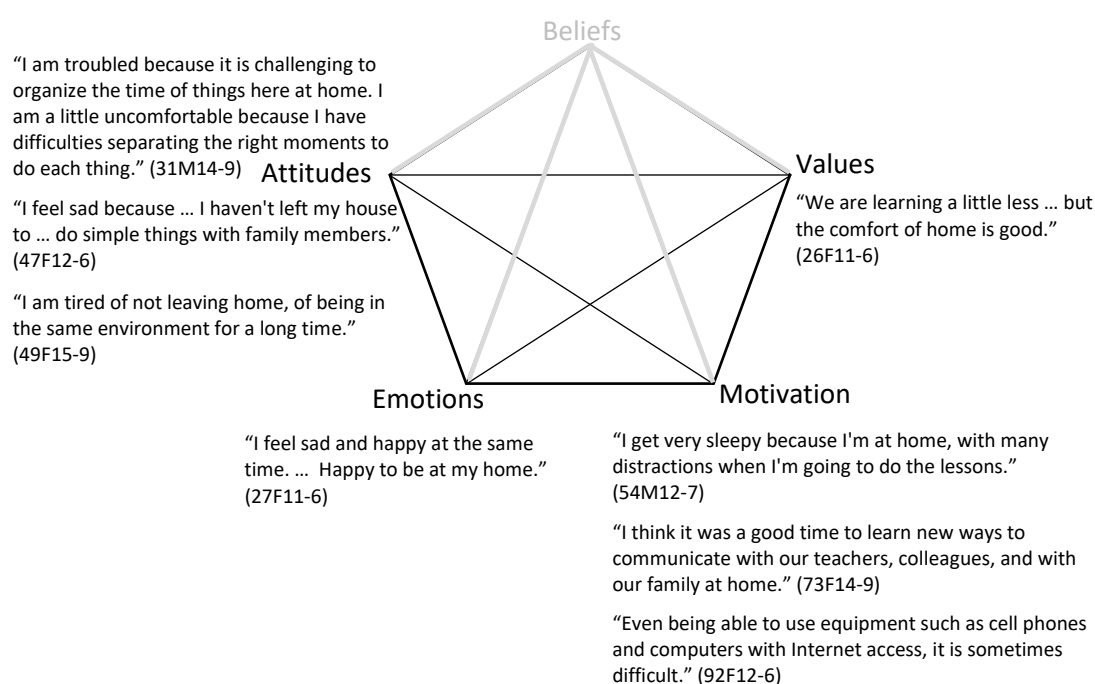
Face-to-face classes represent a guide to behavior, something desired and essential, as it is so central that it is seen as something that "is missing in the life of a human being" (80F13-8). Students consider remote classes as a more complicated or even harmful activity, based on the belief that almost nothing has been learned: "And if we had been attending in-person classes, we would have learned more" (67F15-9). Students believed remote classes had an influence on their affect: "Because of the online classes, my emotions have been like a rollercoaster" (25F12-6). They also realized that a behavioral response to the new situation is needed: "I'm more connected" (57F11-6). Some statements portray the students' positive attitudes toward face-to-face classes. This represent a well-known area to them that may not require the development of new responses, habits, and adaptations in the level of attention: ("I am paying more attention to class" [57F11-6]), commitment ("I am still committed to my classes" [15M12-7]), and time management ("I like it because I can choose when to do activities" [56M12-6]) that remote classes require. Remote classes also imply regulating feelings of sadness and indifference, which build up without the support and socialization provided by friends.

### Students' Affective Field Concerning Home

The home is an *affective anchor* for students (Figure 3). It is culturally central because it is associated with family, identity, and security (Fitchen, 1989). The home can have more personal (happiness, belonging, privacy), social (relationships with friends, entertainment), or physical (structure, services, work environment) meanings (Sixsmith, 1986). This anchor is expressed in the perception of comfort—"The comfort of home is good" (26F11-6)—and happiness—"Happy to be at my home" (27F11-6). Despite that students can engage in different ways and motivate themselves to learn while being at home all the time, "Even being able to use equipment such as cell phones and computers with Internet access, it is sometimes difficult" (92F12-6).

**Figure 3**

*Representation of Students' Affective Field Concerning Home*



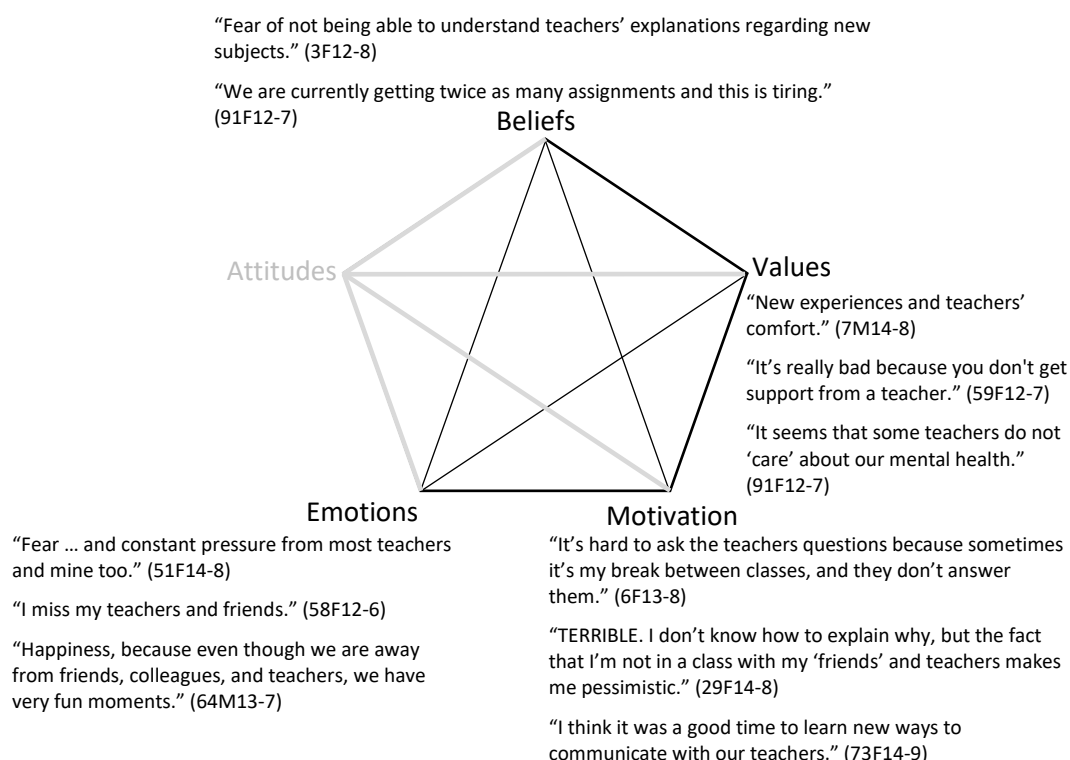
The home seems to be overburdened in terms of its role, contributing to what we call affective fatigue. There is a conflict that can be portrayed as follows: I love my home, but I am tired of being here, with distractions, without learning, doing confusing things.

### Students' Affective Field Concerning Teachers

The fear reported by students seems to express the confrontation between self-concept about their abilities, expectations of results, self-image beliefs, and the way they relate to teachers in this affective field (Figure 4). Students are afraid of "not being able to understand teachers' explanations" (3F12-8). They are afraid of "constant pressure" (51F14-8) but miss their teachers, despite feeling overwhelmed and under too many demands. They were concerned about the attention they received ("They [teachers] don't answer" [6F13-8]), with teachers' supportive role ("teachers' comfort" [7M14-8]) and empathy ("It seems that some teachers do not 'care' about our mental health" [91F12-7]) emphasized.

**Figure 4**

*Representation of Students' Affective Field Concerning Teachers*



The teacher–student relationship plays a vital role in students' efforts to learn (Lumpkin, 2007). Students express that the teacher who cares and supports is configured as an essential and valuable affective element, in agreement with the literature (Wentzel, 2016). However, students have been in remote classes for an extended period, so the role of teachers in the affective field of students can take different paths between extremes: strengthened, it reinforces the engagement for the construction of new knowledge; or weakened, it ends up interfering in learning.

## Conclusion

In this article, we have tried to understand what it means, under the lens of affect and from the student's perspective, to experience remote education during the COVID-19 pandemic. The affect identified in the research has a representational function, in addition to the subjects, revealing both the impacts brought about by the pandemic and pointing out the necessary supports to overcome it.

By giving students a voice, in addition to the analysis that can be carried out, the word, the main element of the dialogue, becomes two dimensions—action and reflection—so interwoven that Freire (2014) calls them the "true word" (p. 107). It was by the word that the students' affect was understood a little better. In our research, we recognized four affective fields of the participants.

In the affective field related to friends, affect is intertwined, which points to the extreme importance of the role of this element in education, especially in adverse periods. To a certain extent, the classes and the school make up a complex field, given the number of intersecting variables and affect. Understanding the preference for face-to-face classes requires a deeper understanding of the construction of identities in collaborative environments, their imbrication with the supportive role of friends and teachers, specific and global motivational states, or even the social representations that one has of schools. It also requires understanding why boys expressed more affect in this field.

Another critical element, with two faces in the pandemic, are the teachers: they provoke expectations and anxieties, but they are also a figure of comfort and care; therefore, they need to be recognized and valued in this positive role. Considering that isolation due to COVID-19 influences our ability to recognize the happiness of others and increases that of perceiving sadness (Meléndez et al., 2020), students may be capturing distorted information issued by teachers, interfering with the positive role that this element usually portrays.

Finally, the affective field that involves the home shows its relevance in the period, constituting itself as a central affective anchor. The home to which students refer in their texts, despite all the turbulence, still seems to be the only known and safe soil. Thus, the home's importance in this research is corroborated. Furthermore, it is recognized that interpreting the complexity of its representativeness involves understanding the role of families, identities, cultural elements, and personal, social, and physical meanings in students' lives.

Helgeson et al. (2006) point out that positive effects may occur from traumatic events, and these benefits are more significant the more distant from the traumatic situation one is. Negative emotions are known to decrease, and positive ones to become more robust, as time goes by (Folkman, 2008). From the negative affect expressed by the participants, we can say that this distance had not yet been reached, indicating that the participants were still experiencing the pandemic intensely at the time of research. On the other hand, we also detected positive perspectives. However, we ask ourselves when, under what circumstances, and at what intensity—and if it is even relevant—beneficial effects can be seen in students going forward. In sum, identifying the phenomenon of *affective fatigue*—usually studied in patients undergoing cancer surgery—points to the complexity of experiencing remote education during the pandemic.

Given this demand and considering the various research already carried out, the search for solutions to the issues brought about by COVID-19 in education must involve multidimensional strategies that consider the reported phenomenon and the friends–home–teachers tripod (even though we recognize that the empirical evidence may not have been sufficient to allow for a more precise connection between the affective fields discussed). In this sense, it is necessary to plan measures, together with educators, so that the government and schools can implement projects focused on the problem, for example, guaranteeing psychological services and quality training for all, especially students and teachers.

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# The Tensions Between Student Dropout and Flexibility in Learning Design: The Voices of Professors in Open Online Higher Education

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## Abstract

Flexibility is typical of open universities and their e-learning designs. While this constitutes their main attraction, promising learners will be able to study “anytime, anyplace,” this also demands more self-regulation and engagement, a cause for student dropout. This case study explores professors’ experiences of flexibility in e-learning design and continuous assessment and their perception of the risks and opportunities that more flexibility implies for student persistence and dropout. In-depth interviews with 18 full professors, who are the e-learning designers of undergraduate courses at the Open University of Catalonia (UOC), were analyzed, employing qualitative content analysis. According to the professors, the main causes for dropout are student-centered, yet they are connected to learning design: workload and time availability, as well as students’ expectations, profiles, and time management skills. In the professors’ view, flexibility has both positive and negative effects. Some are conducive to engagement and persistence: improvement of personalized feedback, formative assessment, and module workload. Others generate resistance: more flexibility may increase workload, procrastination, dropout, and risk of losing professorial control, and may threaten educational standards and quality. Untangling the tensions between dropout and flexibility may enhance learning design and educational practices that help prevent student dropout. Stakeholders should focus on measures perceived as positive, such as assessment extension, personalized feedback and monitoring, and course workload calibration. As higher education is globally turning to online delivery due to the COVID-19 viral pandemic, such findings may be useful in both hybrid and fully online educational contexts.

*Keywords:* online higher education, learning design, continuous assessment, flexible learning, persistence, dropout

## Introduction

Learning design (LD) can be defined as “the practice of devising effective learning experiences aimed at achieving defined educational objectives in a given context” (Mor et al., 2015, p. 221), impacting many aspects of the students’ experience. Course design and learning environment are key factors in dropout and persistence (Lee & Choi, 2011). As central elements of LD, assessment and feedback are key drivers for e-learning (Armellini & Aiyegbayo, 2009). Assessment is probably the principal contact between student and teacher; feedback on assignments is often the main vehicle for teaching (Simpson, 2003). Continuous assessment (CA), through continuous feedback, can thus be used to improve student learning, achievement, and persistence (Nguyen et al., 2017).

Dropout represents one of the greatest challenges faced by online educators and administrators, as online higher education (OHE) courses have significantly higher student dropout rates than conventional courses (Lee & Choi, 2011). However, the problem of dropout has become exceedingly important for both OHE and higher education (HE) stakeholders, as we face the *online turn*—the growing trend in HE towards transitioning to online teaching (Han et al., 2019), which has recently been exacerbated by the impact of COVID-19, forcing HE institutions to adopt online delivery overnight (Naylor & Nyanjom, 2020).

Dropout can be broadly defined as withdrawal and non-completion of a course or program (Xavier & Meneses, 2020). However, for our purposes in this study, *dropout* refers to withdrawal from a course’s CA process. *Persistence* is synonymous with success and the opposite of dropout: a multifaceted phenomenon defined as completing a course and continuing to program completion (Hart, 2012). Student engagement is associated with success and persistence; it is contingent on both an institution’s structures, policies, actors, and practices, and how students avail themselves to opportunities for engagement (Dexter, 2015). Thus, dropout, persistence, and engagement depend on the learners, the institution (LD and faculty), and external factors (time pressures and life circumstances such as family, health, work, and financial issues). In this study, we focus primarily on the roles of LD and flexibility.

Flexibility is considered the most crucial element of part-time distance learning. Flexible learning addresses the differences in needs, preferences, and skills between students by providing them different choices regarding what, where, when, why, and how to learn, supporting personalized learning and a student-centered approach (Soffer et al., 2019). Flexibility has become the main attraction of OHE, especially for busy, time-poor nontraditional students (Butcher & Rose-Adams, 2015). Open OHE promises learners they will be able to study when, how, and what they want—“anytime, anyplace,” a claim that has been criticized (Houlden & Veletsianos, 2019). However, flexibility is also a cause for student dropout, for it demands more self-regulation, self-motivation, and time management skills and can lead to procrastination. Hence, debate is ongoing on whether to provide more or less flexibility in OHE and the impact it may have upon students’ success.

Some authors (Deschacht & Goeman, 2015; Simpson, 2003) defend flexibilization of course design, structure, and workload to accommodate students’ employment challenges (Moore & Greenland, 2017), including assessment policies, points, deadlines, and strategies: “Inflexible barriers resulting from time pressures (especially at assessment points) can increase the stress of juggling competing priorities” (Butcher & Rose-Adams, 2015, p. 133). However, more flexibility and less guidelines may increase the risk of procrastination and place more demands on student self-regulation and motivation. Thus, other authors have found flexibility to be a variable that predicts student dropout (Michinov et al., 2011).

Additionally, offering more flexibility to the learner also places higher demands on instructors, often requiring more time and effort from them (Nikolova & Collis, 1998), while also diminishing predictability and conditions for planning. However, literature on the critical experiences of professors as learning designers on this matter is scant.

## Context of Research

Our research was done in the context of a fully online open university, the Open University of Catalonia (UOC), which employs a flexible, student-centered e-learning model and an asynchronous mode (Sangrà, 2002). UOC's typical students are nontraditional learners: adults with jobs and family responsibilities; 83% are 30 years of age or over, and 90% both study and work (Sánchez-Gelabert et al., 2020). Someone with such a profile is more likely to suffer from conflictive commitments, which negatively impact academic performance, thus influencing dropout proneness (Owen et al., 2017). The dropout rate at UOC is 57.6% in a long-term program perspective, with first semester dropouts accounting for nearly half of this total (Grau-Valldosera et al., 2018).

UOC's LD is characterized by the full integration of CA, of a diagnostic, formative, and summative character, employing graded continuous assessment activities (CAAs), which students submit online according to a preestablished calendar. CA is devised as a mechanism for learning and providing feedback in the learning process. To pass a course, students have to succeed in the CA process; in some cases, they are given the alternative of only sitting final (face-to-face) summative exams, which are mandatory in undergraduate programs and for which the CA process prepares them. Therefore, dropping out of the CA process does not necessarily imply that the student dropped out of the course or failed it; but it is very often the first and most important step towards attrition. Nonetheless, at UOC, dropout from CA is almost synonymous with dropout from or failing a course. Thus, CA is arguably the prime moment to intervene in terms of dropout—for professors and instructors cannot control inter-semester dropout. Thus, UOC's LD is very structured and competence-oriented yet not very flexible in key aspects: the calendar is usually strict, with definite deadlines for CAAs and exams, and there are no official policies for assignment extensions or for the possibility of making up for a missed or failed CAA. Full professors (FPs) are responsible for the e-learning design of courses, including assessment and educational resources and goals, and for supervising the work of instructors. Instructors (part-time adjunct professors) are mainly responsible for teaching courses. Academic advisors support students in everything not related to the course itself—in enrollment, in problem solution in general, and as intermediaries in the communication with other faculty and the institution.

This study was developed in the context of an intervention at the UOC, designed to increase engagement and persistence in the CA process: a seminar of a reflective and formative character, with FPs (learning designers) and experts sharing best practices regarding successful incorporation of flexibility measures in courses, according to their experiences. FPs were invited to apply one or more forms of flexibility in their courses, according to their own diagnostics and their course's specific assessment model, type of activities, and learning objectives. Among the different suggested measures intended to make LD and CA more flexible were offers of progressive CA; personalized feedback and monitoring; more diversified learning resources; the possibility of making up for a low mark in a CAA in subsequent CAAs; the creation of a "CAAO" (ungraded mark) to induce a smoother entry in the course, and as a diagnosis tool; and acceptance of assignment extension requests. Grounded in the assumption that LD should be an

iterative and collaborative process (Bennett et al., 2009), such formative action was a first step for the subsequent voluntary incorporation of flexibility measures in the FPs' LD of courses. However, in this study, we do not assess their efficacy.

As Veletsianos and Houlden (2019) stress, flexibility requires further inquiry—how can aspects of open OHE be made more flexible? Which elements may benefit students the most, preventing dropout and fostering engagement and success? Our main focus here is on LD, for, from the professors' perspective, it is during the course that they can intervene—especially on the CA process and the feedback it may provide. However, there is a dearth of inquiry on the lived experiences of professors (Badia & Chumpitaz-Campos, 2018), especially employing qualitative approaches to investigate the relations between LD and student persistence. Thus, generating knowledge about professors' experiences and perceptions of flexibility in OHE settings may aid OHE institutions to address dropout, retention, and persistence issues, concentrating on early detection and on providing and evaluating the support and interventions needed.

To address such a gap, this research's aim was to examine the nature of the professors' experience of and views about flexibility in e-LD and CA; their perceptions of the main student dropout factors; and the risks and opportunities that more flexibility would imply for persistence, attrition, and engagement.

## Method

### Design and Participants

This case study employed an exploratory, cross-sectional, qualitative design. The “bounded entity” (Putney, 2010, p. 115) we inquired into was the UOC, and its primary unit of analysis (Yin, 2002) consisted of the experiences of UOC professors. A purposive, criterion-based sampling method was employed, using a maximum variation sampling approach (Ritchie et al., 2014). Participants included 18 FPs—50% female, ages ranging from 35 to 59 years ( $M = 46.22$ ,  $SD = 6.59$ ), with experience as learning designers in OHE ranging from 1 to 13 years ( $M = 9.06$ ,  $SD = 4.58$ )—from the UOC who had participated in the formative seminar. The research team sent an e-mail to all participants, inviting them to take part in the study. Professors were randomly selected according to gender and the rates of persistence (lower, average, and higher) in their courses' CAs in relation to the rates in their respective programs. Thus, three professors per department—each responsible for a different undergraduate course—were selected. Each participant was assigned a code to ensure anonymity (see Table 1). All courses were mandatory, apart from the optional one coordinated by the P2 professor. Courses coordinated by professors P4, P7, P9, P12, P16, and P18 were introductory (first-year) courses. In terms of limitations, our sample is random but relatively small—that is, it was not intended to be statistically representative. Instead, according to the maximum variation sampling approach, we sought to collect a diversity of professors' experiences in relation to different study programs, courses, and levels of CA persistence.

**Table 1**

*Distribution of Participants According to Selection Criteria*

Department	Lower persistence course	Average persistence course	Higher persistence course
Arts and Humanities	P14, male	P15, male	P9, female
Business and Economics	P8, female	P13, male	P16, female
Computer Science, Multimedia, and Telecommunication	P1, male	P17, male	P5, male
Information and Communication Sciences	P18, male	P4, female	P6, male
Law and Political Science	P10, female	P12, female	P11, female
Psychology and Education	P7, female	P3, male	P2, female

### Data Collection

During in-depth, face-to-face, hour-long semi-structured interviews, the professors were presented with different flexibility measures and asked to reflect upon their convenience and, particularly, how increasing flexibility may impact persistence and dropout in their courses. Interview protocols were developed according to the themes under study, the phenomena and factors that are relevant to them, the specificities of the actors studied, and UOC's LD. Interview questions focused on the following topics: dropout factors; characteristics of the course, its CA process, and program; and how the professors perceived different measures in relation to student dropout and the specific course they designed and coordinated. All participants gave informed consent. The study—including data collection, handling, and protection—complied with the university's ethical requirements. Interview protocols are available upon request.

### Data Analysis

The interviews (in Catalan or Spanish) were transcribed verbatim and analyzed iteratively and manually following Schreier's (2016) established qualitative content analysis, by searching for selected aspects of meaning that were relevant to the research aims. Through double coding (first a trial coding, performed by the first author, and then a final coding, revising and expanding the frame), main themes and codes were generated and agreed upon by both authors. For reasons of clarity, in the next section, we present the results, structuring them in terms of the research aims, and not in terms of themes and codes (which are stressed in italics).

## Results

This section employs illustrative vignettes to summarize our results and discusses them in contrast with the literature. In the professors' voices, some variables were much more important for dropout; flexibility had different meanings, presenting both positive and negative effects, and its viability was discussed; and some intervention measures were perceived as more necessary and positive. Longer or

shorter experience as OHE learning designers did not seem to significantly affect the professors' perceptions.

### Perception of Dropout Factors

In the professors' experience, the main causes for dropout (of CA) in their courses were mainly student-centered—*learner factors*—yet some are connected to e-LD. One of the main factors mentioned was time management skills: the professors perceived that many students who dropped out of their courses were time poor and/or had poor time management:

It's mainly time-related problems, time management issues. It might be due to professional problems, or family, domestic, job issues ... which do not allow students to continue. [Or else] they've enrolled in too many courses and maybe are first- or second-semester students and enrolled in six [courses], then they get overwhelmed and have to prioritize. ... It's clearly about lack of planification. (P6).

In this sense, *life circumstances* often play a crucial role: dropouts usually “have some work-related problem, normally it's either work or family [issues]” (P11). Juggling study load with work and family commitments is a major problem for first-year, nontraditional students (Kara et al., 2019). *Procrastination* was also seen as a common issue: “It might be that the students are used to engaging with the CAA only in the last week. It seems the student [dropout] is not capable of self-regulation” (P4). However, the literature highlights that self-regulation skills may be less important when the student has little available time (Veletsianos et al., 2021). For the professors, time-related issues were the most reported reason for withdrawal. According to Ashby (2004), the most important dropout variable in OHE is difficulties in juggling studies, work, and life demands; academic procrastination and time management issues often make such difficulties seem unsurmountable (Michinov et al., 2011). However, blaming the students may be a form of external attribution by the FPs and a means to avoid responsibility for the roles LD and themselves play in dropout. In this case, FPs were possibly adopting *Darwinista* (students drop out because they are somehow unfit) and *Fatalista* (they drop out due to reasons beyond their control) attitudes to student retention (Simpson, 2013).

Connected to this, *student profiles* also matter. First-year students “who enroll late, students who haven't grasped well the [online] campus system or how it works ... they are a bit lost and ... they are the profile who misses the first CAAs [and drops out]” (P12). Indeed, new students are particularly prone to dropping out (Grau-Valldosera et al., 2018). Participants also mentioned students' abilities and skills regarding OHE and technology, as well as many other intrinsic factors related to self-motivation and engagement, such as previous professional and OHE experience. In this regard, their comments coincided with the literature: individual student success (and dropout) is influenced by the educational environment, including LD and CA, and student characteristics in general, which include digital literacy and previous OHE experience (Day et al., 2018).

The gap between *student misconceptions* and expectations and actual experience also contribute to dropout, especially among first-year students:

Learners begin their degrees and, of course, run into reality. It's a university, not an e-learning that is that cool or that easy or that simple. (P7)



They are not well-informed. This is a university degree and requires effort. They see it as something super easy. (P8)

They were too optimistic regarding what they could undertake. (P15)

It seems new-entry learners often take broad university messages that they can study when, how, and what they want, and that online learning is “easier” due to such flexibility (Hyllegard et al., 2008). This may generate misconceptions and inaccurate expectations (Bawa, 2016), such as underestimation of time demands and workload (Korstange et al., 2020), which later impact students’ motivation, performance, and time availability. Accurate expectations facilitate student satisfaction and motivation, especially during the critical first year of studies (Henry, 2018).

Finally, FPs voiced their concern about the timing of student withdrawal from CA (*early dropout*): most students drop out after the first CAA, not submitting it or else not passing it, and consequently not able to follow their courses. Others drop out after the second CAA, but this occurs less often. This knowledge is important for the prioritization and efficacy of early interventions and appears to happen in other open universities: “Much dropout occurs very heavily in the first few weeks of a first module” (Woodley & Simpson, 2014, p. 461).

### Learning Design and Dropout

Although FPs mostly associated dropout with student factors, they also expressed that many general characteristics of their courses’ LD were connected to higher rates of dropout. Course and CA *workload* were often mentioned:

The problem is the [course] workload. (P2)

Too many CAAs and they require too much work. (P9)

Learners who don’t get engaged with the first CAA. The learning resources are very extensive. (P3)

In general, the more difficult or complex the CA is, the lower the engagement and performance will be in the CA. Courses with high complexity (P5, P8, P10) or extensive course content, as well as particularly difficult courses (P5, P10) and those that are too theoretical (P7), tended to have high dropout rates. Some FPs (P1, P5) mentioned that their courses *must* be complex and difficult, for they are supposed to provide students with core knowledge and skills. However, the literature stresses that too difficult assignments and demanding courses or programs (Kara et al., 2019) are important challenges to completion. Students’ sense of overload may be caused by inadequate LD, impacting their time availability and constraints: “They try to do too many things in too little time” (P4). Time constraints or lack of time—here as consequences of LD—make up one of the main dropout factors in the literature.

Introductory courses (*type of course*) were also problematic, as their attendance is mostly composed of first-year students, who are much more prone to dropping out. Moreover, such courses tend to have very large class sizes, which makes it more difficult for faculty to be flexible in assessment deadlines and provide personalized feedback and support: “We grant [assessment extension requests] only exceptionally. Now, do I think it’d work? No. I don’t think that’s the problem. What happens is that it is titanic ... these classes have 70 students” (P7).

LD also involves the design of the interactions between the different actors in OHE, including student support. However, our participants only mentioned such factors peripherally, focusing instead on the roles and attitudes of the different *actors*. For instance, instructors, who are responsible for putting LD into practice, were deemed relevant for dropout and persistence:

The other factor is ... the instructor's teaching practices and presence. (P5)

There are instructors who are more empathetic, placing themselves much more in the student's shoes and do many more actions, while others do the bare minimum. The instructor is a basic element. (P12)

Instructor support and connection play a critical role in student retention (Stone & O'Shea, 2019).

Academic advisors were also perceived to play an important role, especially for first-year students: "They can help the ones who are beginning, no? I believe the academic advisor is a key figure when you have a new student. They should know how to help that student pass the CA" (P12). Orientation programs have been shown to increase retention through early elucidation of student expectations and clear advising (Henry, 2018).

### **Flexible Measures in Learning Design: Risks and Opportunities**

For FPs, flexibility can have both positive and negative effects in terms of possible benefits and costs/risks. Such perceptions depend mainly on the specific characteristics of the course and students: FPs appraised flexibility measures confronting such characteristics and the expectations for the course they were responsible for.

Some flexibility measures were seen as conducive to engagement and persistence (*engagement measures*). Improving personalized feedback, especially for new students and those students who fail the first CAA, was deemed crucial:

I believe that every accrual in personalized feedback and monitoring can end up resulting in improved learning. (P1)

An exhaustive monitoring of these students [is needed], so as to prevent dropout—there's little we can do, but we make the effort. (P12)

The student is very thankful for that. However, it's a lot of work [for faculty]. (P8)

Reducing module content/workload (P2)—that is, simplifying learning resources—was also seen as beneficial: "Sometimes the more resources you give them [students], the more you overwhelm them" (P11). However, sometimes this was seen as ineffectual: "Semester after semester, we've been reducing the course workload, but it's still problematic" (P5). Indeed, according to the literature, high-quality personalized feedback is the most powerful influence on student achievement (Mulliner & Tucker, 2017), and diminishing course workload and difficulty may be beneficial for completion (Willging & Johnson, 2009).

Changing LD in terms of the *flexibility of CA practices* was also seen as important, especially the assessment practices that affect the first assignment (e.g., adopting a diagnostic or lighter first CAA): "I've done it in my program, it's very good and we've already planned to offer it in the next semester. ...

It's fantastic ... it helps the students to orient themselves better" (P9). Offering reparatory CAAs was deemed beneficial: "Yes, it's good. Everything that helps saving the student is fine" (P18). However, few FPs perceived making deadlines flexible as positive:

Yes, yes, it can foster more motivation. (P13)

It may create a certain chaos, but it can also lead to an absolute personalization. (P18)

Flexible deadlines and assessments seem to be important in the literature, for compulsory (and at times overlapping) assignment deadlines and overly defined pace of learning reduce students' control over their time, placing greater demands on their time management and availability (Henry, 2018). In an inflexible LD with strict deadlines, few CAAs, and no alternatives for failing or not submitting the first assignment, students are faced with only three choices: to persist, so as to benefit from CA feedback and learning; to withdraw; or to sit final exams: "The first CAA ... is like the touchstone. If you pass it, you keep going, if you don't, you drop out" (P5). In this situation, the first assignment functions as an early exam; if the student fails it and withdraws from the CA process, they will not benefit from assessment feedback—which substantially reduces their possibility of passing the course. Besides, retention is strongly informed by student performance (Henry, 2018).

However, overall, such flexibility measures generated strong *resistance*, due to *perceived risks*. Flexibilizing deadlines "is a problem, then you are faced with very complicated dynamics ... in that you don't have control over such specific issue" (P3). It "creates a disadvantage for the students who follow the calendar ... in the end, you have to maintain certain criteria. It's detrimental to [education] quality" (P12). For many FPs, more flexibility may increase student workload, procrastination, dropout, and—for faculty—the risk of losing professorial control: "Flexibilizing means giving more time? Then we have screwed it up. If you give more time everyone seizes this second option ... If there's a limit, there's a limit" (P3). More flexibility was often seen as a threat to educational standards and quality—demanding less of students and relaxing deadlines and course difficulty, for instance, would eventually produce poorer learning outcomes:

I've lowered the course's academic level. I don't want to relax it more. (P7)

To lower the standards ... so as to not lose students ... that is, the mixing of business with education, it's complicated. (P15)

In a sense, many FPs seemed to perceive more flexibility as a weakness. The impression was that many had accepted *some* flexibility but did not want to "give away" more of it because it went against their principles. For Veletsianos and Houlden (2019), such perception is a commonly perceived trade-off required by flexible learning: flexibility might necessarily come at the cost of rigor or other standards. However, professorial resistance may also be connected to traditional arguments from faculty for not changing their practices to be more learner-centered, which involves a shift of power from faculty to learners (Weimer, 2013). This appears to be a central conundrum for FPs: if retention and dropout are institutional problems, and FPs think they are important, then how can persistence and engagement be fostered? And how can it be done without endangering what we professors expect students to do (and often they don't)?

Many FPs defended more flexibility but said it demands more time and effort from faculty (*costs*):

I'm a great advocate of flexibility, but then it has some consequences ... for myself, as a FP, and for my team of instructors. At any rate, it implies [more] time and dedication. (P17)

The idea may be good, but it requires a lot of time [from faculty] so as to put it into practice to make it work. (P5)

What we have to do is to make it viable. (P18)

Class sizes (often with 70 students) hinder instructors' adoption of flexible measures such as personalized feedback in the course's first weeks, as it would be too time-consuming (P8; P13). Brigham (1992) alludes to a need for "faculty flexibility" so as to develop successfully flexible online courses (p. 186). However, the literature stresses that flexibility can be a challenge for instructors, implying more workload and time, thus generating resistance (Veletsianos & Houlden, 2019). According to McNaught (2013), "the massive impost of workload on staff within the sector has been a significant issue in the reluctance for staff to engage" with (more) flexible learning (p. 869).

### Revisiting the Problem with First-Year Students

The theme of *first-year students* emerged as a central preoccupation for FPs—including the ones who do not design and oversee introductory courses, for thanks to open enrollment pathways, a mix of first-year, sophomore, and senior students may be present in any given course. Many FPs fear that first-year students are especially prone to dropping out for many reasons: lack of self-regulation skills, less academic preparedness, lack of familiarity with the online education model, time poverty, and so on. Adapting to the CA process is thus likely to be more difficult for them. First-year transition is most critical in shaping persistence decisions (Trotter & Roberts, 2006), but it can be especially challenging for online students (Henry, 2018).

In this sense, the traditionally flexible entry requirements of open universities represent an additional and major problem. Most FPs pointed out that *open access* is likely to produce high rates of dropout—which they attempt to remedy by implementing some flexibility measures, especially in introductory courses, while remaining resistant to other measures. In other words, they saw a tension between entry flexibility in the programs and then having to flexibilize electronic LD in their courses. Thus, some FPs implicitly defended *less flexibility* for entry (i.e., raising program admission requirements): "If there were an initial filter ... then you can think about where you want the university to go ... you could think about it differently" (P7). One FP mentioned that

when you try to diminish dropout, you end up lowering [educational standards]. It's too easy to fall in that trap. Maybe there are too many people in university [degrees] ... there are too many students who simply don't qualify, and nothing happens. (P16)

Indeed, many of these perceptions seem to be connected to a fundamental tension between *open* and *university*—open universities want and promise to be open and flexible while striving to avoid the possible consequences (poorer quality and higher dropout rates) in comparison with the traditional, on-campus university model. However, most FPs do not explicitly advocate restrictions to open admission but rather emphasize the effective management of misconceptions and inappropriate expectations, especially through early academic advising. This is in agreement with the literature: "Make it harder to get in. Not through selection but with brutal honesty about what the students will be getting into ... . Make it harder to get out" (Woodley & Simpson, 2014, p. 468). Especially in the case of

open universities, which offer flexible open access policies but also stringently demand motivation, self-regulation, and time availability, “‘expectation management’ is the predominant aim, rather than selection” (Delnoij et al., 2020, p. 15).

## Conclusion

This article has analyzed the reflections and perceptions among professors on flexibility measures addressing dropout and persistence, born out of sharing common practices and experiences. Based on an agnostic approach regarding flexibility, FPs were invited to experiment and imagine different flexible measures in the specific context of their courses. Confronting the problem and the possible flexibility actions generated difficulties and tensions regarding accommodating students’ needs, changing institutional practices, and fostering student retention, all while preserving standards and education models. In this regard, many specific advantages regarding possible measures were voiced, especially regarding LD, CA, and personalized feedback and support.

However, flexibility was also seen as risky and problematic, given that FPs worried about increasing demands on faculty and perceived a general lack of organization and planning among many students in their courses, which may lead to dropout and failure if more flexibility is offered. In sum, flexibility cannot be viewed as an either-or situation; its adequacy depends on the context (educational model, course, and students) and also on the experiences and viewpoints of professors and learning designers.

In this sense, the widespread claim of “anytime, anyplace” (and “for everyone”) possibilities offered by flexible OHE must be seen through a critical lens (Veletsianos & Houlden, 2019). Students who enter OHE are often unprepared for the huge demands on their self-regulation and time management, and many have unreal expectations; besides, their pace of study is often constricted by strict calendars. For them, while “flexibility can be seen as a virtue, enabling multitasking and fluidity of roles, it can also be seen as a curse, impacting negatively on family life and creating new stress” (Kahu et al., 2014, p. 524). Online studies tend to blur the boundaries between study and home or work, often occasioning conflict between the three spheres, which frequently leads to time poverty and course dropout. Flexible, open entry frequently feeds such a conundrum, as it allows access to unprepared students.

Therefore, flexibility in OHE has both positive and negative consequences. This is a problem, for OHE has become traditionally flexible, especially in open universities, where flexibility is seen as a value principle, an ethos essential for inclusion and accessibility (Naidu, 2017). This paper has looked at one open university as a case study, so direct generalization might be difficult. Nonetheless, some of our results might be valid for other open OHE models with asynchronous learning formats based on CA. However, the key issues studied here—the perceptions of professors who are learning designers about flexibility, dropout factors, LD, assessment models, conceptions, and standards of OHE—may be comparable to those observed in other OHE and hybrid HE institutions. Detecting and analyzing such issues can represent an opportunity to review flexibility policies and LD choices. Thus, we recommend further research on the lived experiences of faculty regarding such problems, perhaps comparing the resistances and risks perceived to the ones traditionally connected to the learner-centered learning paradigm and to the tensions between open and (traditional) university models.

This is especially important given what we have termed the contemporary *online turn*: the trend of HE increasingly turning to online delivery and its recent intensification by the global pandemic. Even

though this research was performed prior to the emergence of COVID-19, findings suggest that untangling the relations between online flexibility, LD, and dropout is crucial to prevent attrition in both hybrid and online HE, as well as to ensure that the now much-needed flexibility of OHE is employed with positive results in terms of optimizing retention and success. As most campus-based HE is presently turning to online formats, the results of this debate should be of interest to all educators who now face the inherent problems of the online turn. In this sense, this discussion goes beyond the flexibility measures presented here, which are context dependent. The tensions and opportunities they may generate should therefore be studied in different learning contexts (open, online, hybrid) and HE institutions.

In conclusion, too much flexibility was seen by FPs as disorganizing and lacking rigor, lowering the standards of education. It seems that the ideal is *balance* between structure and flexibility. Providing a structured yet flexible classroom environment was seen by students as a key element for effective online teaching (Young, 2006); strict scheduling helps keep some students on track, but too much flexibility poses organizational challenges (Henry, 2018). Professors voiced such fundamental *tension*:

[Faculty] are very flexible. Flexible enough, to a certain extent, because you also have to be fair with the students who follow the calendar, no? ... In this confrontation of positive values, that is, to be flexible but also disciplined, well, we need to find a balance. (P14)

## Declaration of Interest

No potential conflict of interest was reported by the authors.

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# University Students' Persistence with Technology-Mediated Distance Education: A Response to COVID-19 and Beyond in Zimbabwe

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## Abstract

Technology-mediated distance education (TDE) has become part of the new normal in the range of teaching strategies used in universities in Zimbabwe. Contemporary literature abounds with studies that highlight challenges associated with access to education in universities, yet very little is highlighted about how TDE can be used to enhance access to education in Zimbabwean universities during the COVID-19 era and beyond. The purpose of this study was therefore to investigate determinants of students' behavioural intentions to persist with TDE in universities in Zimbabwe during COVID-19 and beyond. The study employed a quantitative approach that used a self-constructed structured questionnaire for data collection from a sample of 1,300 distance learning students selected from five universities using a stratified random sampling strategy. Structural equation modelling using IBM SPSS Amos 22 was used for data analysis. Results of the study show that cultural and norms issues ( $\beta = .325$ ;  $p < .001$ ) and characteristics of the students ( $\beta = .329$ ;  $p < .001$ ), the lecturer ( $\beta = .362$ ;  $p < .001$ ), the institution ( $\beta = .427$ ;  $p < .001$ ), and external stakeholders ( $\beta = .279$ ;  $p < .001$ ) were all significantly associated with the behavioural intentions of university students to persist with TDE. Results of this study have implications for both policy and practice with regard to implementing TDE in universities.

*Keywords:* flexible learning, information and communication technologies, online education, technology advances, technology-mediated distance education

## Introduction

The purpose of this study was to establish determinants of students' behavioural intentions to persist with technology-mediated distance education (TDE) in universities during the COVID-19 period and beyond. The advent of the COVID-19 pandemic outbreak has given a fresh impetus for the use of information and communication technologies (ICT) as pedagogical tools for e-learning in teaching and learning environments. In the context of Zimbabwe, the history of distance education dates to the 1930s, when distance education (DE) was introduced as an experiment for primary education and supported by the 1999 National Policy of Distance Education (SAIDE, 1999). DE became such a popular mode of learning for the working class that it was expanded to secondary and tertiary levels and later morphed into TDE, owing to the introduction of technology for learning and teaching and supported by the national ICT policy of 2005 (Maphosa, 2021). Various studies show that universities are now expected to act as linking points that bridge the gap between university theory and the digitized world of work by employing widely adopted technologies, leveraging on the diffused practice of bringing your own device (BYOD) (Caporarello et al., 2016). Despite universities promoting technology-mediated learning, it has been found that academics in universities do not necessarily engage with innovative teaching and learning technologies due to issues of technology self-efficacy (Liu et al., 2020). Rudhumbu (2020) found that no more than 30% of lecturers demonstrate behavioural intentions to adopt technology for teaching in universities in Zimbabwe. This is indeed quite worrying at a time when technology use is viewed as the new normal in universities (UNESCO, 2020).

Education is one of the most disrupted spaces caused by COVID-19, and according to Tam and El-Azar (2020), these disruptions allow us glimpse at how education could change for better—or for worse—in the long term. The pandemic has changed how millions of learners around the globe are educated. There are new solutions for education that could bring much needed innovation and new shifts in approaches that could widen equality gaps. According to UNESCO (2020), some African countries are currently among the 188 countries currently implementing nationwide closures that impact a total of 1.5 billion enrolled learners (89% of student population) across all levels of education and 135,575 tertiary-level students. Interruptions to education can have far-reaching consequences beyond the spread of the disease itself and efforts to contain it. The digital divide continues to widen, especially affecting groups of students in socioeconomic distress who are more likely to have poor or no Internet access because they cannot afford the cost of a laptop, desktop computer, or handheld gadget, or Internet connectivity, or because they live in regions or neighbourhoods with limited connectivity (OECD, 2020; Ouma, 2019).

## Contextual Framework: Distance Education and Its Growth on a Global Level

TDE is a learning mode that provides students with an open, flexible, and highly interactive learning experience that allows them to explore connections online between what they would have learned and other sources of knowledge and experience, thus enriching their learning experiences (Houlden & Veletsianos, 2019). As a flexible teaching and learning approach, TDE allows lecturers to provide students with scalable, personalized, and contextualized e-learning support for effective learning (Bolliger & Halupa, 2018). TDE

can be categorized as either synchronous or asynchronous (Sharma, 2018). Synchronous TDE allows for “live” interactions between the students and the lecturers through technology-mediated interventions such as videoconferencing, audioconferencing, Zoom, Webchats, and others, while asynchronous TDE allows students to interact with the lecturer through technologies such as learning management systems (LMS), e-mails, video recordings, and discussion forums; hence, some delays in interactions occur (Sharma, 2018).

TDE has been a subject of debate and contestation in many countries, including Russia, Brazil, Portugal, the United Arab Emirates, Turkey, Uganda, and Zimbabwe. In these and other countries, the history and development of TDE has been characterized by suspicions of poor quality at initial stages while in other countries, tight controls of Internet connectivity have been a serious setback to the growth of TDE. Despite these challenges, TDE has continued to grow the world over (UNESCO, 2020). In Zimbabwe, there has been a general belief that universities offering distance and open education provide inferior education to their students (Kaputa, 2013; Musingafi et al., 2015; UNESCO, 2018), with some referring to DE as education for “old” people who have failed to compete for access to university education in conventional universities (Rupande & Nyenya, 2014). Despite this initial negative belief, online DE in Zimbabwe continues to grow and gain in popularity due to its flexibility, accessibility, and affordability, with some universities preferring to use blended learning.

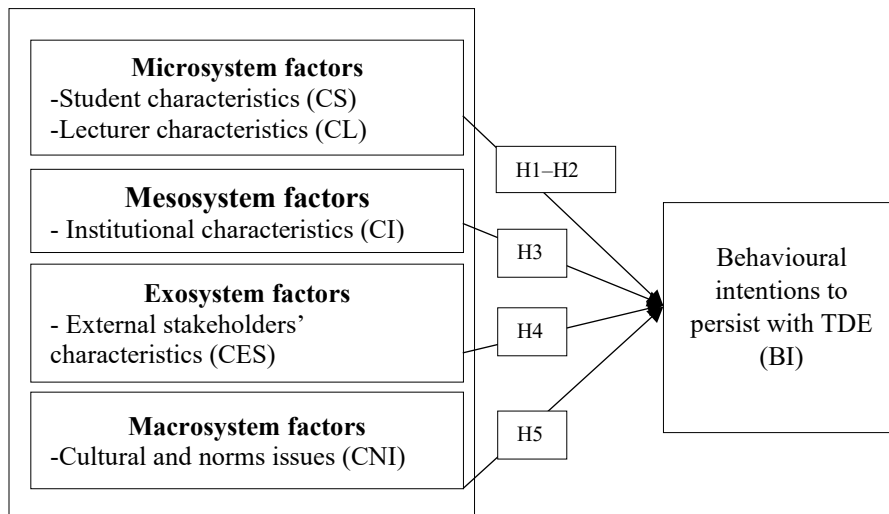
## **Theoretical and Conceptual Framework Informing Hypotheses Formulation**

This study is informed by the ecological systems theory (EST), also called the bioecological systems theory, developed by Bronfenbrenner (1979). EST argues that the environment in which a person lives affects every facet of that person’s life, from how the person thinks and acts to his or her attitudes and emotions, that is, how a person behaves (Exploring Your Mind, 2020). EST further argues that education is a complex system influenced by an interactive system of multiple layers, including the microsystem, mesosystem, exosystem, and macrosystem (Guy-Evans, 2020). Ettekal and Mahoney (2017) find that human behaviour is a result of a complex process involving a system of interactions within and between individuals, as well as between individuals and the environments in which they live.

Human behaviour, therefore, and according to Krebs (2009), is a joint product of contextual factors that relate to how each of the four layers—namely, the microsystem (activities and interactions of individuals and groups, e.g., students and teachers, with their immediate environment, e.g., a classroom); the mesosystem (institutional or organizational factors that affect how a person behaves); the exosystem (wider social settings that include industry, government, and their policies and how they affect people’s behaviour); and the macrosystem (cultural values, customs, and resources that affect how people behave) (Ettekal et al., 2017; Krebs, 2009;). Based on a literature review and the theoretical framework, a research model (Figure 1) was designed and used for formulating research hypotheses.

**Figure 1**

*Research Model*



*Note.* CS = characteristics of students; CL = characteristics of lecturer; CI = characteristics of institution; CES = characteristics of external stakeholders; CNI = cultural and norms issues; H = hypothesis; TDE = technology-mediated distance education; BI = behavioural intention. (Source: Designed by the researcher)

### Characteristics of the Student

Characteristics of the students, one of the microsystem factors, relates to the behaviours and actions of students that promote positive attitudes towards an object or idea or, in the context of the current study, towards TDE during the COVID- 19 era and beyond. Separately, McGhie (2017) and Yang et al. (2017) have found that characteristics of students such as the ability to set realistic expectations as well as levels of motivation both extrinsically and intrinsically contribute to their behavioural intentions and positive attitudes towards TDE. Yang et al. (2017), Rosenberg and Ramellucci (2017), and Fidalgo et al. (2020) all find that time management, technology self-efficacy, social presence, and interest are critical student characteristics that contribute to the development of positive attitudes towards and behavioural intentions to persist with TDE.

H1: A significant relationship exists between the characteristics of the students and their behavioural intentions to persist with TDE during the COVID-19 era and beyond.

### Characteristics of the Lecturer

Another microsystem factor that affects the students' attitudes towards and behavioural intentions to persist with TDE is lecturer characteristics. In separate studies, Au et al. (2019) and Tait (2018) have found that adequately trained and experienced lecturers who are able to provide what is called *teaching presence* in TDE is important for the development of positive attitudes towards TDE by university students, also contributing to the development of behavioural intentions to persist with TDE during COVID-19 and

beyond. Tait (2018) also finds that the lecturers' competences, attitudes, perceptions, and pedagogic attributes, in terms of teaching facilitation and presence, are important for students' development of positive attitudes towards and behavioural intentions to persist with TDE. This suggests that a lecturer's ability to use technology to facilitate the program, as well as the effectiveness of the lecturer's general teaching approaches, may be critical to students' development of positive attitudes towards TDE and their positive behavioural intentions to persist with it.

H2: There is a significant relationship between the characteristics of the instructor and students' behavioural intentions to persist with TDE during the COVID-19 era and beyond.

### **Characteristics of the Institution**

Institutional factors are mesosystem factors that relate to conditions in universities that have an influence on how students perceive and persevere with TDE during the COVID-19 era and beyond. Li and Wong (2019) find that the support given to TDE students by universities through human and material resources, time, and leadership style is very important for students' development of positive attitudes towards TDE, as well as for their development of positive behavioural intentions to persist with the TDE. In their study, Bhuasiri et al. (2012) find that an effective leadership style that is consultative and supportive, the provision of an adequate budget for securing adequate ICT resources, and the presence of appropriate ICT equipment are important for the students' development of positive attitudes towards TDE and their behavioural intentions to persist with it. In similar studies, Tait (2018) and Vanides (2018) also indicate that the creation of a conducive learning environment—where students can easily access online learning resources and use online systems; where they are able to interact with each other, with instructors, and with materials synchronously and asynchronously; and where learning happens in a flexible and relaxing environment—is critical for developing positive attitudes and willingness to persist in students. For the successful facilitation of a TDE program during the COVID-19 era and beyond, one that contributes to students developing behavioural intentions to keep using it, universities need to be well equipped in terms of materials and human resources to support TDE.

H3: There is a significant relationship between the characteristics of an institution and students' behavioural intentions to persist with TDE during the COVID-19 era and beyond.

### **Characteristics of External Stakeholders**

External stakeholders are part of the exosystem and relate to industry and its requirements, government, government policies, government agencies, and how they contribute to policy formulation and implementation regarding TDE in universities (Exploring Your Mind, 2020). Characteristics of external stakeholders include their actions towards, demands of, and requirements for education in general and TDE in particular in universities (Guy-Evans, 2020). External stakeholders' characteristics therefore refer to social settings that affect a person's or a group's experiences, attitudes, and actions (Ettekal & Mahoney, 2017). Ettekal and Mahoney (2017) have found that the policies promulgated by government and its agencies, as well as quality demands by both the government and labour on the nature of TDE graduates, have both direct and indirect influences on students' attitudes towards TDE and, in most cases, help to define whether or not students will persist with TDE.



H4: There is a significant relationship between the characteristics of the external stakeholders and students' behavioural intentions to persist with TDE during the COVID-19 era and beyond.

### **Cultural and Norms Issues**

Cultural and social norms are critical aspects of social beings that shape how they behave in a particular way and in a particular setting. These norms have a pervasive influence in shaping how students in universities view TDE and whether they will want to persist with it (Fenske, 2007). Cultural and social norms refer to the rules or expectations of behaviour within a specific cultural or social group, which are often unspoken and are used as standards of what is considered as either acceptable or unacceptable behaviour (WHO, 2009). Norms therefore relate to values, laws, customs, and resources that influence how a person thinks and acts in a particular setting (Fenske, 2007). An Exploring Your Mind (2020) study found that cultural and social norms have a significant influence on people's attitudes towards objects and ideas. In the same study, the use of technology in the teaching and learning process in universities was found to be part and parcel of the teaching and learning culture and norms; hence, these have a significant influence on the attitudes of university students towards TDE.

H5: There is a significant relationship between the cultural and norm issues and students' behavioural intentions to persist with TDE during the COVID-19 era and beyond.

## **Research Methodology**

### **Research and Questionnaire Design**

A quantitative approach was used for this study. A structured questionnaire was developed that had 5 dimensions and 28 items, as follows: characteristics of the student—5 items; characteristics of the instructor—6 items; characteristics of the institution—7 items; characteristics of the external environment—6 items; and cultural and norms issues—4 items. A 5-point Likert scale, from strongly disagree to strongly agree, was employed for data collection. The General Internet Attitudes Scale, developed by Joyce and Kirakowski (2015), and the Computer Attitudes Scale, developed Selwyn (1997), were used in the design of some questionnaire items. For the purpose of administering the questionnaires, the researcher sent soft copies of the questionnaire to academic faculties of the five randomly chosen universities in Zimbabwe for distribution to a selected 1,300 students over e-mails. An allowance of two weeks was given for students to complete and return the questionnaires; this is in line with the average number of days (12.21 days) it takes to complete an e-mail survey (Ilieva et al., 2002). One week was given as allowance for follow-ups. A total of 440 completed questionnaires were received from the following universities: X1 = 84; X2 = 101; X3 = 86; X4 = 81; and X5 = 88. The return rate was 33.8%, which is acceptable against a minimum benchmark of 33% for e-mail surveys (QuestionPro, 2020; Sinclair et al., 2012).

### **Population and Sampling**

A quantitative approach located in a case study design was employed in this study. A case study is a systematic study of a single entity, individual, group, or unit, which researchers investigate in greater detail

and depth in relation to a number of variables (Creswell, 2015). Zimbabwe has 22 universities offering online TDE. Of these, five were randomly selected as cases to participate in the study. A sample of 1,300 students from a population of 74,000 students was selected from the five universities using a stratified random sampling strategy to ensure a proportionate number of students were selected from each university (Creswell, 2015). The sample size was determined using the Research Advisors' (2006) sample size table using a 95% confidence limit and a 2.5% margin of error. Distribution of students in the study sample from the five universities ( $X_i$ ) was as follows:  $X_1 = 244$ ;  $X_2 = 291$ ;  $X_3 = 396$ ;  $X_4 = 221$ ; and  $X_5 = 148$ . The sample profile is presented in Table 1.

Table 1 shows more students aged 25 years and under (58.6%) in the universities than in any other age category—this is a normal trend, owing to the fact that undergraduate enrolments always represent the largest group in universities. Universities are now recruiting more female students (53.9%) than male students (46.1%). Most university students are undergraduates (66%), which again is a normal trend, as there are more undergraduate students in universities than in any other programmes.

**Table 1**

*Respondents' Biographic Factors*

Factor	Item	%
Age (years)	≤ 25	58.6
	26–30	35
	≥ 30	6.4
Gender	Male	46.1
	Female	53.9
Program pursued	Bachelor's degree	66
	Master's degree	30.4
	Doctoral degree	1.7
	Other	1.9

## Results

The Software Package for Social Sciences (SPSS) version 24 was used for data analysis. Structural equation modelling using Amos version 22 was employed to establish the nature of the relationship between the five independent variables—characteristics of students (CS), characteristics of lecturer (CL), characteristics of institution (CI), characteristics of external stakeholders (CES), and cultural and norms issues (CNI)—and the dependent variable, behavioural intentions (BI).

### Data Validation

The researcher validated the data collected using the following tests: data normality, nonresponse bias, common method bias, composite reliability, convergent validity, and discriminant validity.

### ***Normality Test***

It is important for quantitative data that involves testing relationships between variables to be assessed for data normality. SPSS 24 was used in the study to test for data normality: the researcher used histograms, box plots, and visual observations of normal quantile–quantile (Q–Q) plots SPSS 24 to demonstrate the normality of the data collected. Further confirmation of the data's normality was done using the *Z* score, where for all data entries, the *Z* score ( $n = 440$ ) was in the range of  $-2.326$  to  $2.326$  at the 1% level of significance (Base, 2018; McLeod, 2019).

### ***Common Method Bias Test***

Common method bias (CMB), also called common method variations, relates to variations that occur as a result of the instrument used rather than the respondents' actual characteristics (Rodríguez-Ardura & Meseguer-Artola, 2020). To detect the presence of CMB in the study, the CMB assessment tool developed by Bagozzi et al. (1984) was used. In the current study, the researcher detected the presence of CMB by examining the correlation matrix between all research constructs. It was found that the correlation matrix between each pair of constructs was less than .9, which demonstrated that there was no threat of CMB in the study data (Rodríguez-Ardura & Meseguer-Artola, 2020).

### ***Nonresponse Bias Test***

The test for nonresponse bias (NRB), as articulated by Armstrong and Overtone (1977), where research should compare the means of each item of the first  $n$  respondents and of each item of the last  $n$  respondents, was used in the study. From the 440 respondents, the researcher compared the means of each item of the first 100 respondents and of each item of the last 100 respondents and found no significant differences; hence, it was concluded that the current study was not affected by nonresponse bias.

### ***Convergent Validity Measurement***

The results in Table 2 show the application of Amos 25, which was used to estimate the measurement model fit in the study. The indices used in estimating model fit include the following: the CMIN/Degrees of freedom ( $\chi^2/df$ ), the goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), the normed fit index (NFI), the Tucker–Lewis index (TLI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Table 2 shows that at the initial stage, the measurement model fit analysis had fit indices that affected data clarity as they were less than .7 (Hair et al., 2014). For data clarity (Hair et al., 2017), therefore, all items for  $\lambda$  and  $I_a$  that were less than .7 were removed from the overall data and the measurement model.

**Table 2**

*Measurement Model Fit Indices*

Model fit indices	Initial measurement model	Final measurement model	Recommended values
$\chi^2/df$	1.553	1.565	$\leq 3.000$
GFI	0.958	0.967	$\geq 0.950$
AGFI	0.902	0.970	$\geq 0.900$
NFI	0.925	0.964	$\geq 0.950$
TLI	0.951	0.961	$\geq 0.950$
CFI	0.926	0.938	$\geq 0.900$
RMSEA	0.051	0.055	$< 0.080$

*Note.* Assessment of model fit was done for the second time, giving an improved model fit. The following data items were therefore removed: CS4, CL2, CL6, CS1, CS2, CS7, CES2, CES4, and CNI2. GFI = goodness of fit index; AGFI = adjusted goodness of fit index; NFI = normed fit index; TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation (Hooper et al., 2008; Kline, 2005).

Table 3 shows the model fit indices—namely, composite reliability (CR $\alpha$ ), standardized factor loadings ( $\lambda$ ), average variance extracted (AVE), Cronbach's alpha reliability ( $\alpha$ ), individual dual item reliabilities (squared multiple correlations) (I $\alpha$ ), and critical ratios (CR), which were used to confirm convergent validity of the data. All the indices were above the minimum benchmarks for confirming the convergent validity of the data as shown by all  $\lambda > .6$  (Bagozzi & Yi, 1988); all I $\alpha > .5$  (Kwan & Chan, 2014); all CR  $> 2$  and significant at  $p < .01$  (Gao et al., 2008); all  $\alpha > .7$  (Hair et al., 2017); and also CR $\alpha > .0$  (Hair et al., 2014). Additionally, all AVE values were  $> .5$  (Fornell & Lacker, 1981).

**Table 3**

*Convergent Validity Measurement*

Model constructs	Items	$\lambda$	I $\alpha$	CR	$\alpha$	CR $\alpha$	AVE
CS	CS1	.751	.783	-	.830	.833	.715
	CS2	.803	.649	28.117*	-	-	-
	CS3	.815	.704	26.019*	-	-	-
	CS5	.749	.744	23.572*	-	-	-
	CL	CL1	.810	.791	-	.800	.821
CL	CL3	.833	.801	21.361*	-	-	-
	CL4	.761	.825	19.447*	-	-	-
	CL5	.819	.759	15.401*	-	-	-
	CI	CI3	.845	.748	-	.761	.766
CI	CI4	.861	.801	27.563*	-	-	-
	CI5	.773	.759	24.248*	-	-	-
	CI6	.826	.801	21.647*	-	-	-
CES	CES1	.805	.739	-	.788	.791	.662

	CES3	.793	.754	25.613*	-	-	-
	CES5	.759	.801	23.80	-	-	-
	CES6	.827	.763	20.391*	-	-	-
CNI	CNI1	.847	.794	-	.803	.816	.719
	CNI3	.796	.802	18.447*	-	-	-
	CNI4	.851	.783	14.269*	-	-	-

Note.  $\Lambda$  = standardized factor loadings;  $I\alpha$  = individual dual item reliabilities (squared multiple correlations); CR = critical ratios;  $\alpha$  = Cronbach's alpha reliability;  $CR\alpha$  = composite reliability; AVE = average variance extracted; CS = characteristics of students; CL = characteristics of lecturer; CI = characteristics of institution; CES = characteristics of external stakeholders; CNI = cultural and norms issues. CR is fixed.

\*  $p < .001$ .

To confirm discriminant validity of scale items, the relationship between the square roots of AVE (bold diagonal values) for each construct were compared with the vertical correlations of the constructs (Hair et al., 2014). The results in Table 4 show that diagonal loadings are greater than their corresponding vertical loadings of each construct, demonstrating the scale items' discriminant validity. Table 4 also shows that all constructs were positively associated with each other, which means that a change in any one of the constructs positively impacted the others.

**Table 4**

*Discriminant Validity Measurement*

Variables	AVE	M	SD	CS	CL	CI	CES	CNI
CS	.715	3.84	0.71	<b>.846</b>	-	-	-	-
CL	.648	3.81	0.67	.315**	<b>.805</b>	-	-	-
CI	.734	3.95	0.59	.629**	.721**	<b>.857</b>	-	-
CES	.662	3.79	0.68	.401**	.604**	.755**	<b>.814</b>	-
CNI	.719	3.61	0.69	.522**	.613*	.643*	.381*	<b>.847</b>

Note. AVE = average variance extracted; M = mean; SD = standard deviation; CS = characteristics of student; CI = characteristics of institution; CES = characteristics of external stakeholders; CNI = cultural and norms issue; CL = characteristics of lecturer.

\*  $p < .01$ . \*\*  $p < .001$ ; Bold diagonal values in the table represent the square roots of AVE values for each variable.

**Hypotheses Testing Using the Structural Modelling Approach**

In the results of the structural modelling, shown in Table 5, behavioural intentions to persist with TDE (BI) is taken as the dependent or exogenous variable, while characteristics of the student (CS), characteristics of the instructor (CL), characteristics of the institution (CI), characteristics of the external stakeholders (CES), and cultural norms and issues (CNI) are taken as independent or endogenous variables. The five hypotheses (H1–H5) were tested using the structural equation modelling in Amos 25. Assessment of the model fit showed that all the model fit indices were within the acceptable range:  $\chi^2/df = 1.638$ ; GFI = .947; AGFI = .923; NFI = .971; TLI = .981; CFI = .969; and RMSEA = .551 (Hooper et al., 2008; Kline, 2005).

**Table 5**

*Test of Hypotheses*

Hypotheses	Hypothesized relationships	SRW	CR	<i>p</i>	Decision
H1	BI CS	.329	3.149	0.0007	Accepted
H2	BI CL	.362	3.394	0.0001	Accepted
H3	BI CI	.427	7.211	0.0004	Accepted
H4	BI CES	.279	5.271	0.0000	Accepted
H5	BI CNI	.325	7.371	0.0004	Accepted

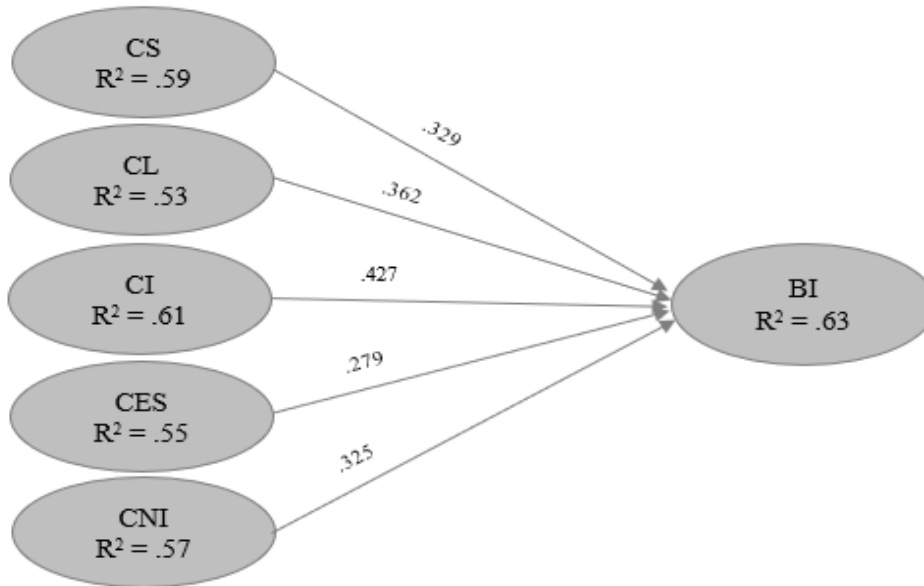
*Note.* SRW = standardized regression weight; CR = critical ratio; H = hypothesis; BI = behavioural intentions; CS = characteristics of students; CL = characteristics of lecturer; CI = characteristics of institution; CES = characteristics of external stakeholders; CNI = cultural and norms issues. CS( $R^2 = .59$ ); CL( $R^2 = .53$ ); CI( $R^2 = .61$ ); CES( $R^2 = .55$ ); CNI( $R^2 = .57$ ); BI ( $R^2 = .63$ ).

\*  $p < .001$ .

The results of the hypotheses testing in Table 5 show mixed results, with some variables significantly influencing BI and others not. Demonstrating that all five hypotheses were supported, the model's path analysis shows that the following factors significantly influence BI: CS ( $\beta = .329$ ;  $p < .001$ ), CL ( $\beta = .362$ ;  $p < .001$ ), CI ( $\beta = .427$ ;  $p < .001$ ), CES ( $\beta = .279$ ;  $p < .001$ ), and CNI ( $\beta = .325$ ;  $p < .001$ ). These results further show that CI had the highest influence on BI, followed by CL and CS. CES had the least influence on BI. The results in Table 5 as well as in Figure 2 show the explanatory power of the latent variables as follows: CS (59%), CL (53%), CI (61%), CES (55%), and CNI (57%); CI explained the highest and CNI explained the lowest variance on the BI of students to pursue TDE. This shows that the five latent variables were strongly supported by the model. The model as a whole explains 63% of the variation in university students' behavioural intentions to persist with TDE.

**Figure 2**

*Path Coefficient of the Study*



*Note.* CS = characteristics of student; CL = characteristics of lecturer; CI = characteristics of institution; CES = characteristics of external stakeholders; CNI = cultural and norms issues; BI = behavioural intention.

## Discussion

The results of this study show that microsystem factors have a significant influence on the behavioural intentions of university students to persist with TDE during and beyond the COVID-19 era. Characteristics of students that include attitude towards technology, technology self-efficacy, interest, and social presence are important for the development of behavioural intentions to persist with TDE. This has also been confirmed in past studies. For example, Yang et al. (2017) and Fidalgo et al. (2020), in separate studies, found that students' characteristics including time management, technology self-efficacy, social presence, and interest are critical to the development of behavioural intentions to keep using TDE. The critical role of motivation, both intrinsic and extrinsic, in the use of technology for learning has also been highlighted as critical for university students' development of behavioural intentions to persist with TDE (e.g., Yang et al., 2017).

With regard to the characteristics of the instructor or lecturer, the results of this study show that the ways that lecturers prepare to teach and interact with students during both synchronous and asynchronous sessions have bearings on students' attitudes towards TDE, which in turn contributes to their behavioural intentions to persist with it. The technology self-efficacy of the lecturers, particularly, has been identified in various studies (e.g., Au et al., 2019; Tait, 2018) as having a critical role to play in the way lecturers teach and hence in the behavioural intentions of students to persist with TDE. This has been confirmed in earlier

studies. For example, Tait (2018) found that lecturers' competences, attitudes, and perceptions, as well as pedagogic attributes in terms of teaching facilitation and presence, are important for the students developing positive attitudes towards TDE. In their study, Au et al. (2019) also found that lecturers' technology self-efficacy is perhaps the most critical element in promoting effective facilitation of TDE that contributes to the development of students' positive attitudes towards TDE. Tait (2018) found that the lecturers' competences, attitudes, perceptions, and pedagogic attributes, in terms of teaching facilitation and presence, are important for students developing positive attitudes towards and persistence with TDE. Therefore, how lecturers conduct themselves while facilitating TDE, as well as their teaching abilities and knowledge of content, is critical.

Results also indicate that an institution's characteristics have a significant influence on the behavioural intentions of university students to persist with TDE during COVID-19 and beyond. The presence of up-to-date, adequate, and appropriate technological infrastructure at the universities as well as the level of support the students get from both the institutional management and the technology support teams are viewed as critical for the development of positive attitudes by students towards TDE, leading to the development of behavioural intentions to persist with the TDE during the COVID-19 era and beyond. Tait (2018) and Vanides (2018) found that the creation of a conducive learning environment at the universities, where students can easily access online learning resources; use online systems; and are able to interact with each other, with instructors, and with materials synchronously and asynchronously, and also where learning happens in a flexible and relaxing environment, is critical for the development students' behavioural intentions to persist with TDE.

Characteristics of external stakeholders, which are exosystem factors, also emerged as having a significant influence on university students persisting with TDE during and beyond COVID-19. The behaviour and pronouncements of external stakeholders such as government, workplaces and even community members with regards to TDE can make or break how students view the program and whether they will continue with the program. If stakeholders view the program in a negative way, then students will also view it in a negative way and may not want to continue with it. On the other hand, if stakeholders view it in a positive way through, for example, the government coming up with supportive policies and workplaces accepting graduates from the program, university students will also view the program in a positive way, and many may want to persist with the program. Several previous studies have alluded to the important role of external stakeholders in ensuring that university students persist with TDE. In their study, Ettekal and Mahoney (2017) found that the policies that government and its agencies promulgate, as well as quality demands on the nature of university graduates by both workplaces and government, have both a direct and indirect influence on how students view TDE and, in most cases, help to define whether or not the students persist with TDE.

It further emerged from the current study that culture and norm issues, as macrosystem factors, have a significant influence on the persistence by students with TDE during the COVID-19 era and beyond. Culture has always played a critical role in shaping how people think and act, and in the context of the current study, culture shapes and defines whether students support the idea of TDE (Ettekal & Mahoney, 2017) and are prepared to persist with it. If students therefore grow up in an environment, whether at school or outside, where the use of technology is an everyday occurrence, such students may find using technology for DE a



motivating experience and will be prepared to continue with it. At the same time, students who do not grow up in a culture of technology may find using technology for learning a very challenging task and may not develop behavioural intentions to persist with TDE even during COVID-19. This is confirmed in a study by Exploring Your Mind (2020), which found that the sociocultural environments in which students live can either support or oppose the culture of technology use for teaching and learning and hence may affect the behavioural intentions of students to persist with TDE.

## **Conclusion and Recommendations**

This study sought to establish and explain the determinants of students' persistence with TDE in universities during the COVID-19 era and beyond. Based on the results, it was concluded that cultural and norms issues and characteristics of students, lecturers, institutions, and external stakeholders are critical determinants of university students' persistence with TDE. This suggests that the first important thing that universities need to do to ensure that their students continue with the TDE is to provide the necessary human and material resources to support programs. This could be done by creating a conducive e-learning environment with adequate modern technological resources, highly trained teaching and support staff, and consultative and supportive leadership. Also, government needs to come up with necessary and supportive policies that help to portray TDE in a positive manner and also help to ensure that TDE gets adequate support in terms of technology infrastructure and training.

## **Implications**

This study opens an important window to and underwrites the critical role of TDE in general and during periods of pandemics, such as COVID-19. TDE has been shown to be a critical driver of access to education during disasters if factors that inhibit its success are adequately dealt with. Most importantly, this study has implications on both practice and policy with regard to the implementation of TDE in universities. Regarding practice, the study shows how TDE can be effectively implemented by identifying barriers to its implementation and how such barriers can be addressed. With regard to policy, the study can contribute to the development of policies by both government and industry that contribute to positive attitudes towards TDE, since one of the critical factors that affects effect implementation of TDE has been identified as attitudes.

## **Limitations**

The study used a quantitative approach, which may have affected the depth and breadth of data collected about the behavioural intentions of university students to persist with TDE. Future studies may use a mixed-methods approach either to validate the current study's findings or to improve them.

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# Developing Institutional Open Educational Resource Repositories in Vietnam: Opportunities and Challenges

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## Abstract

The introduction of open educational resources (OER) provides new opportunities for learners worldwide to access high-quality educational materials at the lowest cost. As a developing country, Vietnam is one of the countries that can most benefit from the OER movement. However, the concept of OER in Vietnam remains little known to the public, with few institutional OER repositories (IOER) developed. This study contends that IOER development in Vietnam is complicated and constrained by many contextual difficulties; it was designed to explore the challenges and opportunities. After a literature review, 20 semi-structured interviews were conducted with relevant stakeholders. Building on the findings from the literature, this study found that IOER development in Vietnam is constrained by five categories of challenges: (a) technological and infrastructure matters, (b) economic constraints, (c) sociocultural characteristics, (d) pedagogical concerns, and (e) legal limitations. Many of these challenges are not identified in the literature and provide insights into potential implications and solutions for future IOER in Vietnam and other countries.

*Keywords:* open educational resources, OER, institutional open educational resource repository development, IOER



## Introduction

The open educational resources movement is a global phenomenon similar to other open movements such as open education, open-source software, and open access (Stracke, 2020). These grassroots initiatives share a common vision: to make our communities and global society better through free and open solutions. The term *open education resources* (OER) was coined and defined at a UNESCO forum in 2002 (UNESCO, 2002) and refined via declarations (notably, the 2011 *Guidelines on Open Educational Resources in Higher Education*) (Stracke et al., 2019). Additional impetus was provided by World Congresses in Paris (2012) and Ljubljana (2017), both organised by UNESCO. The Ljubljana OER action plan (UNESCO, 2017) led to the UNESCO Recommendation on OER, adopted by all 193 member states (UNESCO, 2019). Although the establishment of the OER movement, closely connected to UNESCO, represents a top-down approach, the OER movement has subsequently been driven by grassroots initiatives, communities, and individuals. National authorities, such as the Ministries of Education in the Philippines and Slovenia or supra-national ones, such as the European Union, have started to consider OER as a valuable strategy only in recent years (European Commission, 2013; Stracke, 2019).

OER comprise all types of educational resource in a global, national, or institutional repository that are released with an open license, granting free access and the right to adapt and reproduce resources (Truong, 2020). This study investigates the development of institutional OER repositories (IOER), defined as online archives in universities used for collecting, preserving, and disseminating OER. These OER are either the intellectual output of the university or localised resources from elsewhere.

In Vietnam, the concept of OER was introduced almost two decades ago. In 2002, the Fulbright Economics Teaching Program in Vietnam published its teaching and research materials online. Following a visit in 2005 to the United States by the Vietnamese prime minister, who received a copy of Massachusetts Institute of Technology's (MIT) entire OpenCourseWare (OCW) material, the Vietnam OCW program was established, and in December 2007, an official website (<http://www.vocw.edu.vn>) was launched; in 2008 it was renamed VOER (Vietnam Open Educational Resources). The OER@University Roadshow program was established in 2016 to train university-level librarians and lecturers across Vietnam to use and create OER. International and national conferences on OER have been organised; the most recent being held in Hanoi in October 2019.

Universities and their libraries in Vietnam have been enthusiastic about participating in OER programs offered by the government or other agencies. However, they remain hesitant to create their own IOER, reflected in the lack of operational IOER. It is believed that the development of IOER in Vietnam is complicated and constrained by contextual difficulties, but little research has been published as to why this is. This article reports on exploratory research designed to investigate the challenges and opportunities in promoting and developing IOER in Vietnam.

## Literature Review

A considerable volume of literature about OER published since 2000 suggests that building a high-quality, diverse, and sustainable OER repository is challenging and requires preparation and a well-thought-out strategy on the part of decision-makers and implementers (e.g., Coughlan et al., 2019; Friesen, 2009). The literature identifies five main categories of challenges that countries and

institutions face when embracing the OER movement: (a) technological and infrastructure limitations, (b) economic constraints, (c) sociocultural characteristics, (d) pedagogical concerns, and (e) legal issues.

Numerous studies have reported constraints related to computing and communications infrastructure in less developed or developing countries (Mtebe & Raisamo, 2014; Ngimwa & Wilson, 2012; Thumbumrung & Aroonpiboon, 2018). Some studies (e.g., Dutta, 2016; McGreal, 2017; Mosharraf & Taghiyareh, 2016) also indicate that the successful harnessing of OER can be affected by economic factors. Developing IOER requires an initial investment in information and communication technologies (ICT) facilities and infrastructure, services, production costs, policy development, training, and marketing campaigns. Sustaining an IOER project may require significant long-term commitment of resources as the repository's quality is dependent on the quality of maintenance, curation, and preservation (Hodgkinson-Williams, 2010; Hu et al., 2015; Thumbumrung & Aroonpiboon, 2018).

Sociocultural characteristics have been recognised as a major challenge to advocacy of the open movement in general. These include linguistic diversity, cultural sensitivities, and diversity within a country, as well as stakeholders' characteristics, such as their awareness, willingness, and capacity to adopt OER (Hu et al., 2015; McGreal, 2017; Thumbumrung & Aroonpiboon, 2018). Pedagogical issues related to educational culture may also hinder adoption of OER. National and institutional teaching and learning culture can directly influence stakeholders' incentives to adopt and produce OER (Hodgkinson-Williams, 2010; Mosharraf & Taghiyareh, 2016; Thumbumrung & Aroonpiboon, 2018). The evidence further suggests that legal issues, such as incompatibilities between national intellectual property (IP) rights regulations and OER's open licences, the governance of open licences, and dealing with third-party copyright issues, can prove problematic (Dutta, 2016; OECD, 2007; Pena, 2009).

Scholars in Vietnam (e.g., Do, 2013; Do et al., 2019) have reported contextual challenges to the OER movement based on their conceptions or the perspectives of users, such as users' limited capacity in using OER, the prevalent teaching and learning approaches in the country, or problems related to copyright and IP rights. In Vietnam and internationally, there is a scarcity of empirical research relating to the development of IOER from the viewpoint of higher education providers. The primary goal of the current study is to answer the following question from the perspective of higher education providers: What are the opportunities and challenges in developing IOER in Vietnam?

## Methods

Elman et al. (2020) state that researchers consider using an exploratory approach when there is a general lack of knowledge or little information about the research topic. Because of the lack of research into the contextual challenges and opportunities facing IOER development in Vietnam, the current project was designed as exploratory research. To achieve its objectives, this qualitative study was conducted by adopting an interpretive research paradigm with an inductive reasoning approach capable of providing in-depth understanding of the phenomena being investigated from the interviewees' perspectives. Goldkuhl (2012, p. 135) states that a qualitative approach is often associated with the interpretivist paradigm, which can be applied to "social constructs that are complex and always evolving, making them less amendable to precise measurement or numerical interpretation" (Glesne & Peshkin, 1992, p. 6). Data were collected through interviews with participants who know about or had participated in the OER movement or IOER development in Vietnam. A combination of non-probability

sampling techniques (purposive sampling and snowball sampling) was used to select interview participants. The main reason for adopting these sampling techniques is the nature of this research, which targets a group of people who are challenging to identify, locate, and recruit (Williamson, 2017). Analyses of relevant policy and strategy documents, where available, were also undertaken.

Ethics approval was obtained on December 3, 2018. Data collection was undertaken in Vietnam in early 2019. 20 participants were interviewed, from two foreign universities, seven public universities, three private universities, and two education-related organisations, all based in Ha Noi, Hai Phong, Ho Chi Minh City, and Can Tho—four of the largest Vietnamese cities by population. Participants included two university administrators (UA), three IOER leaders (OL), five library administrators (LA), two librarians (LS), two faculty administrators (FA), three faculty members (educators) (F), and three OER champions knowledgeable about and committed to the OER movement (C). IOER leaders are those who lead OER repository development projects in their institutions. Each interview took place face-to-face, averaging 70 minutes. The interviews were semi-structured, with an opening question (“What are the challenges and opportunities of developing IOER at your institution and in Vietnam?”) followed by more probing questions (e.g., “How do copyright laws affect teachers and students?”; “Why is achieving institutional autonomy important for OER repository development?”).

The collected data were first transcribed verbatim and then analysed using the conventional content analysis approach (Hsieh & Shannon, 2005). Using NVivo 12, the codes and concepts emerged directly from the data during the coding process. These were then compared with the literature to gain a broader understanding of the context and sorted into meaningful categories and themes based on their nature, relationships, and suggestions that resulted from the comparison.

## Findings

Five categories of challenges for the development of IOER in Vietnam were derived from the data analysis: technological and infrastructure issues, economic constraints, sociocultural characteristics, pedagogical concerns, and legal limitations.

### Technological and Infrastructure Matters

IOER are primarily collections of digital resources requiring digital tools, software, and systems to be used, and so the impact of technological factors must be considered. Access to ICT devices and Internet connectivity in Vietnam is not an issue; however, 14 interviewees raised technology issues such as low bandwidth, obsolete technologies, and limited access to ICT facilities and hosting services. One champion (C2) suggested that smaller universities in remote areas may find these issues especially challenging and that although a university in Vietnam may be able to develop an IOER to serve its students and staff, it would not be able to afford to serve the whole country or the world.

Ideally, the tools used to create, develop, collaborate, deliver, search, and use open learning content would be open-source. Five interviewees commented that some universities had leaders who understood the value of free and open-source software (FOSS) and had recently implemented open-source tools on their campuses (e.g., Thang Long University and Hai Phong Private University). Most, however, thought that it would be challenging to replace commercial software with FOSS in Vietnam:

users' apathy towards FOSS is a critical obstacle prevailing against the general benefits of following open principles. As a lecturer explained,

In the past, we also installed open-source software operating systems like Ubuntu for the computers in our learning resource centre ... but not anymore. In fact, the Windows operating system has ingrained in everyone's minds, so when we changed [to the new type], users showed less interest. (F2)

This is potentially a critical issue affecting sustainability, because although the use of FOSS typically requires an initial investment and a reliable arrangement for ongoing maintenance, the costs are generally significantly less than for commercial software and systems and, in particular, annual licence fees.

All interviewees considered university libraries to be best placed to implement IOER within higher education organisations (HEOs). However, to use FOSS, libraries need qualified staff to customise the software to meet their needs and the appropriate authority, funding, and support to do so. Currently, very few libraries are in this situation. As one IOER leader commented,

Developing IOER depends on the policy, economic and technical conditions of each university and country, but in Vietnam, it is especially difficult ... . If we want to make it technically open, we need a comprehensive policy from the university heads. (OL2)

Corroborating previous research, this study found that technological factors have a strong influence on IOER development in Vietnam. Shortcomings relating to the existence, availability, and development of technology need to be addressed to facilitate the development and adoption of the infrastructure needed to support IOER projects. This will take time, money, and significant effort.

### **Economic Constraints**

The lack of funding for IOER development projects was identified as a critical obstacle by seven interviewees, with funding required for improvements to ICT infrastructure, software and hardware maintenance, staff costs, training, and marketing. Such costs need to be provided for in university budgets and underpinned by appropriate policies and procedures. The director of a university library (OL3) was discouraged by the heavy cost pressures that libraries have recently been under, especially for commercial software licensing and scholarly resources subscriptions.

A library administrator commented, "We need to consider the sustainability aspect, like the annual maintenance fee, who will invest money to do that? ... The creation [of IOER] may not be hard but maintaining it is extremely difficult" (LA1). Indeed, apart from initial financial investment to implement the IOER project, the university needs to secure funding to sustain it.

Participants suggested that the type of education establishment influences the IOER development project. Universities in Vietnam, especially public universities, are overseen by the government and its agencies and have less autonomy than other types of educational establishments. Approximately 70% of HEOs are publicly funded and must follow state budget laws when planning and carrying out their activities. Financial issues can thus present a significant barrier to projects such as IOER development. This situation may be changing, as many public universities are currently transitioning from the old system of state subsidies to autonomy based on self-financing mechanisms, a move aimed at improving

the quality of tertiary education. As of 2020, the government has given some key public universities in Vietnam autonomy in areas including the right of self-government in developing policies, designing curriculums, managing budgets, calling for funding, and recruiting personnel. Eleven interviewees suggested that achieving autonomy opens up potential opportunities for public universities to develop IOER in the future. This is seen as an extremely important facilitating factor for the OER movement in Vietnam in general.

The findings suggest that a lack of funding is a principal reason why many university and library administrators are apathetic towards the OER movement in Vietnam.

### **Sociocultural Characteristics**

Interviewees raised many sociocultural issues they considered problematic, including a shortage of policy from government and university leaders regarding OER and IOER use and development, HEO communities and their attributes such as awareness about OER, attitudes to copyright and copyright enforcement, technological and information literacy, and English proficiency.

The Vietnamese government leads the country through the legal system, policies, and guidelines, playing a vital role in most of the activities of Vietnam's HEOs. Despite some early enthusiasm about OER, there has been a lack of policy development, and little has been done towards creating a supportive framework for OER on the part of government. This was considered a major obstacle by 15 interviewees. One participant commented:

In my opinion, the most important thing is the government's policy on this [OER and IOER]. So far, Vietnam does not have any policy for implementing OER initiatives. ... There have been people in many conferences to speak up on this issue, but the government still has no specific policy. (OL2)

This lack of OER policies means no official recognition, guidelines, support, or rewards exist for creating OER and developing IOER, leading to the apathy of universities, lecturers, and students towards the OER movement.

Limited awareness of OER and a lack of understanding by stakeholders in HEOs of OER's potential were most frequently raised as serious challenges. Fourteen interviewees argued that stakeholders' indifference to the OER movement was primarily due to insufficient appreciation of OER and their educational potential. One informant commented, "OER can only exist and thrive when there is a large number of users; unfortunately, users in Vietnam have not yet recognised those benefits" (OL3). Another explained that the problems their university has been facing also include users' lack of awareness and knowledge of OER: "Even if they know about OER, they do not know where and how to find them for their use" (OL1). Seven interviewees suggested that many Vietnamese lecturers have a mindset that leads them to underestimate the quality or value of OER, as it is free, and they equate free with valueless: "To users, OER means free of charge. In Vietnam, people understand that free stuff is worthless; you get what you pay for!" (OL3).

Attitudes towards copyright are also problematic. Users in Vietnam have a limited understanding of copyright law and what it means for access to various materials. Many believe that everything available on the Internet is publicly owned and can be freely used without crediting the author. Lack of copyright knowledge, perhaps combined with limited information literacy, can result in other issues: for example,

an IOER leader was surprised to find that some outside users were paying for access to OER materials from a third party when they were freely available on the library website (OL1). As many potential users cannot distinguish between the different copyright statuses of materials, they see little benefit in OER and so lack the motivation to develop and use OER.

Additional challenges relate to the skill levels of OER users and producers in areas such as digital and information literacy and English proficiency. Half of the interviewees suggested that limited digital and information skills are holding users back in terms of harnessing OER efficiently. The basic computer skills of the majority of Vietnamese people are relatively good compared with those of people in other developing countries; however, the capacity for searching, evaluating, localising, and classifying OER remains a hurdle. A library staff member (LS2) observed that many users were confused about evaluating the information sources found on the Internet.

Published OER are expected to be in Vietnamese; however, most existing materials are in English, so proficiency in English is required for their effective use. An IOER leader (OL2) at a foreign-owned university suggested that the process of developing its IOER had been less complicated than it would have been at a key public university, which this participant had previously worked at, due to students at this foreign-owned university having high proficiency in English. A champion added that “foreign language ability of Vietnamese users is quite poor. In the past, MIT provided us thousands of open courses, but our users couldn’t use them because they could not understand [those OER]. What a waste!” (C1).

As an educator, a certain level of fluency in English is also required to understand and localise these materials:

Lecturers can use Google translate, but their knowledge of the language is also crucial as they cannot just use Google translate to convert the material’s language to Vietnamese and then publish or share it, they need to proofread and revise the content. (OL1)

This particular problem may be changing as Vietnam’s government has recently launched English-taught advanced training programs at many universities to improve students’ English proficiency (LA3). Further, despite numerous potential socioeconomic barriers, in 2018, the minister of Information and Communications submitted a proposal to make Vietnam’s second language English, to assist the integration of Vietnam into the global economy. The proposal has received strong support from the community, and the expectation is that in the near future, English will be widely used in Vietnam (C1). Notwithstanding the challenges, the OER movement in Vietnam has the prospect of growing vigorously thanks to proactive champions who are committed to OER activities. Moreover, an increase in the number of university lecturers with overseas training and qualifications is expected to increase awareness of and understanding about the open movement, copyright, and IP rights in Vietnam (OL3; LA4).

### **Pedagogical Concerns**

Consistent with the literature, this study found that IOER development is impacted by a range of pedagogical issues, including the characteristics of teaching and learning, the existence and popularity of OER in Vietnamese and of developed IOER, and a general lack of recognition of libraries’ essential roles. Some of these are closely associated with the economic constraints and sociocultural characteristics identified in previous sections.

Lecturers in Vietnamese universities have two required tasks: teaching and scientific research. While lecturers invest time and effort in teaching, not all engage in research and publishing, for reasons including lack of time and facilities (stated by three respondents). University lecturers' primary source of income is derived from teaching. Depending on attributes such as seniority, qualifications, degrees, experience, and titles, university lecturers are classified into different categories and have different salary calculation formulas. Their salaries are not high compared with those of people in other careers. Consequently, lecturers often teach additional classes to increase their income, with some even working at private universities as visiting lecturers because the remuneration is higher (C2). The problem was summed up by a university board member, who said that "developing IOER is really difficult in Vietnam because, in my opinion, it is all about our income. We have not yet reached the level where we no longer care about the economic issues" (UA1).

Unwillingness to lose income from copyright materials such as textbooks also prevents some lecturers from creating OER. As a champion noted (C1), although some lecturers are willing to share their work as OER, others want to retain ownership of copyright so as to reprint new editions of textbooks regularly.

This study found that learning and teaching cultures in Vietnam, such as educators' teaching approaches and students' learning habits and practices, also strongly challenge IOER development. Five interviewees submitted that the teacher-centred instruction dominant in Vietnam can limit students' proactivity, curiosity, and exploration. They have less motivation to undertake additional research or seek learning resources, other than those provided by their instructors, to get a satisfactory mark. A participant commented,

Before coming here [a public university], I worked at [A] university library [a foreign-owned university]. I realised the learning and teaching styles of the two universities are very different. Over there, students must go to the library and look for references for their assignments. Students here, on the other hand, only need to learn from the given textbooks. ... They have no independence and desire to learn beyond that. (LA4)

These attitudes may be changing. Recognising the fact that in the information age, the ability to perceive, find, and use information has become a critical skill, a university rector emphasised the importance of encouraging students' curiosity and research:

It's the responsibility of the lecturers in developing the curriculum that requires students to search for and use more learning resources. Our university's training program is designed to reduce the time on classes and give students more time for self-studying. (UA2)

A related issue is lack of familiarity with the culture of sharing IP, for example, by waiving copyright and related rights, which is necessary in an OER environment. A library staff member commented: "In Vietnam, educators are very afraid of 'opening' [showing] the content of their works to others; so persuading them to 'open' their works is also a problem. They are not used to such [sharing] culture" (LS2). It is common practice for both students and lecturers to keep their IP protected and closed to the public. A side effect of this, which also contributes to the issue, is the lack of a comprehensive academic database with which to conduct similarity checks, making it harder to detect plagiarism and IP infringements. As noted by 11 interviewees, the fear of being plagiarised, or being discovered to have

deliberately plagiarised, is one reason why users in Vietnam are reluctant to “open” their written or published works. One interviewee provided an example:

There was a university library that had two identical dissertations located next to each other on the shelf with the same classification numbers and no one had noticed them. The first librarian catalogued the first book, and after a few years, the second staff member did the second one, so they didn't recognise them. In the end, a reader explored the similarity when reading both of them. (LA3)

There is also a perception that Vietnamese OER are poor quality. The lack of OER localised into Vietnamese language and context and the national VOER's unpopularity are challenging the promotion of the OER movement in Vietnam. When asked about the VOER program, a participant observed,

I know it, but as far as I can see in Vietnam, it's not widely used. When I came to check it out [VOER website], it was unclear and not very easy to use. ... Secondly, they did not develop complete textbooks, but created separate pieces. To me, as a user, I doubt their reliability, consistency, and completeness. (OL2)

Such views may, however, depend on the type of stakeholder. Different users have different expectations of educational materials and thus of what should be available as OER. For example, undergraduate students and learners prefer complete resources, such as courses or textbooks, while lecturers are probably interested in reusable learning objects, such as multimedia simulations or case studies. Graduate students will pay more attention to research-supported materials such as open data or academic publications than to lecture slides. Thus, the comment above may not necessarily reflect poor quality but a failure to properly target or cater for the needs of different stakeholders.

Six interviewees reported that currently, OER initiatives in Vietnamese HEOs are mostly ad hoc, with no university having successfully developed a genuine IOER. This situation has led to higher education communities' lack of confidence and willingness to harness OER for teaching and learning practices, or to engage with IOER development activities.

All interviewees regarded university libraries to be best placed to implement and maintain IOER. However, lack of recognition of libraries' essential roles in learning and teaching by other stakeholders was seen as presenting a serious obstacle to IOER development. Such attitudes impact on library staff who, despite acknowledging the benefits of OER, lose motivation due to a lack of authority and incentives, as suggested by two interviewees. These issues appeared to be connected to the type of educational institution and the degree of autonomy of decision-making allowed: private and foreign universities in Vietnam have higher levels of autonomy in comparison with public universities, and thus, they have more flexibility and authority in using and creating OER and developing IOER. The IOER leader from a foreign-owned university explained:

In my university, lecturers have more independence than those from other schools [public universities]. People [OER advocates] need to have a different approach to those lecturers [from public universities] as they need to get permission from their superiors to include OER in the curriculum. (OL2)



Reflecting the literature, the results of this study show that the pedagogical concerns and practices in HEOs exert a strong influence on the OER movement in Vietnam. The type of education establishment and institutional autonomy are demonstrated to be influential factors for IOER development.

### **Legal Issues**

Because the concept of OER was only formulated in 2002, it can be expected that issues would arise with the legal systems of numerous countries and that those issues would need to be addressed to create a supportive legal framework. Although Vietnam's IP legislation covers every aspect of the protection of IP following international standards, there are ambiguities relating to copyright ownership of educational resources. For example, a lecturer (F2) commented that as Vietnam has no clear regulations on the legality of open licences, educators hesitate to create and use OER.

The situation is further complicated if the work includes third-party components. Materials created by a member of staff or students at an HEO in the course of their employment or training, for example, research publications and student projects, provide a rich source of educational materials. In such cases, it is not clear whether copyright belongs to the employer (university) or the creator. This lack of clarity in copyright policy and law was noted as an issue by seven participants.

Due to the large number of regulations involved, law enforcement in Vietnam can be complicated. In the education sector, inconsistencies between education law, publishing law, and law on IP rights, together with the low level of penalties and compensation, have resulted in a large number of copyright infringement cases. Consequently, universities are reluctant to act on copyright infringement lest it damage their reputation. An IOER leader revealed an unexpected infringement case in the past (OL3): this person was blamed by another university for giving open access to their university institutional repository so that users could notice the copyright infringements by students at that university.

Consistent with previous studies, this research found that the limitations and inconsistencies of Vietnam's legal system constrain IOER development and also the OER movement in this country.

## **Discussion**

This research supports the findings reported in the literature: that when developing OER and IOER, HEOs in countries such as Vietnam face a set of challenges in terms of technological and infrastructure matters, economic constraints, sociocultural problems, pedagogical concerns, and legal limitations.

Technology-related factors were identified as influential on the OER movement and especially on the development of IOER in Vietnam, similar to that in other countries described in the literature (e.g., Mtebe & Raisamo, 2014; Ngimwa & Wilson, 2012; Torres, 2013). However, the most critical technological problem in Vietnam is not related to access to ICT facilities or Internet connection; rather, it is ensuring the sustainability of the IOER by employing FOSS. Ideally, an open educational resource should be based on open licensing, be open access, and be published in open formats using FOSS (Markoff, 2005). Currently, it would be challenging to ensure that these key requirements are achieved in Vietnam. A more realistic strategy might be to aim for a limited version of the OER model. The steps towards OER require time and effort from all parties; changing people's philosophy from "closed" to "open" is the biggest challenge. Regarding technical issues, it seems that securing the creation, publishing, and distribution of OER entirely based on FOSS would be time-consuming and difficult to

achieve, hence, educational resources published in open access and with an open licence only should be encouraged. Once stakeholders are familiar with OER and the “open” concept, universities can start implementing open source to ensure the sustainability (i.e., the long-term continuation) of their repositories.

Similar to that of other nations reported on by various scholars (e.g., McGreal, 2017; Ngimwa & Wilson, 2012; Pena, 2009), Vietnam’s lack of funding for initiating and sustaining a project is identified as an impediment to IOER development. As noted, most activities of public HEOs in Vietnam are under the direct management of the government and funded through the state budget. This explains why foreign and private universities are more active in the open movement in this country, as they are more flexible in mobilising their budgets. Given the potential that OER offer to education, the government and other authorised bodies in Vietnam should give greater autonomy to public HEOs, allowing them to have the freedom to formulate and execute operational strategy and plans for their institutions.

This investigation has explored many sociocultural challenges that constrain higher education providers in developing IOER. Among them, the lack of stakeholders’ advocacy was identified as the biggest obstacle to the OER movement in Vietnam, also recognised in previous research in other countries (Hu et al., 2015; Thumbumrung & Aroonpiboon, 2018; Torres, 2013). This challenge can be addressed if higher education communities can be convinced of the real benefits of OER. This study contends that providing opportunities to use high-quality OER from overseas contributes significantly to changing users’ views about free and open resources. HEOs should facilitate the localisation of high-quality OER into Vietnamese. Language is an enabling factor for developing IOER in Vietnam, as despite having 54 ethnic groups, Vietnamese is the single official language of the country. According to a 2018 UNESCO survey, the adult literacy rate in Vietnam was 95%, which is considered an excellent advantage for localising OER in Vietnamese.

Important to IOER development is government and education administrators developing appropriate strategies and policies. Such policies should be aimed at tackling the financial, legal, and sociocultural issues identified. Although the official policy about OER has not been issued, the release by the government of Official Dispatch No. 4301/BGDĐT-GDĐT in 2019, which outlines recommendations encouraging the creation and development of OER at HEOs, is a remarkable milestone and is expected to be a critical facilitator in boosting the OER movement in Vietnam (Ministry of Education and Training, 2019).

This research has investigated the influence of pedagogical issues on the development of IOER, in line with other studies (e.g., Hodgkinson-Williams, 2010; Thumbumrung & Aroonpiboon, 2018; Torres, 2013). Despite the difficulties identified by the participants, positive moves have been made by higher education providers in Vietnam. For example, universities that have visionary top managers and proactive library staff (e.g., Thang Long University and Ha Long University) have recently taken steps to create and use OER (Do et al., 2019). Additionally, recognising the importance of libraries for teaching and learning, several universities (e.g., Ton Duc Thang University, Hai Phong Private University) have started to invest more in libraries, improving ICT infrastructure and recruiting skilled staff. These libraries have been empowered to organise, collaborate, and engage with other units within their universities to enhance the institution’s academic reputation and education quality (Do et al., 2019).

Further, a side effect of the COVID-19 worldwide pandemic has been to make online education mainstream. In early 2020, universities, institutions, and schools in many countries, including Vietnam, decided to move classes online to minimise the spread of COVID-19. More potential exists for OER in this environment, as educators can facilitate the rapid development of online courses, which could in turn lead to more interest in OER.

This research indicates that the limitations and inconsistencies of Vietnam's legal system are constraining IOER development in Vietnam. Other countries have reported similar problems (see, e.g., Hodgkinson-Williams, 2010; Hu et al., 2015; Pena, 2009). Nevertheless, the recent introduction of certain laws has opened the door for the OER movement to thrive in Vietnam. For instance, in June 2019, the Law on Education No. 43/2019/QH14 was approved by the National Assembly. Article 4, clause 3 of this law clearly states, "Developing an open education system, building a learning society to create opportunities for everyone to have access to education, learning at all levels, all forms, and lifelong"; and Article 6, clause 1 says, "The national education system is an open and interconnected education system including formal education and continuing education" (Vietnam Government Portal, 2019a). It is expected that the newly released Law on Libraries, which came into effect in July 2020, will help libraries to function more efficiently and boldly, as it clearly defines the rights, obligations, and responsibilities of agencies, organisations, and individuals with respect to libraries and their activities (Vietnam Government Portal, 2019b).

In general, this research contributes considerably to the knowledge of IOER development from the perspectives of higher education providers. As noted, the Vietnamese government has recently officially declared its support for the OER movement via official dispatches and documents. In responding, universities in Vietnam must actively create favourable conditions for their lecturers, researchers, students, and learners to harness and create OER. Universities can refer to this study's findings to develop strategic plans to leverage opportunities and overcome obstacles when developing IOER.

Although these findings resulted from investigation in Vietnam, they may be applicable in supporting the development of IOER in other countries that have similar economic, cultural, social, and/or educational conditions to Vietnam. In Vietnam, stakeholders' lack of awareness of OER and advocacy are the most frequently raised serious challenges. Although the exact nature of these challenges varies according to the context of specific countries, OER advocates in other countries might face similar issues. They are urged to organise more OER promotion and awareness-raising activities that increase recognition of OER and their advantages among stakeholders. Once stakeholders understand the potential of OER, they can recognise their need for OER use and decide to support the OER and IOER development. Decision-makers should also incorporate libraries and library staff in any OER-related projects. These activities can be accomplished with sound procedures and policy, especially those on recognition, commendation, and rewards on using and creating OER and developing IOER.

## Conclusion

This research was designed to explore the opportunities in and challenges to the development of IOER in Vietnam. It identified challenges including: technological and infrastructure issues, economic constraints, sociocultural difficulties, pedagogical matters, and legal constraints. Many of these have not been previously noted in the literature. A number of opportunities were also identified, however, there remains a sense that they are outweighed by the challenges. This study also found that the

opportunities and challenges of the OER movement in Vietnam are interconnected. It is beyond the scope of this study to examine the opportunities and challenges of using OER from the perspectives of users. A further study focusing on the viewpoints of users in using OER in Vietnam is therefore suggested.

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# How Are We Doing with Open Education Practice Initiatives? Applying an Institutional Self-Assessment Tool in Five Higher Education Institutions

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## Abstract

This collaborative self-study examines how five higher education institutions in British Columbia (BC), Canada, have achieved momentum with openness and are implementing and sustaining their efforts. A goal of this research was to see whether an institutional self-assessment tool—adapted from blended learning and institutional transformation research—can help to assess how an institution has progressed with its open education initiatives. By adopting both an appreciative and a critical approach, the researchers at these five BC institutions compared the similarities and differences between their institutional approaches and the evolution of their initiatives. The paper includes discussion of how a self-assessment tool for institutional open education practices (OEP) can be applied to OEP initiatives at an institutional level and shares promising practices and insights that emerge from this research.

*Keywords:* open education practices, self-assessment tool, institutional initiatives, blended learning, institutional transformation



## Introduction

British Columbia (BC), Canada, has a well-established government-supported open education resources (OER) initiative that began in 2003 and subsequently became an open textbook initiative in 2012. Through BCcampus, the 25 public postsecondary institutions in BC are supported by OER grants, professional development, and research opportunities, as well as infrastructure for open textbook publishing. Since 2012, a total investment of \$1.7 million in OER development and grants has resulted in approximately \$26 million in student textbook savings, and a collection of curated and peer-reviewed textbooks has grown to over 360 items. Given the recent progress with OER and resultant open education practices (OEP) in BC, it is timely to address what success factors contributed to the recent momentum observed at five of the institutions. Therefore, we, as researchers from five public postsecondary institutions in BC, conducted a collaborative study based on our respective institutions.

Our research is informed by a position that openness, and open education, is a type of institutional change initiative and that there is value in looking at research on other types of institutional change initiatives for insights into success factors. As Weller et al. (2018) have noted, open education research has developed largely as islands of subtopics disconnected from each other, with the result that open education research has ignored previously published knowledge. Since institutional level studies on openness are a nascent area of inquiry, the following question arises: Can research on blended learning as institutional initiative (Graham et al., 2013; Lim & Wang, 2017) and research on broader institutional transformation (Kezar & Eckel, 2002) lend insights into potential success factors for institutional OEP initiatives? This article will discuss the themes emerging from our investigation of the theoretical and practical applications of an institutional self-assessment tool that identifies gaps and attends to the success factors for institutional-level OEP initiatives.

## Literature Review

OEP is a term that is continually contested and redefined. In this study, we define OEP as “a broad descriptor that includes the creation, use and reuse of OER, open pedagogies, and open sharing of teaching practices” (Cronin, 2017, p. 16). As explained in Inamorato dos Santos (2019),

Open education is about a set of practices that together can lead higher education to be more inclusive, in line with societal changes, and also to be more innovative in terms of making the most effective use of teaching and educational resources, research and students’ services. These practices are often referred to as open educational practices. (p. 8)

While considerable enthusiasm exists for the benefits of OEP, researchers and practitioners express ongoing concern about the sustainability of openness (Friesen, 2009; Rolfe, 2012; Wiley, 2007) and the growing realities of invisible labour in open education (Watters, 2018) and in academia more broadly (SSFN-RIG, 2017). Questions have been raised about whether grassroots open education efforts, led by keen faculty or institutional champions, are sufficient to expand OEP sustainably across an institution and whether the kind of support needed at all levels of the institution to do this is available. Furthermore, there is increasing recognition of the importance of examining institutional-level efforts to achieve openness as a

means to better grow, sustain, and evaluate the efforts. The recent report *Achieving the Dream* (Griffiths et al., 2020) states, “OER adoption is a strategic institutional initiative. Units across campus must work in coordination to plan and execute the development of OER courses across departments as well as related policies and practices for service units, advising, bookstores, and administrative functions” (p. 8). This report concludes that senior administrative support and faculty development and support are important to build momentum and remove obstacles to ensure scaling up of efforts. Similarly, in a recent US study, Spilovoy et al. (2020) found that faculty awareness of OER was higher when an OER initiative was implemented at an institutional level (p. 3).

As institutions move to consider implementing or assessing open education initiatives, it is crucial that they understand the characteristics and potential success factors as part of the process. Hannon et al. (2014) observe that bootstrapping—where local OER initiatives serve as a catalyst to institutional OEP—can occur, but they note that “it is critical that new arrangements are established and nurtured with diverse social-technical entities, including participants, procedures, policies and technologies alike” (p. 148). Inamorato dos Santos et al. (2016) offer a 10-dimension framework of strategies for higher education institutions and policy makers to “promote transparency for collaboration and exchange of practices among higher education institutions” (p. 2), noting that without such a tool, institutional stakeholders may overinvest in some areas and overlook others. We share this concern and, in our study, provide a rationale for seeking to assess the institutional effort as a whole in a balanced way. Inamorato dos Santos et al. (2016), in their framework, identify six core dimensions (access, content, pedagogy, recognition, collaboration, and research) and four transversal dimensions (strategy, technology, quality, and leadership) of promoting and sharing open education.

Blended learning initiatives share similarities with open education initiatives in their endeavour to introduce and sustain pedagogical change and enable positive impacts on teaching and learning. They are often positioned as an academic innovation or institutional change (Garrison & Vaughan, 2013; Taylor & Newton, 2013) that requires many stakeholders to engage at all levels of the institution.

In our review of eight case studies of institutional blended learning, we identified common components or facilitators that characterize successful blended learning initiatives. In particular, a recent UNESCO publication (Lim & Wang, 2017) notes that “sustainable and scalable blended learning practices in HEIs must begin with institutional leaders adopting a holistic approach towards driving and supporting these practices” (p. 22). Through examining six case studies from Asia-Pacific universities of how these universities built the capacity to drive, sustain, and scale their blended learning initiatives, Lim and Wang (2017) arrive at a self-assessment tool that includes 17 components across eight strategic dimensions (p. 28).

In the area of institutional transformation, Kezar and Eckel (2002) and Eckel and Kezar (2003) have done considerable work analyzing what factors are important in implementing and sustaining institutional transformation and note that “much of the literature presents change strategies as isolated, distinct actions and does not present strategies as systemic, concurrent, and interdependent” (Kezar and Eckel, 2002, p. 296). Their research, conducted with six US universities over a period of four years, formed the basis for a series of research publications that discuss five core strategies and additional sub-strategies that institutions should consider in undertaking a transformation endeavour.

When combined, Garrison and Vaughn (2013), Taylor and Newton (2013), Lim and Wang (2017), and Kezar and Eckel (2002) show a substantial overlap in what they identify as essential components, resulting in a set of 21 components that emerged as critical to a successful initiative of blended learning or institutional change. Our study builds on the work of Lim and Wang (2017), Lim et al. (2019), Kezar and Eckel (2002), and Eckel and Kezar (2003) to form the basis for a tool to assist institutional self-assessment of OEP progress.

## Methodology

This study used a self-study methodology. Self-study is employed for “studying professional practice settings” (LaBoskey, 2004, p. 817), where professionals situate themselves as both the researchers and the focus of the research process. In the context of this research, the self-study methodology was a way to examine our individual OEP experiences at our home institutions and then discuss these experiences collectively using a critically reflexive collaborative approach (Hamilton & Pinnegar, 2014; Pinnegar & Hamilton, 2009). The selection of institutional samples consisted of both convenience and purposive samples of five heterogeneous public postsecondary institutions. The variations among the institutions included type of institution (research university, online teaching university, open learning university, provincial institute, and polytechnic university) and size, as measured by full time enrolments. Additionally, differentiating characteristics and mandates are noted in Table 1.

**Table 1**

*Characteristics of the Institutional Sample*

Institution	Description	Full time domestic student enrolments <sup>a</sup>
Justice Institute of BC	Provincial mandate to provide first responder education and training. Approximately 30% of enrolments are online.	3012
Royal Roads University	Provincial mandate to offer labour market relevant programming in the applied and professional fields; online blended/dual mode	2062
Thompson Rivers University	Dual mode (campus/online): campus-based programs and legislated mandate to provide open learning; separate oversight council for open learning	8755
University of British Columbia, Vancouver campus	Research- and teaching-focused university; both in-person and online course offerings	46923
Kwantlen Polytechnic University	Polytechnic teaching university with applied and academic programs; in-person, blended, and online course offerings	8809

*Note.*<sup>a</sup> Enrolments from the Ministry of Advanced Education, Skills and Training (2019)

The criteria for including the institutions were the following: (a) the presence of activity in OEP at the institution as evidenced through BCcampus-funded open textbook initiatives or other OEP activities (e.g., open courses and open faculty development), and (b) the availability of an informant (Creswell, 2007) at the institution who had participated directly in or led an OEP initiative to be part of the research team. Through the engagement of researchers from different disciplines and institutions, the collaborative approach facilitated by our self-study methodology clarified perspectives, revealed multiple points of view, and allowed us to consider alternative explanations (Louie et al., 2003).

## Research Questions

The following research questions framed this study:

1. How do five British Columbian postsecondary education institutions advance and sustain their efforts in OEP?
2. What can we bring to the surface as important components or efforts in successful institutional OEP initiatives in order to guide other institutions?
3. How can an institutional self-assessment tool developed for self-assessment and evaluation of institutional OEP initiatives be improved?

## Data Collection and Analysis

The self-study methodology (Hamilton & Pinnegar, 2014; Pinnegar & Hamilton, 2009) used to investigate the research questions involved a three-part process. First, a self-assessment tool (<https://oepimpact.opened.ca/isat/>) consisting of Likert-scale and open-ended questions was created based on 21 components outlined in the literature review. The tool was piloted with two of the researchers to clarify questions and assess its feasibility and to identify additional areas for further exploration. Two additional questions were added as a result of this pilot. A complete version of our survey (licensed CC BY) to facilitate adaptation to multiple contexts) can be viewed online (<https://oepimpact.opened.ca/isat/>).

We then filled out the revised survey form. In our responses, we were each asked to provide evidence or an explanation of our responses to each question. Once completed, we were also asked to identify an additional knowledgeable stakeholder/person at our institution to help correct for bias by critiquing and verifying the responses. A number of changes were made based on these reviews and incorporated by each of us into our respective responses.

In the second part of the process, we together reviewed all five institutional survey responses. Because of the variation among types of institutions and our respective OEP initiatives, we extensively explored the description, comparison, analysis, and theorizing of developments at each institution (Bazeley, 2013), both within the contexts of our individual institutions and by comparing across the five participating institutions. The collaborative nature of the inquiry enabled us to employ successive stages of both individual and

collaborative analysis to arrive at consensus on four key themes and to enhance the validity of the findings. Both multiple sources of data as provided in each of the surveys and the shared insights gained through sharing and collaborating among multiple researchers supported the triangulation of data sources and researchers (Patton, 2002).

Finally, in the third part of the self-study process, we undertook a series of five, extended (approximately one-hour) semi-structured discussions among ourselves to discuss the four themes. These discussions were audio-recorded and transcribed for the purpose of analysis. We were each assigned a transcript and followed the describe, compare, relate, extend, and explain process to further analyze each theme in conjunction with the survey data. Each transcript analysis was then reviewed and annotated by another research team member, who made adjustments as needed.

## Findings

This paper will discuss four themes that emerged across all five institutions from the survey data and that formed the topics for our recorded discussions: advocacy, policy, leadership, and institutional culture. These themes describe dimensions that we found need to be considered in undertaking and assessing the progress of OEP initiatives.

### Advocacy

Advocacy can be defined as efforts to effect and support change in the organization toward adopting and implementing OEP. A challenge with describing advocacy was the increasing breadth of meanings of the term when we examined it more closely in the transcript analysis. In the examples discussed, advocacy among institutions ranged from active forms such as lobbying, promoting OEP to faculty and department chairs, facilitating learning sessions, and other such activities to less active forms such as verbally endorsing early OEP initiatives, developing enabling policies, and making funding available. Its objectives varied from lower education costs for students, particularly in relation to open textbooks, to pedagogical benefits or, more widely, access to learning as part of a social justice mandate. These purposes varied depending on which stakeholder group was undertaking advocacy. For instance, students focused mainly on textbook costs, whereas faculty explored alternative pedagogical models using open educational resources, and some senior administrators saw a political advantage in adopting an OEP stance.

In locating sources of advocacy, we found that common sites of its appearance at early stages of organizational change resembled an internal “third place” or third space (Gutiérrez et al., 1999; Oldenburg, 1999). These spaces consisted of informal groups or committees usually drawn from the middle ranks of the organization, such as centres for teaching and learning, libraries, bookstores, teaching and/or research faculties, and instructional support areas. These spaces, at least at the early stages, operated without formal sanction. They also included activities at more granular levels in the institution. As noted by one of the researchers, “There are probably all kinds of people talking to their colleagues and sharing practices, and ideas, and resources. If we’re thinking of a small sphere of influence, it could even be one person doing that with another and convincing them to change some of their teaching practices, right? And then that can, kind of, keep going and snowball, potentially.” In this way, advocacy is both visible and less visible.

Spilovoy et al. (2020) note that leadership in openness can also originate from students or student organizations, since students are often named as the main beneficiaries of the benefits OER afford. This dynamic was noted in our study, where student leaders exerted a lobbying force on faculty and senior administration with a focus on OER and open textbooks. In addition, some supportive senior administrators took on an advocacy role, typically in response to student lobbying or external funding opportunities, such as open textbook grants. In some cases, OEP were taken up by senior administration as a strategic initiative for increased access and visibility as well as for institutional competitiveness or profile in both domestic and international arenas. As noted by one researcher:

It may be that at a different level of the institution it actually is strategic to be an advocate and supportive of an open initiative, whatever that looks like, because of the context of the institution, the length of time it's been around . . . where it's trying to be in the higher education space. So, I think there's, almost, a political component to advocacy here.

In these ways, advocacy interacts with other dimensions of the study (including policy and leadership), emerges from multiple levels and areas of the institution, and takes various forms that range from active to enabling or permissive.

## **Policy**

According to a recent report by eCampus Ontario (Skidmore & Provida, 2019), policy “is a tool with which institutions structure their affairs, determine their organizational stance on particular issues, and create the framework for guiding the direction of their work” (p. 2). We found a general lack of formal policy, or even guidelines, around OEP developed at most institutions included in this study. The development of institutional policy was a possible indicator of the maturity of the OEP initiative, whereby resource allocation and recognition of the importance of these practices within the institution would emerge. For example, the UBC inclusion of OER/OEP work in their promotion and tenure guidelines (Skidmore & Provida, 2019, p. 15) has been used at other institutions as a model to help support faculty engage and participate in developing OER/OEP.

Both the survey data and researcher discussions revealed tensions encountered around policy development. This was also highlighted by Skidmore and Provida (2019), who found that policy can be perceived as a barrier when it is viewed as being administratively driven and this can cause tensions between grassroots initiatives and formal policy development. For example, we found that open education working groups are important pan-institutional support mechanisms for gathering resources and maintaining the sustainability of initiatives. From a policy perspective, a lack of formal terms of reference or inclusion in institutional governance structures (such as senate recognition) could lead to vulnerabilities if membership or leadership lacked continuity. At the same time, we identified risks to moving from informal or tacit agreements or work on OEP to more explicit ones (such as policy and formal structures). As one researcher pointed out, “I mean, you can do a lot of OEP quietly in the background. ... But if you start to push it and put it out into the limelight, it can become a target and become politicized.” Another researcher shared that explicit direction on OER development at their institution led to a surfacing of resistance to OER from faculty and/or parents about quality and credibility.

Policy was also discussed in relation to leadership, and it was highlighted that at some point, lack of policy or guidelines could lead to risks around sustainability of initiatives (including lack of commitment to resources) or to vulnerabilities if leadership or key advocates left the institution or moved on. We recognized that policy and leadership might need to intersect to provide support for defined roles and responsibilities related to OER/OEP development. We discussed intersections and tensions between institutional culture, maturity, and evolution of an open education initiative; timing and the way policy is introduced; and awareness of challenges of lack of policy versus top-down policy. We noted that in one institution, policy came more easily when a certain level of grassroots support was attained. As Cox and Trotter (2016) also suggest, culture and agency are key factors in considering the role of policy, as “each university’s institutional culture mediates the role that policy plays in academics’ decision making” (p. 160).

In relation to OEP, the importance and need for the development of policy and guidelines has been discussed at both the governmental and institutional level, and proponents suggest that policies can inform governance structures, signal leadership support, and provide access to resources (Skidmore & Provida, 2019). As highlighted by Coolidge and DeMarte (2016), governments, as drivers of policy, can encourage equitable access to higher education by providing support and direction on sustainable OER developments. At the institutional level, Cox and Trotter (2016) argue that the success of OER-related policy is highly dependent on three intersecting components—structure, culture, and agency—and that for OER to be sustainable, policy decisions must be both hygienic (necessary, but not sufficient) and motivational (incentivized). It may be important to identify enabling governance and policy structures as part of the overall framework to better characterize the role of policy in helping to transform institutions.

## **Leadership**

We discussed leadership within the framing of Kezar (2012), who describes the convergence of grassroots leadership (individuals without positions of authority) and top-down (positions of authority) leadership. As noted above, one of the important ways to enable leadership for an OEP initiative is via open education working groups. Four of the institutions in this study had an open education working group, and despite being at different stages of maturity, these working groups functioned as a form of collaborative leadership. Working groups initiated from or were mentored by cross-departmental middle leadership (faculty/administrators/professional levels). This usually involved or included centralized areas such as libraries, teaching and learning centres, and instructional designers, where members gather informally to share and promote ideas or support initiatives with a variety of possible motivations. This supports Eckel and Kezar’s (2003) finding of the role of working groups or cross-departmental teams as an important strategy at the outset and middle stages of institutional transformation in the sense-making process, where old ideas and assumptions and mental models can be transformed.

Over time, the leadership needs to become more formalized to gain more formal senior-level visibility, support, and resources and to be included in strategic planning cycles. We also noted that this formalization may help encourage, mentor, and support subsequent informal groupings. At this stage, a tenuous transition may take place between grassroots efforts and ensuring the continuity and sustainability of open education initiatives as they become part of regular practice, or in situations where there is a strong leader but no diffusion, or where there is strong diffusion and no leadership. As one researcher stated,

How do we move forward as an institution trying to infuse this further without that kind of formal recognition of the amount of work that everybody is putting in as well? . . . So, what happens if, you know, priorities change? Then how do you maintain that momentum? So, you've got grants, but then you don't actually have the support to build anything.

At the same time, there may be tensions between the degree to which leadership should be formalized and risks and opportunities involved in doing that. In some respects, this echoes Kezar (2012), who described this tension as “kaleidoscope convergence” (p. 745), noting that unlike distributed leadership, convergence presents its own unique challenges, patterns, and levels of success.

The role of student leadership in moving an initiative forward was a gap identified in the survey tool, and we found clear examples where students can and do play a key role in promoting open education and can directly access senior leadership for this purpose. At one university, students organized an open education week and two-day conference; at another university, the student government put forward a proposal to senior administration seeking funding for OER. At the same time, we noted that in some cases, student advocacy created a backlash among some faculty as well as feedback from administration regarding misdirected and poorly timed funding requests—but this also led to guidance from administration as to how move forward using appropriate procedures. This suggests the possible need for mentorship of students in navigating institutional structures and governance. Coordination between informal institutional grassroots initiatives and student leadership could help grow senior institutional leadership support and resources for more formalized structures and policies that can then continue to grow such initiatives. On this point, Baker and Ippoliti (2018) refer to a knowledge gap in how institutions include students formally in OER initiatives and outline several ways that students can be brought into the OER conversation both in and out of class. This includes reaching out to students and engaging with student groups in collaboration and partnership.

### **Institutional Culture**

Definitions of institutional culture abound, though what we discussed under this heading fits broadly within the definition used by Kezar and Eckel (2002) which was originally proposed by Petersen and Spencer (1991, p. 142) as “the deeply embedded patterns for organizational behavior and the shared values, assumptions, beliefs, or ideologies that members have about the organization or its work” (p. 438). Kezar and Eckel (2002) argue that institutional culture affects how processes of change work in institutions, and we found this to be the case as well.

Considering institutional culture is one way to provide a framework to organize and provide meaning to the many specific differences between the institutions in the ways they have started, developed, and sustained OEP initiatives.

Our discussion of institutional culture followed the opening questions: “Are there characteristics of an institution’s culture that make it more susceptible to . . . going down the path of open? Or are there aspects that would be resistors?” We found several aspects of institutional culture to be drivers or obstacles to OEP at our institutions.

### ***Institutional Mandate***

Institutions examined in this study that have a commitment to access in their mandates or whose focus is on teaching and learning tend to have more emphasis on OEP at the leadership level and more supports devoted to it. We also noted some disconnect between commitments to open education in institutional



mandates or strategic documents and the degree to which those are reflected in policies, resources, or activities.

### ***Reputation***

Reputation is described by whom the institution compares itself to and how it positions itself among peer institutions. Some institutions work to position themselves as innovators and leaders amongst their peers who also emphasize the importance of OEP. In the words of one of the researchers, “I can see a way in which the comparison with external institutions have played in our favour . . . not just a desire to do things visibly in this space, but to stay ahead of the pack in this space.” But if OEP is not a priority among those institutions viewed as peers, this may not work as a driver.

### ***Centralization/Decentralization***

The degree to which leadership and decision making occur centrally or in decentralized units also affects OEP initiatives and activities. In some institutions, decisions about textbooks and other educational resources are made at a department or program level, and in others these decisions are largely left to individual faculty; each has its own benefits and challenges in promoting OER adoption. In addition, broader policies and practices around OEP may be made and implemented at a central level or may be fragmented across different parts of the institution, leading to uneven efforts. Some institutions have established structures and mechanisms for faculty, staff, and students to communicate and collaborate between disparate units and disciplines, whereas others have not, which makes coming together to move forward on OEP initiatives more challenging.

Other organizational structures also affect OEP at the institutions in this study. Some institutions have more contract and part-time faculty, who may not have the time, the institutional support and resources, or the organizational structures needed to come together to work on OEP initiatives. OEP at some institutions have been driven quite significantly by the advocacy of active student organizations, while other institutions have fewer established structures for strong student advocacy and collaborative activities.

An important challenge in trying to map differences in institutional culture related to OEP is that each of us, as researchers, has only a partial perspective on the large and slippery notion of a broad “culture” within an institution. We each must base our understanding of our institutional culture on our own experiences and role at that institution. This is a limitation of the discussion of our respective institutional cultures; a remedy would require a deep analysis of these cultures by including voices of many people across each institution, which goes beyond the bounds of the current research.

Nonetheless, even with this limitation, we found that institutional culture was a meaningful way to organize some of the many differences amongst our institutions in relation to OEP efforts and would be a fruitful path for further research. Specifically, a more detailed comparison of institutional OEP initiatives based on type of institution or institutional cultures may reveal important insights.

## **Summary and Recommendations**

Institutions in this study advance and sustain their efforts through a combination of top-down and bottom-up strategies and activities. This paper focussed on four intersecting components—advocacy, policy,

leadership, and institutional culture—that emerged as important in advancing the OEP initiatives at these five institutions. These components presented both tensions and opportunities to reflect on the evolution of institutional OEP efforts.

### **Advocacy**

Both active and less active, visible and less visible forms of advocacy serve to advance OEP, and it is important to recognize that the messaging or the goal of advocacy may vary depending on who is advocating. For example, cost savings may resonate with students, but improved teaching and learning may resonate more with faculty, while institutional visibility and competitiveness may resonate with administrators. In considering OEP as an institutional initiative, there may be value in having a coordinated approach to understanding drivers and targeting messaging for different stakeholders at the institution.

### **Policy**

Though policy is often perceived as a top-down imperative that can interfere with grassroots initiatives, both the literature and research participants support the notion that policy development can be an overall driver for OEP at the institutional level. Policy was seen to provide a foundation for the sustainability of various initiatives, and it was suggested that one possible addition to the framework would be a “policy environment” category that captures the unique institutional culture and governance structures that would enable OEP to be supported effectively. There is value in identifying enabling governance and policy structures within institutions and facilitating the development of enabling policies and guidelines as open education in the institution and the sector matures and evolves.

### **Leadership**

While formalizing leadership with grassroots-led efforts may bring risks, the initiative will not be sustainable without visible leadership from senior administration. This signals the importance of creating space for leadership from all levels of the institution, including students, with visible support from senior administration. Furthermore, institutions may need to develop and support student and faculty leadership and advocacy.

### **Institutional Culture**

Institutions whose mission and mandate focus more on teaching or on wide access to postsecondary education tended to have more OEP activity, as do those which compared themselves to peer institutions with a significant emphasis on OEP. Those with more established and effective organizational structures for collaboration and decision making between units, roles, and disciplines were more likely to have more OEP activity and advocacy than those with more silos or decentralized structures. It is therefore important to target OEP efforts more specifically to institutional mandates or priorities and to leverage or create organizational structures that allow for collaboration among various roles and parts of the institution.

Undoubtedly, further refinement is needed given that the tool is used in different contexts and at different stages of the institutional journey with OEP. While our research identified gaps in the tool itself, we also observed that the institutional value for using a self-assessment tool may be in highlighting gaps or identifying initiatives which may be hindering other strategies or causing the disproportionate assignment of resources. For example, two of the lowest scoring areas for the institutions in this study were research

support and evaluation of the impact of the initiatives. If an institution is operating in an environment where its long-term success depends on sustaining the initiative via external grants or buy-in from senior leadership, this is no doubt an important gap to address.

## Limitations

This study has several important limitations. First, despite the fact that we included verification steps to strengthen the trustworthiness of the data and findings, we are simultaneously researchers and stakeholders at the institutions included in this study and are invested in the success of the initiatives. As such, the question of whether we were compelled to exaggerate or minimize our successes is one we addressed throughout the process. Additionally, this study could be enhanced through including more institutional stakeholders verifying the survey responses. Nonetheless, we underline the value of key informants participating across institutions in dialogue and reflection for creating opportunities to leverage resources and best practices in institutional OEP strategy.

The sample of institutions included in this study is both a strength and a weakness in that it represents a broad range of types of institution and institutional mandates. This means that the findings speak more broadly to a wider range of institutions and to a specific educational jurisdiction, but also may shed less light on the specifics of each type of institution than would a study of a more homogeneous sample. While Eckel and Kezar's (2003) institutional culture typology was not the focus of this study, further researchers may want to explore OEP initiatives more deeply from that angle. They may also find value in examining a sample of similar institutions or in conducting a more granular comparison of institutional types and respective cultures and their OEP efforts.

## Conclusions

As OEP initiatives evolve and mature at institutions, frameworks and tools that can assist in evaluating these initiatives are valuable. Through the use of a self-assessment tool designed to examine institutional OEP efforts at five BC postsecondary institutions, four interconnected and overlapping components emerged: policy, advocacy, leadership, and institutional culture. In this respect, our findings echo Kezar and Eckel (2002), who note that institutional transformation strategies evolve "simultaneously or in clusters rather than sequentially . . . balance among strategies is an important principle in transformational change and also linked to the interdependence of strategies" (p. 304). At the same time, we recognize the practical importance of a tool that can help to identify gaps in overall OEP initiative efforts and to redirect resources or develop strategies to address those gaps and achieve this balance, to help realize the potential for institutional OEP to affect transformational change.

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## Book Review: 25 Years of Ed Tech



**Author:** Martin Weller (Athabasca University Press, 2020, 208 pages) ISBN: 9781771993050

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Technology is one of the fastest-changing fields in the modern era, impacting every human endeavour. The field of education is one of the beneficiaries of these technological developments. While some educational institutions have embraced these technological developments with ease, others have been struggling to cope with the shifting expectations and demands of educational aspirants. A historical perspective would throw light on the pace of technological developments and the changing scenarios the educational system has witnessed over the past few decades. The bigger challenge for

these institutions is how to cater to the needs of educational aspirants belonging to three different generations (Gen X, millennials, and postmillennials). The volume in hand has accomplished the task of documenting these historic milestones of technological development and implementation in education starting from 1994. The author has given an overview of technology from when it gained prominence and became a significant tool in the hands of educational practitioners rather than from when it came into existence.

The book opens in 1994 when digital content first started catching the attention of educational practitioners. Multimedia content enabled by the Internet facilitated adoption of a networking approach to teaching and learning. The Bulletin Board System that made it possible to connect with people from different places led to the advent of discussion forums and professional groups with specialised areas of interest. The early form of e-learning was delivered this way and terms such as Learning Management System (LMS) and Virtual Learning Environment (VLE) came into being. The author feels that the seeds of specialised global communities were sown with the use of the Bulletin Board System. While tracing the history of the Web back to Berners-Lee in 1989, the author focuses on its use as a social networking platform and communication system connected in 1995. It was an open system, following a decentralised approach, where no one was more important than any other. Thus, the Internet became an organism full of life, regulated by social values with positive and negative aspects. Facebook, WordPress, and Netscape became more than buzzwords. All this happened through dial-up connections where telephone lines were connected to a Web browser through a modem. FrontPage made it possible to create web pages on Angelfire and



GeoCities, and easily publish the content. These platforms provided their own website/page builders through templates. Educational institutions took advantage and created their own websites. Academic content was shared this way. This was version 1.0 of the Web (Web 1.0). Email was the prominent medium of communication for both the masses in general and the teaching and learning communities.

Around 1996, computer-mediated communication emerged as part of the development of the Bulletin Board System, following a generic approach. Education systems used these technologies meaningfully for instant messaging, video messaging, discussion forums, and online databases, among others. The text-based exchange of content was taken over by the exchange of multimedia content in multiple formats through graphical user interfaces. All this could be shared in synchronous and/or asynchronous modes. It was possible to assign different roles to various users as well as different types of permissions to allow them to perform their roles in the online environment. By the start of 1997, web-based learning became the order of the day, and educationists started re-focusing on a constructivist approach to learning. The activity of publishing academic content was democratized, and a movement of non-linear co-creation was seen laying more focus on theoretical aspects of education rather than technology itself. This movement emphasised student-centered learning from multiple resources which could be social and experiential in nature.

The year 1998 marked the entry of the open Web to the field of education in the form of wikis that ultimately culminated in the development of Wikipedia. The content could be created in a collaborative way by a large community of users on wiki spaces. This created an organic body of ever-increasing information and was able to challenge the erstwhile commercial and proprietary mindset. The read-write aspect of the Web gave birth to blogs on special topics. Student-generated content also acquired prominence during this time since it could be used as a learning tool by other students. The author defines 1999 as the year of integration of the different components that made e-learning an in-thing, though the concept already existed. This gave way to a debate comparing e-learning with face-to-face learning. Some of the educational institutions even started venturing into launching online courses. The author considers this period as e-learning's golden age since it paved the way for its mainstreaming. In 2000, the concept of learning objects was introduced to the field of e-learning. These learning objects supported e-learning as the smaller chunks of information could be used, reused, and referenced in different ways. Their formats were standardized in order to facilitate their wider use though the quest to find a standard definition still remained. Their reusability in pursuit of pedagogical effectiveness was questionable, and thus discouraged their use. The author, in this chapter, has tried to identify the causes.

The chapter E-Learning Standards re-focuses on e-learning and learning objects. E-learning became more popular, forcing the community to come up with different standards that could be used to make the business more serious. This facilitated the interoperability of content in different contexts and environments. The Sharable Content Object Reference Model (SCORM) became a standard for the creation of digital content for e-learning platforms. However, as the author puts it, the complexity of standards outweighed implementation costs. The author traces the birth of the learning management system (LMS) to 2002. These systems helped educational institutions to create virtual learning environments (VLE) which are used now for online courses, MOOCs, and blended learning. The LMS was seen as an integrated entrepreneurial solution for educational institutions, and thus became pivotal to the e-learning environment. The virtual classroom and virtual conferencing became ubiquitous to online courses. The year 2003 heralded the use

of blogs in education, leading to the emergence of a community of educational bloggers. The Really Simple Syndication (RSS) feeds made the blogs popular since they provided an easy way to reach subscribers with updates. Blogs have now become part of social media and networking. The author has highlighted some of the negative aspects of such developments, which include racism, misogyny, misleading content, data capitalism, misuse of data, etc.

The author also discusses Open Educational Resources (OER), the seeds of which were sown in the year 2001 with the announcement of the OpenCourseWare initiative. By 2004, the many educational institutions entering the field of OER led to the open content movement. Open content licensing became unavoidable and different organisations came up with their own versions of open licensing. Prominent among them was Creative Commons. YouTube came into existence in 2005. The platform became popular for providing video uploading and streaming services. Other video content sharing platforms also contributed to the movement. This made the creation of video content and sharing with a larger community easy for educators. With this, the concept of a flipped classroom became reality. The move promoted participatory culture at a global level, transcending all geographical barriers, though concerns over cultural value systems remain. The concept of the Web 2.0 became popular in 2006, and the label 2.0 as a suffix could be seen attached to almost everything. This new version of the Web facilitated interactive content and users could both generate their own content and share it with the rest of the world using open data tools. The author gives credit for the granularity of learning content to the Web 2.0. This has led to the development and dominance of social media platforms in public social life.

The year 2007 witnessed a wave of interest of educators in online virtual worlds, though Linden Labs had launched way back in 2003. Second Life was one of the popular platforms for creating 3D objects including virtual characters in the form of avatars. These could be well integrated with an LMS in an educational institution. Lectures could be delivered virtually with these avatars, in addition to finding more creative ways of using them. The author describes how e-portfolios gained focus in 2008. The creation of e-portfolios was important for showing technical and professional expertise and its evaluation. These are pertinent tools in vocational programmes. By 2009, as the author observes, social media took a turn towards education. Social media facilitated connections at a global level and provided a democratic platform for discussion across different areas of specialisation. This resulted in the emergence of social media as a viable and effective tool for marketing and research. However, the author identifies some of the main concerns about the unfettered use of social media. The ease of creating connections, communities of practice, and plentiful content created by users over social media had, by the year 2010, led to a distributed approach to learning in a networked way.

The interactive features of Web 2.0 culminated in the popularisation of personal learning environments (PLE)—more learner-friendly and accommodative, these extended the Learning Management Systems. PLEs shifted the controls to learners, thereby facilitating personalised learning. The year 2012 is popularly known as the year of the MOOC though MOOCs have existed since 2008. However, it was in 2012 that the concept of the MOOC gained attention from educators all around the world. This paved the way for dedicated online learning programmes, and that is how the concept of openness was put to experimentation. Many educational institutions geared up to offer MOOCs to a global community of learners as well as SOOCs for their campus-based students. The extension of openness through OER and

MOOCs led to digital versions of books in the form of open textbooks. Most often these were available for free, while in other cases, a nominal charge was levied to get the open licence. Many research projects studied the effectiveness of open textbooks. The generation of voluminous student metadata on demography, online active time, learning styles, content usage, etc., attracted the technical community to the use of analytics. By 2014, learning analytics became an independent field to be further explored. This helped educators focus on quality aspects of content delivery. Teachers could track the progress of their students and make desirable interventions in the pedagogical process.

The developments in the use of technology in education led to the authentication of student achievement through digital badges. While badges could act as a source of student motivation as part of formative assessment, the educational institutions could also award these badges to students on completion of a programme for presentation to third party agencies seeking proof of completion or achievement. As the author observes, 2016 boosted the discussion on the use of artificial intelligence (AI) in the area of education even more than learning analytics had. The author advocates for the narrow use of AI to handle specific activities in the education ecosystem. In 2017, there was a serious discussion on the application of blockchain technology in education. Certain areas were highlighted as suitable for its use in education, including certification, verification, data ownership, and payment. Educational institutions started experimenting with this technology for providing access to digital certification. However, the author is of the opinion that the complexity of this technology and prevailing issues have discouraged its widespread use. In the last chapter, Ed Tech's Dystopian Turn, the author focuses on trends in the use of technology rather than technology per se. He raises some concerns connected with breach of privacy, border surveillance, data breach, and polarisation, among others.

Some of the chapters in the book emanate from the author's personal observations, which takes the discussion beyond mere representation of history. Quite a few of the chapters deal with topics on tools and techniques that had been in use well before the year marked by the author in the chapter. Therefore, it may not be justifiable to attach their origin or usage to a particular year. For example, learning management systems, virtual learning environments, OER, MOOCs, ePortfolios, etc. were already in existence before the dates mentioned in the book. However, the allocation of a year to a chapter in such cases is probably more indicative of it having become mainstream in teaching and learning in high-income countries. Overall, the author has focused on trends of technology usage when they entered the mainstream.

This review is an overview of some of the nuggets found in the book. It would be interesting to revisit the ups and downs in the education system as these technologies have been embraced over the years. The education system has grown in sync with technological developments and struggled a lot to be technologically relevant. On this note, I feel that *25 Years of Ed Tech* is a worthwhile read, especially for millennials and postmillennials, including policy makers and educators, who are seeking a historical pedagogical perspective.



November – 2021

**\*This Technical Note provides a description of the [OE Global Award winning OERu Learning Environment](#).**

## Open For All: The OERu's Next Generation Digital Learning Ecosystem<sup>1</sup>

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### Abstract

This paper describes the functionality, scalability, and cost of implementing and maintaining a suite of open source technologies, which have supported hundreds of thousands of learners in the past year, on an information technology infrastructure budget of less than US\$10,000 per year. In addition, it reviews pedagogical opportunities offered by a fully open digital learning ecosystem, as well as benefits for learners and educators alike.

The Open Education Resource universitas (OERu) is an international consortium made up of 36 publicly funded institutions and the OER Foundation. The OERu currently offers first-year postsecondary courses through OER-based micro-courses with pathways to gain stackable micro-credentials, convertible to academic credit toward recognised university qualifications. The OERu, adhering to open principles (Wiley, 2014b), has created an open source Next Generation Digital Learning Ecosystem (NGDLE) to meet the needs of learners, consortium partners, and OERu collaborators. The NGDLE—a distributed, loosely coupled component model, consisting entirely of free and open source software (FOSS)—is a global computing infrastructure created to reach learners wherever they are. All OERu services are hosted on commodity FOSS infrastructure, conferring significant advantages and creating opportunities for institutions adopting any of these services to enhance education opportunities at minimal cost. The NGDLE can also increase technological autonomy and resilience while providing exceptional learning opportunities and agency for learners and educators alike.

*Keywords:* open source, learning environment, ecosystem, OER, equity, ICT

## The OERu's Open Source Next Generation Digital Learning Ecosystem

The Open Education Resource universitas (OERu) is an international consortium of 36 publicly funded institutions, which, together with the OER Foundation, form a worldwide network. The OERu currently offers first-year postsecondary courses assembled from OER as micro-courses, with pathways to gain academic credit toward recognised university qualifications.

The OERu adheres to open principles with their emphasis on the “5Rs”—reuse, revise, remix, redistribute, and retain (Wiley, 2014b)—which are themselves inspired by the four essential freedoms of free software (Free Software Foundation, 1996–2021; Wiley, 2014a). In line with these principles, the OERu has created a Next Generation Digital Learning Ecosystem (NGDLE), built entirely with free and open source software (FOSS), to meet the needs of learners, consortium partners, and OERu collaborators. All OERu services are hosted and delivered via this infrastructure.

The OERu uses the term FOSS to acknowledge the crucial “free software” principles underlying what is now more commonly referred to as “open source software” (Open Source Initiative, n.d.). Over time, the term open source software has evolved, primarily as a result of the influence of commercial entities rather than communities, to downplay these crucial principles, and focuses instead merely on a development methodology, losing the Commons focus and community values.

This paper sets out the significant advantages of this FOSS approach and shows how, if emulated by OERu partners and other academic institutions, it could both enhance the digital services used in education and substantially reduce costs for institutions. In addition, we suggest that this approach can increase the autonomy and resilience of technical solutions, while building digital skills for learners and educators alike.

This paper begins by describing the OERu's FOSS technology infrastructure and explaining its advantages and challenges. It then reviews the functionality, scalability, and cost profile of this implementation, currently capable of supporting thousands of learners (in addition to registered user participation, the OERu's anonymous Website statistics indicate that more than 200,000 learners participated in OERu courses in 2020 in total) on an information technology (IT) infrastructure budget of less than \$10,000 per year (about \$0.05 per learner/year in 2020). Furthermore, the implementation promises to scale to millions of learners with only very small increases in infrastructure capacity required. The cost-to-learner ratio does not increase in a linear fashion, for example, because of the way most Web services are designed. The capacity to serve users increases more rapidly than the cost; so, ten times the number of active learners could be served for only double the infrastructure cost. Ultimately, the OER Foundation, responsible for maintaining the infrastructure, thinks the cost per learner could fall below \$0.01 per year as a result of the economies of scale possible. All costs are in U.S. dollars unless otherwise noted.

### Why a FOSS NGDLE?

By 2014, 99% of universities in the United States alone were using a learning management system (LMS), with 74% of staff feeling they were “useful instructional tools” (Baule, 2019). However, the LMS is “focused

on the institution and the course” (Conde et al., 2014, p. 189), rather than placing the learner at the centre of their learning experience.

In 2014, EDUCAUSE ran a series of focus groups investigating digital learning environments and how they could better support learning and teaching (Brown, 2017; Maas et al., 2016). This research resulted in the April 2015 white paper (Brown et al., 2015) on “next-generation digital learning environments,” or NGDLE. As Brown et al. (2015) highlight, “higher education is transitioning from the transmission model of education to one built on concepts such as active learning, personalisation, hybrid course designs, and new directions for measuring degree progress,” calling for “an ecosystem of sorts” (p. 3). The white paper acknowledges that “the challenge for the NGDLE is supporting this diversity while retaining the necessary technological coherence. But in this challenge also lies the opportunity. Clearly, we [higher education institutions] need to invent new architectures that support a digital confederation” (Brown et al., 2015, p. 4). Brown (2017, para. 7) urges institutions to think beyond their digital learning environment towards “strategic destinations..., new directions, and opportunities,” and this is one ability and strength of the OERu.

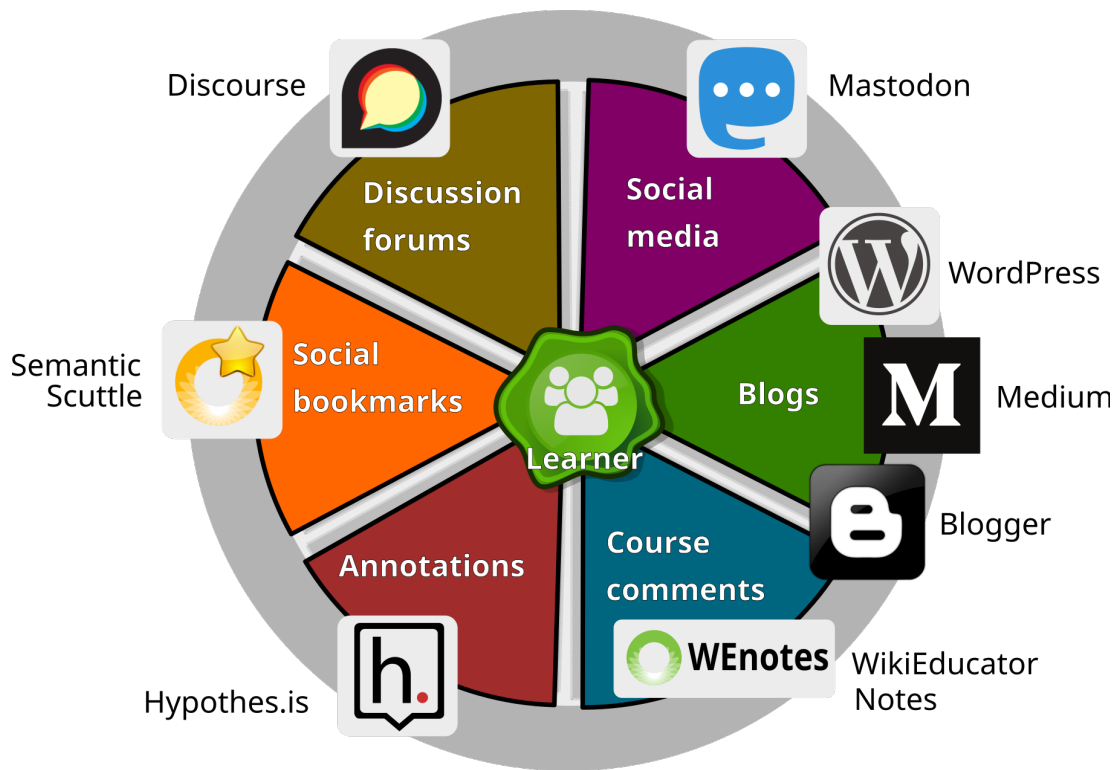
The OERu draws a distinction between an “environment,” which is simply a place that may or may not support life or experience growth, and an “ecosystem,” which is an inherently dynamic *living* environment in which the place and its inhabitants are interdependent, and their many interconnections enable the living parts to grow in diverse ways. The OERu’s NGDLE exists to encourage a thriving ecosystem.

The OERu has determined that one way of supporting learners to develop digital and associated learning literacies for the 21st century is to employ in learning systems the very same technologies in which these learners need to build digital fluency to learn effectively. This contrasts with the cloistered digital experience of an LMS environment. The OERu approach of “learning on the Internet” has more moving interactive parts and is less constrained than an LMS environment, but that added complexity also offers advantages:

- Content is created collaboratively with detailed version control and not limited to participants from a single institution.
- Learners can maintain control of their own work (digital artefacts) both during and following completion of their study.
- OER materials can be shared among institutions regardless of which LMS, if any, they have adopted.
- Learners actively employ and experience the technologies, conventions, and practices of the “real” digital world rather than a model environment constrained to a single application. The learner-facing part of the OERu’s NGDLE is constantly evolving, which is also a characteristic of a thriving ecosystem, rather than being a fairly static environment. Figure 1 shows the current set of the learner-facing services.

**Figure 1**

*Learner-Facing Services Within the OERu's Next Generation Digital Learning Ecosystem*



The OERu's NGDLE, then, is an example of a global infrastructure created to reach learners wherever they are and to place them at the centre of their learning experience.

## Service Provision

These services are hosted either by independent Internet communities or on the OERu's FOSS infrastructure. The OERu's current set of learner and educator accessible tools includes the following:

- **Mastodon** is a social media tool and OERu's alternative to Twitter, allowing posts of up to 500 characters. Unlike Twitter, Mastodon is non-commercial, FOSS, and distributed, with thousands of independent implementations around the Internet that "federate," linking together to help their users "follow" (i.e., communicate seamlessly with) people on other Mastodon instances. With this community-driven model, there is no advertising or threat to learner privacy (Mackintosh & Cooper-Taylor, 2018b; Mastodon, n.d.).



- With **blogs**, learners can post in more depth and include other media, such as images, audio, or video. The OERu encourages the use of three gratis blogging tools—WordPress (which is also FOSS), Medium, and Blogger—but learners can use any blogging tool they wish. Learner blog posts are aggregated and shared with OERu learners (if their creator has given their post the appropriate course-specific tag).
- **WEnotes** is a micro-blogging tool, developed by the OER Foundation, included on course pages so that learners can make comments or ask questions right inside the page<sup>2</sup> (Lane, 2017 (August); Mackintosh & Tittsler, 2013).
- **Hypothes.is** can be used to annotate or discuss any published Web page or PDF document accessible publicly via the browser, including the ability to organise research, take personal notes, and search for others' contributions based on topic tags (Cooper-Taylor & Mackintosh, 2018a; Hypothes.is, n.d.; Wood, 2020).
- **SemanticScuttle**, a social bookmarking tool, enables learners to add, annotate, edit, and share bookmarks of Web documents (Cooper-Taylor & Mackintosh, 2018b; Slashdot Media, 2021).
- **Discourse** is the OERu's learner forum tool for persistent, discoverable discussion and collaboration (Discourse, n.d.; Mackintosh & Cooper-Taylor, 2018a).

In addition, the OERu's component-based platform uses its WEnotes aggregator, internally developed software,<sup>3</sup> to create a feed of learner posts and comments originating from all of these distributed interaction technologies.

## Advantages and Challenges of a Component-Based Infrastructure

The OERu believes its NGDLE demonstrates that, by accepting a small increase in architectural complexity (relative to conventional all-in-one monolithic LMSs), the OERu can achieve better functionality, flexibility, and scalability, as well as an advantageous cost profile. It also reduces the OERu's liability by achieving technological, supplier, and geographic diversity in its infrastructure without dependence on any specific commercial suppliers.

### The Challenge of Complexity

When compared to conventional LMSs, the OERu's NGDLE appears more complex. Instead of fitting everything into a single platform as an LMS does, the NGDLE comprises an ever-evolving array of largely independent FOSS technologies, each developed and maintained by its own communities, working in concert for the benefit of all.

Rather than requiring expertise in a single LMS product, running the OERu's NGDLE requires a capable technology “conductor” to orchestrate dozens of technologies that work together. Typical developers of proprietary software have an incentive to block would-be competitors so they often make it purposefully incompatible to stymie them—for example, Microsoft has a reputation for what they internally refer to as

“Embrace, Extend, Extinguish,” or EEE (Deadly embrace, 2000) to disrupt compatibility of competing software.

FOSS developers, by contrast, have no incentive *not* to employ open standards and open design conventions in their software, greatly facilitating integration and, perhaps surprisingly, consistency of approach. FOSS components, then, generally play harmoniously with one another because there is no incentive for them not to do so. There are no deterrents or obstacles to building integrations or extending FOSS components for anyone with the means to do so.

A technologist familiar with these conventions and standards can rapidly and reliably deploy NGDLE technologies, combining them into, from a learner’s perspective, a well-integrated, consistent suite of learning and collaboration services (Brooks & Pomerantz, 2017; EDUCAUSE Learning Initiative, 2015). The underlying complexity accompanying this technological diversity is, then, not nearly as confounding to a learner as it might first appear.

### **Functionality Advantages**

A component-based approach means selecting only the “best-of-breed” FOSS options, often from among several mature contenders (such as in the collaborative chat space, where contenders include Mattermost, Rocket.Chat, Element/Matrix, NextCloud Chat, and Zulip). This means that specialised platforms for each niche, including learner identity management, course presentation, document management, chat services, discussion forums, collaborative OER assembly, email automation, open badge management, Website annotation, and course assessment, can all be sourced individually by assessing their fitness-for-purpose and the strength of their supporting communities. This is in contrast to the conventional practice, where the only available components are those specifically built for the LMS (whether FOSS or proprietary) to which an institution has already committed itself; those components are seldom best-of-breed.

### **Flexibility Advantages**

Another major advantage of the OERu’s NGDLE is the ability to replace existing components whenever members of the OERu community identify functionally similar components they think offer advantages for learner usability, application stability, maintainability, scalability, and other criteria. If they build a sufficiently compelling case for a change, the OERu can make these evolutionary leaps because FOSS applications (like a non-proprietary version of Lego®) typically implement open standards for integration. These include interfaces and protocols like HTTP/HTTPS (for encrypted Web content transfer), OpenID/OAuth2 (single sign-on technologies), WebSockets (for live updates to content like social media feeds), RSS/Atom/JSON feeds, and various others. Through FOSS project Website feeds, chat platforms, mailing lists, and social media, the OER Foundation continuously monitors existing, emerging, and novel FOSS solutions relevant to the OERu NGDLE. When a better component for a particular area of infrastructure emerges through OER Foundation testing, the OER Foundation can create a complete local replica of the entire OERu infrastructure (minus private user data) at no cost, thanks to its FOSS nature. The OER Foundation can then trial swapping an existing component for a new one, testing to ensure that the change is possible and the benefits outweigh the costs.

## Scalability Advantages

The OERu started small, with just over 2,000 learners from 113 countries participating in courses during the OERu's minimum viable product phase (May 2018–May 2019). This placed a modest load on the OERu infrastructure while allowing the OER Foundation's technical team to validate that everything was working as intended. In many conventional proprietary software implementations, even these small numbers would have challenged the ability of the infrastructure to supply a usable service, namely one that is fast, seamless (e.g., performing the same way across learners' diverse array of computing platforms), and reliable enough to feel trustworthy and credible to learners. A major advantage of this loosely coupled component model is that each component is in active use in other contexts. Every component has already had its "trial-by-fire" at "Internet scale," serving many thousands or even millions of concurrent users, and has already evolved technically to meet those challenges. The OERu's confidence has been further bolstered by the fact that, in 2020, with no increase in overall NGDLE infrastructure capacity, it provided services to 200,000 learners with no impact on performance.

Although the applications chosen are products of different communities, different developers, and different technologies, they all adhere to a set of well-tested, robust, and scalable Internet software service patterns. The OERu's key technologies, such as MediaWiki (the technology on which Wikipedia, and the OERu's WikiEducator are built (WikiEducator, 2016)), WordPress, Drupal, Silverstripe, Mastodon, Discourse, and Mautic, among others, are well proven, even at the scale of tens of millions of users.

All have separate data stores (mostly databases, including MariaDB, PostgreSQL, MongoDB, CouchDB, and SQLite), themselves decoupled from the containers doing the computing, usually running scripting engines (OERu components make use of PHP, Ruby on Rails, Python, and Node.JS). Data is manipulated in a "stateless" way, with the software's logic—by design—not being tied to a single piece of infrastructure. This makes these Web services inherently amenable to scaling up horizontally just by adding more servers.

## Advantages of Adhering to Open Conventions

This shared practice is the culmination of many years of testing at Internet scale and makes it possible for the OERu to simply "dial up" all of these services as required by adding more low-cost commodity computing containers. The required replication of functionality is facilitated by the use of Docker, a FOSS technology allowing self-contained computing units that can easily be created, copied, removed, or moved among computing environments.

The adoption of FOSS technologies, then, allows us to maintain a stable, flexible, scalable infrastructure with inherent technology diversity united by the open technology standards and conventions to which they all adhere and created by collegial communities motivated by providing utility for themselves and other users rather than by profit. In addition to being more cost effective by avoiding any per-user costs (e.g., seat licence costs), this approach reduces the costs of ongoing software maintenance because it is effectively shared among other institutions and organisations that adopt the FOSS and have a shared interest in its stability and continued improvement. This sharing tends to diversify contexts in which the FOSS is used, thereby broadening the scope of its development. Wide adoption of specific FOSS also creates strong incentives for independent developers to improve their own capabilities with FOSS in general, while imposing no barriers thanks to both the software *and developers* being completely open.

## **Cost Advantages**

All of the technologies in the OERu's stack are free from licence fees. The only costs associated with them are the costs of commodity-hosting infrastructure and the time OER Foundation staff spends setting up and maintaining them. This means that the cost of a given set of components is a low fixed cost, sustainable even with a remarkably low number of learners and which, crucially, does not increase significantly as learner numbers grow. This means the cost of the OERu's learner numbers going from a thousand to a million (a hundred-fold increase) might only carry a five-to-ten-fold infrastructure cost increase. That should be extremely attractive to any higher education institution.

## **Return on Investment**

Return on investment can be achieved in a number of ways, including through investment to improve productivity or by reducing costs, or, ideally, a combination of both. The OERu has created and maintains its capabilities with a very small budget for infrastructure and targeted development. This is accomplished by adhering to four key principles:

1. using commodity FOSS hosting to allow for rapid movement between hosting providers with minimal trouble or disruption to services;
2. for software-as-a-service (SaaS) solutions, employing only FOSS options that provide a safety valve if the pricing model/service does not suit present needs in order to eliminate vendor lock-in;
3. ensuring any external commercial service has a fixed price that does not increase with the number of users; and
4. accounting for internal staff time in cost of ownership calculations.

The OERu currently uses three hosting providers on three continents, all commodity FOSS platforms, without adopting any proprietary features of those services. The OERu does not exceed the (generous) in-built data and storage allotments, so costs are fixed and predictable. The OERu's entire annual infrastructure/IT costs are summarised in Table 1.

**Table 1**

*The OER Foundation's Technology Infrastructure Budget in 2021*

Category	Supplier	Annual Cost (USD)
Hosting infrastructure	Hetzner (Germany)	384.00
	Digital Ocean (US)	6,840.00
	CatalystCloud (New Zealand (NZ) - sponsored)	\$0.00
Software-as-a-Service	Kanboard* (project management)	384.00
	ServerSMTP (email services)	180.00
	Total	7,788.00

*Note.* \*Kanboard is an open source project management tool implementing the “Kanban” process. It is provided as a commercial Software-as-a-Service product, similar to Mautic.

Some of the OER Foundation's hosting infrastructure costs are covered by sponsorship: the Foundation receives up to NZD500 per month of sponsored hosting services from the New Zealand-based hosting provider, Catalyst Cloud, which offers a fully FOSS cloud-hosting infrastructure (Catalyst Cloud, n.d.). Because the OERu runs FOSS GNU/Linux on all servers (using both Ubuntu and Debian distributions), there is no cost involved for the operating system; so, the OERu can run as many servers as required without incremental software costs. Only the cost of the technologist's time and the relative computing resource requirements are variable. However, those costs do not increase at anywhere near the same rate as user numbers. For example, 10 times more users might require twice the staff time (a linear increase would be 10 times the staff time) and perhaps twice the direct computing infrastructure resources.

## Case Study: SaaS and the Value of FOSS

Mautic is a FOSS “marketing automation” tool (Acquia, 2020), chosen to automate email communications with both existing and prospective learners and partners. Initially, to test its functionality, the OER Foundation opted to use the \$30 per month entry-level SaaS offering from the commercial service provided by the Mautic company, which allowed the Foundation a single login to gain immediate access to the software and assess Mautic's fit to the OERu's requirements. This service allowed for up to 2,000 contacts, with a modest cost increase for additional contacts.

After a few months using the service, the OERu determined Mautic was an excellent fit for communicating with both current and prospective learners, as well as partners, and began to build its capabilities into the suite of OERu tools. Around the same time, the Mautic company's salespeople contacted the OER Foundation to say that their pricing model was changing and that the Foundation's costs would rise by more

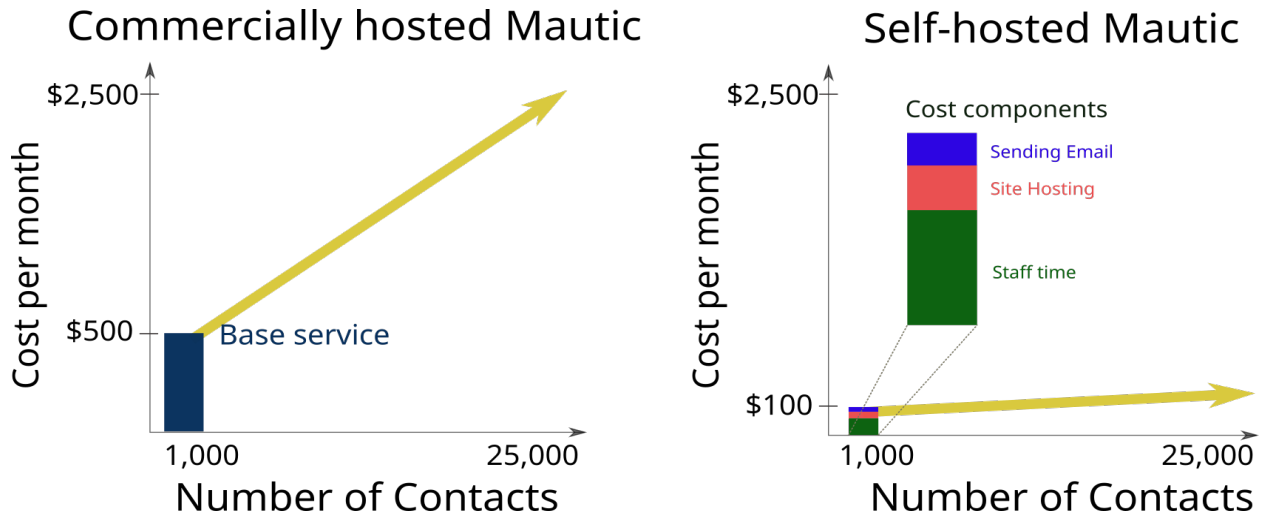
than 10 times, to \$500 per month. In addition, there would be a more substantial increase for additional contacts. For example, 10,000 contacts would cost \$1,000 per month. This placed the Foundation in an uncomfortable position: having found Mautic to be a very useful tool and having invested substantial time in making it central to OERu services.

However, because the Mautic application itself is FOSS, the Foundation was in a position to mitigate this uncomfortable dependence on a third-party hosted software application by assessing the prospect of self-hosting its own Mautic instance. This would not have been an option with proprietary SaaS offerings. It took less than two days to implement and document a self-hosted OERu Mautic instance (Lane, 2017 [March]). The self-hosting places a negligible additional load on the OERu's infrastructure, and the OERu also benefits from Mautic's capabilities being continually improved by the Mautic developer community via updates that the OER Foundation can apply to the OERu instance when convenient. It takes less than one hour per month of the OER Foundation technologist's time to keep up with changes. Moreover, the foundation has effectively joined the Mautic development community, simply by contributing things like bug reports to improve the platform to ensure it meets OERu requirements.

The self-hosted cost profile for Mautic is far more favourable than that of the SaaS. Cost estimates include technical staff time (averaging about \$70 per month), a component of hosting infrastructure, and outgoing email costs. The approximately 200,000 emails sent over the past year using Mautic via an external email SaaS provider cost the Foundation about \$15 per month. The OERu has subsequently gained 25,000 contacts—all having completed a double opt-in process to ensure GDPR<sup>4</sup> compliancy (European Commission, n.d.)—and, as shown in Figure 2, the cost comparison for that of SaaS versus self-hosted is about \$2,500 versus \$100 per month, or \$30,000 versus \$1200 annually. This means that self-hosting in this case provides a \$28,800 annual saving, or 96%, compared to the SaaS offering. That saving alone is several times greater than the OERu's total annual infrastructure budget, and these savings will only increase as contact numbers grow. The OER Foundation believes this validates the FOSS self-hosted approach, and represents a huge opportunity for others, particularly for higher education institutions in emerging economies or dealing with COVID-19–related budgetary cutbacks.

**Figure 2**

*Cost Comparison Between Commercially (3rd party) Hosted and Self-Hosted Mautic (up to 25,000 Contacts)*



## The Benefits of Diversity

As with any living ecosystem, lack of diversity in technology infrastructure increases fragility and therefore risk. A technology monoculture (i.e., a single-vendor proprietary computing environment that only supports integration with software created by that vendor and/or its designated partners) means that a security failure can render an entire infrastructure vulnerable to hostile exploitation by third parties or even simple vendor incompetence (Cullinan et al., 2010). In recent years, there have been thousands of examples of this phenomenon, particularly related to the Microsoft Windows monoculture. A notable example: the catastrophic failure of the United Kingdom's National Health Services in the face of the "Wannacry" ransomware, which exploited common security flaws in the Microsoft Windows operating system deployed throughout the organisation, creating an effective monoculture (Deane-McKenna, 2017).

Similarly, a supplier failure (where a supplier goes out of business, is acquired, alters or discontinues a key product, or changes its pricing model) can render an entire infrastructure unsupportable, or, in the case of pricing changes for proprietary software or services, economically unsustainable. If the institutions making that software available to their learners cannot remedy that liability by migrating to another technology without, for example, loss of data or access, this can have a massive negative effect both on learner confidence and on institutional reputation.

To mitigate this risk, the OERu has no proprietary supplier dependencies for any of its services; its only commercial relationships with technology providers are for commodity hosting of GNU/Linux computing infrastructure. As such, the OER Foundation can transfer any or all of the OERu services from one provider's infrastructure to another's with minimal downtime, no data loss, and minimal cost.

Finally, as the OER Foundation's home country New Zealand has experienced environmental and social disasters (including earthquakes, fires, floods, and terrorism), the Foundation is acutely aware that lack of geographic diversity is a major infrastructural liability. The OER Foundation has therefore chosen to host Web services in multiple facilities around the world. The aggregate cost of those services is approximately \$10,000 per year (including the value of sponsored hosting services that the Foundation receives). As a result of policy changes of one former infrastructure provider that actively disadvantaged FOSS solutions, the OER Foundation moved services that were previously hosted there to infrastructure provided by a more amenable hosting provider, incidentally gaining a further reduction in infrastructure costs in the process. Again, this is something the OERu can do with minimal time, cost, or risk and with little, if any, disruption to learners.

## Pedagogical Opportunities

The OERu philosophy embraces “learning on the Internet” rather than learning via any particular platform, with “participatory technologies [being] integral to openness” (Blomgren, 2018, p. 57). This means that learners have complete control of their course artefacts rather than having them locked into an institutional system. This control enables learners to “navigate their own journey through content to achieve desired learning outcomes” (Bossu & Willems, 2017, p. 24) and is the first principle of the “Open Empowered Learning Pedagogy” (Smyth et al., 2016) framework.

For learners using OER, the advantages include the development of self-directed skills (Lin, 2019), textbook cost savings (Blomgren, 2018; UNESCO, 2019), a variety of dynamic OER materials in different languages (King et al., 2018), mobile learning (Chib & Wardoyo, 2018; Lin, 2019), and the promotion of lifelong learning (Melnikova et al., 2017; Misra, 2018).

Alongside advantages for learners, the use of OER also provides opportunities for teaching staff and learning designers. The European Framework for the Digital Competence of Educators (Redecker, 2017) identifies a key competence for all educators as the ability to “effectively identify resources that best fit their learning objectives, learner group, and teaching style, to structure the wealth of materials, establish connections, and to modify, add on to, and develop themselves digital resources to support their teaching” (p. 20). As well as building digital literacy skills (Bossu & Willems, 2017), these resources help learners and educators alike understand open licences and the use of OER (Preradovic & Posavec, 2019; Weller et al., 2018). As Bossu and Willems (2017) assert, OER can “provide opportunities for collaboration, promote curriculum innovation and student-led content development, as well as contribute to . . . teachers’ much needed continuing professional development” (p. 22). In addition, cost efficiencies for course developers (King et al., 2018; Menon & Bhandigadi, 2018) should not be underestimated.

Educators developing OERu micro courses build new skills in wiki editing and writing for the Web, using FOSS tools, finding openly licensed content, and adopting pedagogies embodying “free-range learning” (Lopes & Porter, 2018; Morgan et al., 2012; Parry, 2012). Writers are pushed to consider the audience more than ever before, knowing that OERu learners are spread across six global regions. Content needs to appeal to, and be clear to a global audience, many of whom are not native English speakers.



The OERu's international network also demonstrates its potential by collaborating on content writing, assessment moderation, and idea generation to ensure a meaningful experience for OERu learners. In practical terms, this means that educators and developers in New Zealand, for instance, may draft course content or an assessment that is then shared with OERu network colleagues in Africa, Canada, the United Kingdom, or the United States for feedback. As well as strengthening connections between collaborators and the OERu network in general, this also builds capability across the OERu community and ensures robust moderation processes amongst experienced staff working in different contexts. As García-Holgado and García-Peñalvo (2018) emphasise, “people are not only end-users but also an important component of a learning ecosystem” (para. 7) This is certainly the case in the OERu.

Transnational collaboration helps OERu partners consider intercultural dimensions of the learning experience and integrate internationally relevant issues into OERu content (Caniglia et al., 2017). This also facilitates contribution to two of the United Nations Sustainable Development Goals (United Nations, n.d.), specifically Goal 4, “Quality Education,” and Goal 17, “Partnerships for the Goals.” With the principled facilitation of the OER Foundation, led by the UNESCO Chair in OER and former Chair of the International Council for Open and Distance Education (ICDE) in OER, the OERu network fully embraces its mission to connect people through “the fostering and sharing of ideas” and “building the knowledge and capabilities needed to ensure a better future for all” (New Zealand National Commission for UNESCO, 2013, p. 6).

## Conclusion

The OERu's NGDLE experience suggests that the status quo for IT infrastructure in higher education institutions is neither the only way to do things nor always the best way. With the OERu unbound by historical decisions, conventions, or vendor lock-in, it is able to pioneer new approaches. Driven by open principles and constrained resources, the OERu only needs to fulfil its clear vision: to build a rich, ever-evolving infrastructure for learners and OER collaborators alike, operating at the scale required to reach large numbers of learners distributed across the globe. Implementing a FOSS end-to-end service gives the OERu a unique perspective and experience, when compared with organisations that implement only the occasional FOSS component among an IT infrastructure dominated by proprietary commercial software which has more restrictive terms and typically features per seat or per instance licence fees.

The advantages of the OERu's component-based NGDLE are both technological and pedagogical, enabling their communities of learners and educators across the globe to thrive. It demonstrates both remarkable cost-effectiveness at scale and the ability to adapt rapidly to meet evolving learner needs, while gently immersing learners in precisely the digital environment in which they need to gain confidence and virtuosity to thrive in furthering their education or as qualified professionals in an increasingly digital world.

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<sup>2</sup> For an example, see course feed for LiDA101, <https://course.oeru.org/lida101/interactions/course-feed/>

<sup>3</sup> See WENotes-Aggregator, OERu, <https://git.oeru.org/oeru/wenotes-aggregator>

<sup>4</sup> The OERu endeavours to pro-actively implement best practice regarding learner privacy, which we believe is currently reflected by the European Union's General Data Protection Regulation (GDPR). For more information, see "General Data Protection Regulation, Wikipedia" [https://en.wikipedia.org/wiki/General\\_Data\\_Protection\\_Regulation](https://en.wikipedia.org/wiki/General_Data_Protection_Regulation). To see the OERu's GDPR compliance statement, see OERuPrivacy Policy, <https://oeru.org/privacy>

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# What We Talk About When We Talk About Virtual Learning Environments

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## Abstract

This is a literature review analysing articles published on virtual learning environments (VLEs), otherwise known as learning management systems, in higher education in the years 2014–2018. The Web of Science database was used to identify relevant articles over this five-year period. The sample comprises 99 peer-reviewed, academic journal articles. A coding sheet is used to analyse each article, identifying the research method, the classification of research (macro, meso, or micro), the focus of research (students, instructors, or both), and, where applicable, the specific brand of VLE. Most output on VLEs is found to be quantitative, to focus on students and on the micro level of learning and teaching, to not have a clear theoretical focus, to not specify which brand of VLE is used, and to be produced in affluent countries. This article adds to the understanding of VLE research by identifying the most frequent foci of research on VLEs, as well as identifying areas that have been under-researched.

*Keywords:* virtual learning environment, learning management system, higher education, educational technology, literature review, Web of Science

## Introduction

Virtual learning environments (VLEs), otherwise known as learning management systems, are established technologies that have been supporting learning and teaching in higher education for over 20 years. Newman et al. (2018), in a large-scale survey of 37,720 students in the United Kingdom, showed 75% of students relying on their VLE to support coursework. In a further large-scale survey in the UK, 72% of higher education students stated they relied on their VLE to do their coursework (Langer-Crame et al., 2019). Because the VLE is embedded in higher education, and because distance learning has increasingly become the norm in the age of the COVID-19 pandemic, now is a timely point at which to reflect on studies on VLEs with a view to informing possible research hereafter, in part by identifying areas that have been under-researched to date.

In their early days, VLEs offered the possibility of innovation, even transformation. According to Dutton et al. (2004), “VLE systems began to diffuse widely in the late-1990s and quickly became a status symbol of innovation” (p. 135). By allowing anytime, anywhere access, VLEs had the potential to transform learning and teaching, enabling synchronous and asynchronous collaboration irrespective of spatial and temporal boundaries. However, VLEs are often used in practice in limited ways to store content (Gordon, 2014; Rienties et al., 2016). Newman et al. (2018) note that 55% of students in their sample said VLEs were well designed, but only 26% enjoyed using the collaborative features. The limited usage of VLEs (relative to their capabilities) is not necessarily a problem: Rodriguez-Ardura and Meseguer-Artola (2016) argue that VLEs help users achieve learning goals (p. 1046). That said, and while VLEs get jobs done in higher education, the gap between their potential and their actual use is considerable.

This article, a literature review with analysis, undertakes a survey of articles published in academic journals on VLEs in higher education in 2014–2018, identified through the Web of Science database. The specific questions considered are the following:

- What is the pattern of academic journal articles on VLEs over the period 2014–2018?
- What can be deduced about VLE scholarship in higher education from published work over the 2014–2018 period?
- What areas of inquiry are under-explored in research on VLEs?

The questions enable exploration of what the studies have to say about the status of the VLE in higher education; the distribution of scholarship on VLEs by country and by academic journal; and what aspects of VLEs are under-researched. Other issues explored in this paper include geopolitical aspects of the pattern of scholarship on VLEs and the specific brand of VLEs used. This study also examines whether VLE research focuses on the micro level of teaching and learning, the meso level of managerial and organisational aspects of VLEs, or the macro level of VLEs viewed through specific theoretical lenses or as part of education systems.



## Literature Review

This section summarizes research relevant to the current study, encompassing both articles on VLEs and on technology-enhanced learning more broadly. It identifies articles with research questions similar to the present study, and with similarities in research interests, too, in order to compare findings.

In an early article, Paulsen (2003) surveyed VLE provision at 113 European higher education institutions using 52 different VLEs, including in-house systems. The research was undertaken in late 2001 and early 2002, before Moodle was available. The most popular system was WebCT (20 institutions), followed by a Norwegian system, ClassFrontier (16 institutions), followed by Blackboard (14 institutions). Blackboard and WebCT merged in 2005 and now trade as Blackboard.

VLEs relocate didactic modes of teaching to the online environment, as reflected in scholarship. Fry and Love (2011) interviewed lecturers in business, whose metaphors for VLEs included “security blanket,” “crutch,” and “electronic filing cabinet” (p. 54), underlining the extent to which VLEs were used to store content. Students’ and lecturers’ use of VLEs as storage facilities may be a choice. However, it may also be a consequence of VLEs’ design and how they are deployed by universities: McGill and Hobbs (2008) argue, “Student use of a VLE is primarily as an end-user. ... Instructors design the interface for their course and implement different levels of functionality” (p. 192). In addition, Naveh et al. (2010) argue that “instructors can maintain their conservative teaching habits. ... From an organizational perspective, this can be done at low cost, yielding relatively high student satisfaction” (p. 132).

VLEs are customarily produced in affluent countries but exported worldwide. Jones (2014) argues that learning technologies “are largely the outcome of design and development carried out by multi-national US based corporations” (p. 170). Moodle’s head office is in Australia, but the other main VLE provider, Blackboard, is based in Washington, DC. Sakai was developed by a group of universities in the United States. WebCT, a major player in the VLE market until it was taken over by Blackboard, also began in the United States. Zeide and Nissenbaum (2018) argue, of VLE vendors, “By adopting commercial marketplace norms, these providers undermine core functions and values of education” (p. 280). Moreover, the production of VLEs in affluent countries can lead to colonial pedagogy whereby the design features of VLEs prompt culturally specific forms of learning.

Moccia (2016) argues, “Technologies are always expensive so leaders in higher education have to bet on where to invest their sometimes-rare resources” (p. 32). A large-scale survey in the UK showed the VLE receiving most institutional investment (Jenkins et al., 2018). Castaneda and Selwyn (2018) argue, “The use of digital technology in higher education is now a multi-billion dollar business ... the commercial design of educational systems and software increasingly shapes the forms of teaching and learning that take place in universities” (p. 6). VLEs are a lucrative market because of their ubiquity. In addition, VLEs’ design influences the kind of learning and teaching that takes place in higher education.

Latchem (2006) undertook a survey of 374 items (265 articles, 86 colloquia, and 23 editorials) published in the *British Journal of Educational Technology*, 2000–2005, arguing that educational technology needed more theory-driven research. Latchem (2006) also showed that “the vast majority of the articles reflected work and thought in western countries or overseas universities whose curricula and methodologies are

essentially western-influenced” (p. 509), suggesting the use of VLEs is political as well as technical, reproducing geopolitical structures and imbalances of wealth and power.

Baydas et al. (2015) used content analysis to study 1,255 articles published in the *British Journal of Educational Technology* and *Educational Technology, Research and Development*, from 2002 to 2014, finding that the most common research method was quantitative. The articles included research on VLEs but were not limited to articles on VLEs. Riquez et al. (2015) reported on a survey of VLE use in Ireland, which has been taking place on a rolling basis since 2008. Students wanted VLEs that were easy to navigate and identified lecturers’ lack of use as a barrier to engagement. A later study of survey responses from 521 staff in Irish higher education institutions found the most common use of VLEs was as content repositories and as a channel for communication (Farrelly et al., 2018). Cobo et al. (2014), in a study in Spain, and Oproiu (2015), in a study in Romania, found similar VLE usage patterns. Ngai et al. (2007), in research conducted in Hong Kong higher education from a Technology Acceptance Model perspective (Davis, 1989), found ease of use and usefulness to be the dominant factors affecting the use of VLEs. Van Raaij and Schepers (2008), also using the Technology Acceptance Model, studied 45 students in an executive MBA programme in China, finding that perceived usefulness had a direct effect on VLE usage.

Shih et al. (2008) undertook a content analysis of journal articles concerned with cognition in e-learning published in five journals (*British Journal of Educational Technology*, *Innovations in Education and Teaching International*, *Computers and Education*, *Educational Technology Research and Development*, and *Journal of Computer Assisted Learning*), recording year of publication, journal, and research topic; they found most of the articles took a quantitative approach. Hung (2012) analysed the abstracts of 689 articles on e-learning published between 2000 and 2008, with a research question investigating trends and patterns of e-learning research. Hung (2012) used the Web of Science database and limited the research to journal articles and proceedings papers. The five most prolific countries for e-learning research were England (conflated with the UK), the US, Taiwan, China, and Germany. The five most prolific journals were *Lecture Notes in Computer Science*, *Computers and Education*, *British Journal of Educational Technology*, *Educational Technology and Society*, and *Lecture Notes in Artificial Intelligence*.

Sosa et al. (2019) surveyed research on emerging technologies, 2006–2016, though their survey was not limited to higher education. From a sample of 288 studies, they found that students were the most frequently studied population in individual papers. Very few of their studies focused on instructors. Other features they categorized included year of publication and research methodology, both of which are categories in the present study. Hsu et al. (2013) examined the abstracts of 2,997 articles on education technology published between 2000 and 2010. The categories for their analysis included productivity by journal and by country, and they also analysed data by year of publication.

Zawacki-Richter et al. (2009) surveyed 695 articles on distance education published between 2000 and 2008. They classified research into three categories: macro (systems and theories), meso (management and organisation), and micro (teaching and learning), finding a shortage of articles at the meso level. Their categories have been adapted for the coding sheet supporting the present study (see Appendix B) because the categories enable a useful subdivision of research. Zawacki-Richter et al. (2009) found most of their sample adopted a qualitative approach, identified gaps in distance learning literature around innovation

and intercultural aspects of distance learning, and noted 80% of their sample came from five countries: the US, Canada, the UK, Australia, and China.

The authors of the present study have been unable to find a survey of articles on VLEs later than 2016, and that article covers the period 2005–2011 (de Oliveira et al., 2016), identifying 14, mainly quantitative, articles on VLEs. Existing research is weighted towards particular and frequently affluent contexts—contexts that are also dominant in the design and production of VLEs. The present study addresses a research gap by providing a more recent survey of research published on VLEs in higher education. The present study also contributes to scholarship on VLEs by identifying popular areas for research, under-researched aspects of VLEs in higher education, and weighting of scholarship on VLEs towards affluent countries, reflecting the dominance of those countries in VLE design and implementation. The breadth of time frame for the present study, while limited, is similar to that in Latchem (2006) and de Oliveira et al. (2016).

## Research Method

The Web of Science database, also used by Hung (2012), is used in this study. The following search terms were used: *virtual learning environment* and *higher education*; *learning management system* and *higher education*; *virtual learning* and *higher education*; *virtual learning*, *higher education*, and *innovation*; *virtual learning environment*, *e-learning*, and *higher education*; and *virtual learning environment*, *ICT* (information and communications technology), and *innovation*. The research was limited to articles published in English. A coding sheet was devised (see Appendix B) to identify core features of the articles. It had originally been hoped to pose a further research question relating to the extent to which scholarship advocated innovative usage of VLEs, but institutional funding given to support the project was reduced, and the research questions were scaled down accordingly. It was noted that the term *learning management system* was used as an alternative to *virtual learning environment* to describe the same type of learning platform (though Pinner [2014] distinguishes between the two in an opinion piece), but *virtual learning environment* is used in this paper for consistency.

The initial search, undertaken by the second author, yielded 2,211 articles. Following the initial identification, the titles, abstracts, and keywords were screened for eligibility to the study, identifying articles in which VLEs were a significant element, using inter-rater discussion (comparative verification on the part of the authors), a method also used in a survey of articles on educational technology by Baydas et al. (2015). The keyword *virtual learning* proved unhelpful as it identified articles concerned with computer simulations or virtual worlds. The screening process resulted in a total of 99 articles selected for coding. A similar approach was adopted by Sung et al. (2016), who performed a meta-analysis of articles published on mobile learning over the period 1993–2013. This study has drawn selectively from the methodology of previous studies in order to better address the specific research questions: disaggregating the data into macro, meso, and micro categories highlights patterns in publications on VLEs and enables conclusions to be drawn, including the identification of research areas that have been relatively unaddressed to date.

For this paper, the analysis categorized the sample in terms of years published, country of origin, areas of focus, brand of VLE, journal, research method, and theoretical perspective. All the articles making up the sample are cited in Appendix A, subdivided by year of publication (2014–2018).

## Results and Discussion

The year-by-year distribution of the sample is shown in Table 1.

**Table 1**

*Distribution of the Sample by Year*

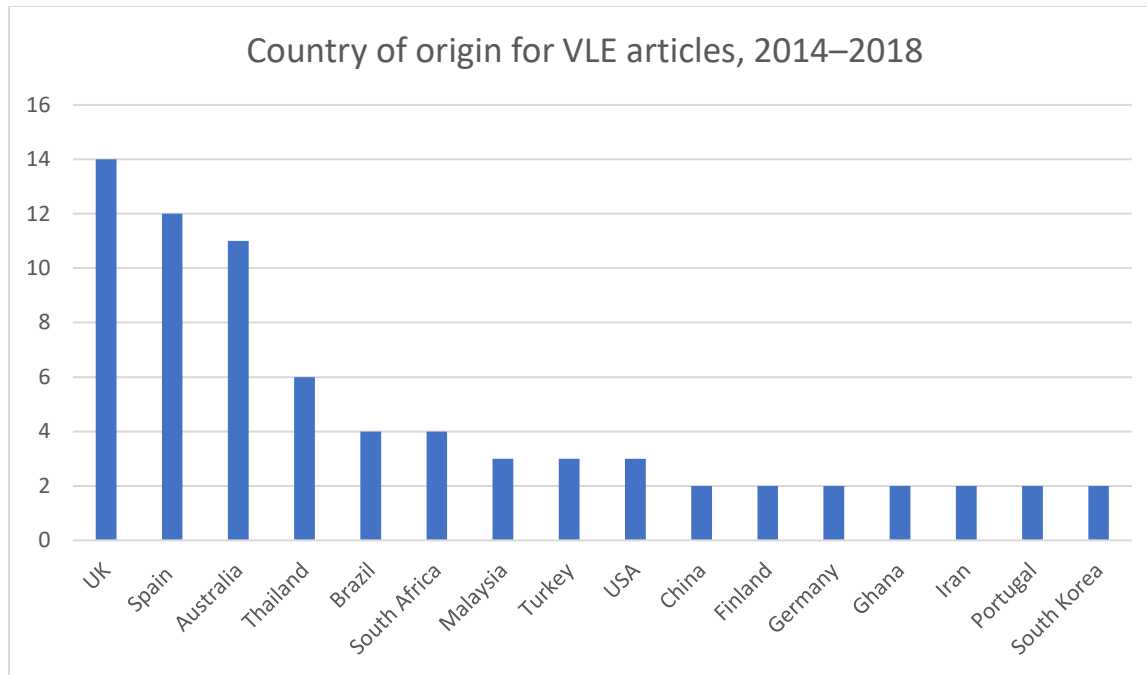
Year	Number of articles
2014	11
2015	19
2016	24
2017	20
2018	25

With the exception of 2014, the number of articles published each year is consistent, varying between 19 and 25. There was no obvious explanation for the shortage of articles in 2014. Data on years prior to 2014 were not collected, and therefore it is not possible to state if 2014 is an outlier or in line with years outside the sample.

Aggregating the data over five years and taking the home higher education institution of the first author as means of identification, the most articles were published in the UK (14), Spain (12), and Australia (11). Countries with two or more journal articles over the period are summarized in Figure 1.

**Figure 1**

*Countries of First Author (Two Articles or More)*



There were 26 countries with one article each, including Colombia, Germany, Kenya, the Kyrgyz Republic, and Pakistan. The geographical spread of articles on VLEs over the period from 2014 to 2018 was extensive, but with a few hot spots (notably, the UK, Spain, and Australia). The output was largely though not wholly weighted towards affluent countries. The relatively low count from the US was noticeable. Latchem (2006), in a survey of articles in the *British Journal of Educational Technology* covering the period 2000–2005, found 40% of the articles were from the UK, 12% from the US, and 8% from Australia (p. 505), though Latchem’s survey was of all articles published in the *British Journal of Educational Technology* (articles, editorials, and colloquia) and not solely those pertaining to VLEs. Hsu et al. (2013) also identified the top 10 countries for publication in the field of educational technology, 2000–2010. Five of their top ten countries also appear in Figure 1: USA, UK (though Hsu et al. [2013] conflate England with the UK), Australia, Turkey, and Germany. Five of their top ten countries do not feature in Figure 1: Taiwan, the Netherlands, Canada, Greece, and Singapore. The present study identifies Spain as the second most productive country for articles on VLEs in 2014–2018. This is at odds with other surveys of productivity in research, though the other surveys were of technology-enhanced learning articles more widely rather than being focused on VLEs. No obvious reason was discernible for Spain’s relative prominence in the field.

The division between macro, meso, and micro, as per the categories defined by Zawacki-Richter et al. (2009), and as recorded on the coding sheets, features in Table 2.

**Table 2**

*The Sample Divided by Categories*

Category	Number of articles
Macro	12
Meso	32
Micro	55

*Note.* Based on categories defined by Zawacki-Richter et al. (2009).

Most articles focused on learning and teaching with VLEs. However, the second category, numerically, was the meso level, which contrasts with Zawacki-Richter et al.'s (2009) study, which found a shortage of articles at the meso level. The fewest number of articles looked at VLEs as part of national higher education systems or as validations or refutations of particular theoretical perspectives. Latchem (2006) divided his sample into empirical enquiry (78%) and theoretical enquiry (22%), indicating a similar tendency to prioritize studies of practice over explorations of theory.

Each article was evaluated in terms of whether its research focus was on students, instructors, or both (recorded on the coding sheets). A small number of articles did not fall into any of these categories in instances where the focus was on administrators or education leaders. The distribution of the sample in terms of the research focus is shown in Table 3.

**Table 3**

*The Sample Divided by Research Focus*

Research focus	Number of articles
Students	59
Instructors	18
Both	18
Other	4

A sizeable number of the articles focus on students alone, and a further 18 focus on students in conjunction with instructors, totalling 77 articles in the sample. Sosa et al. (2019), in their study of literature on emerging technologies in 2006–2016, also identified a research focus on students; 152 articles from their overall sample of 288 focused on students, of which 117 focused on higher education students (p. 136). In the present article, a shortage of articles was found examining VLEs from the perspective of instructors only

(lecturers or tutors), identifying a potentially under-researched area of practice with VLEs, especially as instructors can often be responsible for VLEs' content (McGill & Hobbs 2008).

Over half the articles in the sample did not specify which brand of VLE was used. The identification of the specific VLE may not have been essential for the research, but the omission is surprising in view of the fact VLEs comprise significant expenditure for universities (Castenada & Selwyn, 2018; Jenkins et al., 2018; Moccia, 2016), and information on which brand of VLE is used could have value. The distribution of the sample, in terms of the particular VLE, is listed in Table 4.

**Table 4**

*Specific Virtual Learning Environments (VLEs) Used in the Sample*

Brand of VLE	Number of articles
Moodle	31
Blackboard	18
Sakai	4
Other	6
Unspecified	40

The number of unspecified VLEs could potentially limit research by neglecting the specific brand. That said, commercial VLEs are more conspicuous by their similarities than their differences, offering comparable capabilities regarding information storage and communication channels, and hence, results from published studies may have use value irrespective of which brand of VLE is used. Benner and Tripsas (2012) argue that competing alternatives often converge on a dominant design in a process of mimetic isomorphism, and hence the brand of VLE may make no significant difference. The standardization of VLEs as products imposes, in practice, a digital hegemony and a standardized, reductive, and culturally exclusive mode of learning and teaching, in view of the dominance of affluent countries in the design and sale of VLEs.

The coding sheet recorded the journal title for each article. The numbers of articles from individual journals are featured in Table 5. Only journals with two or more articles are included. Table 5 also positions the number of articles published in each journal alongside that journal's position in the Scimago Journal and Country Rank (SJCR) 2018, where applicable.

**Table 5**

*Journals in the Sample Featuring Two or More Relevant Articles, and the Journals' Scimago Journal and Country Rank (SJCR) 2018*

Journal title	Number of articles	<i>SJCR 2018</i>
<i>International Journal of Emerging Technologies in Learning</i>	7	39
<i>Computers &amp; Education</i>	6	2
<i>Interactive Learning Environments</i>	5	11
<i>Procedia—Social and Behavioral Sciences</i>	4	-
<i>Australasian Journal of Educational Technology</i>	3	15
<i>British Journal of Educational Technology</i>	3	4
<i>Education and Information Technologies</i>	3	21
<i>Journal of Educational Technology and Society</i>	3	-
<i>Research in Learning Technology</i>	3	-
<i>The International Review of Research in Open and Distributed Learning</i>	3	7
<i>Active Learning in Higher Education</i>	2	-
<i>Africa Education Review</i>	2	-
<i>Assessment and Evaluation in Higher Education</i>	2	-
<i>Computers in Human Behavior</i>	2	-
<i>Electronic Journal of e-Learning</i>	2	16
<i>International Journal of Educational Technology in Higher Education</i>	2	20
<i>Knowledge Management and eLearning</i>	2	35
<i>Technology, Pedagogy and Education</i>	2	-
<i>Telematics and Informatics</i>	2	-
<i>Turkish Online Journal of Distance Education</i>	2	-

Most of the journals in Table 5 are slanted towards an interest in technology-enhanced learning. Only six have a more generic interest in education. Research on VLEs gets focused in journals relating closely to technology-enhanced learning rather than being diffused more widely through education journals,



suggesting that VLE research is of more interest to a niche community than to educators as a whole. That said, we recognize that journals are not unchanging entities but, instead, change direction and editorial personnel.

Half of the journals in Table 5 featured in the top 50 journals identified under the heading “E-Learning” (SJCR, 2018). Only three of the journals in Table 5 featured in the SJCR top 10, suggesting research on VLEs is not concentrated in high-impact journals and is distributed more widely through technology-enhanced learning publications. Identifying the impact factor of journals in which educational technology research features was also part of Hsu et al.’s (2013) methodology.

Most of the articles adopted a quantitative approach to data gathering and analysis, as shown in Table 6.

**Table 6**

*Research Methods for the Sample*

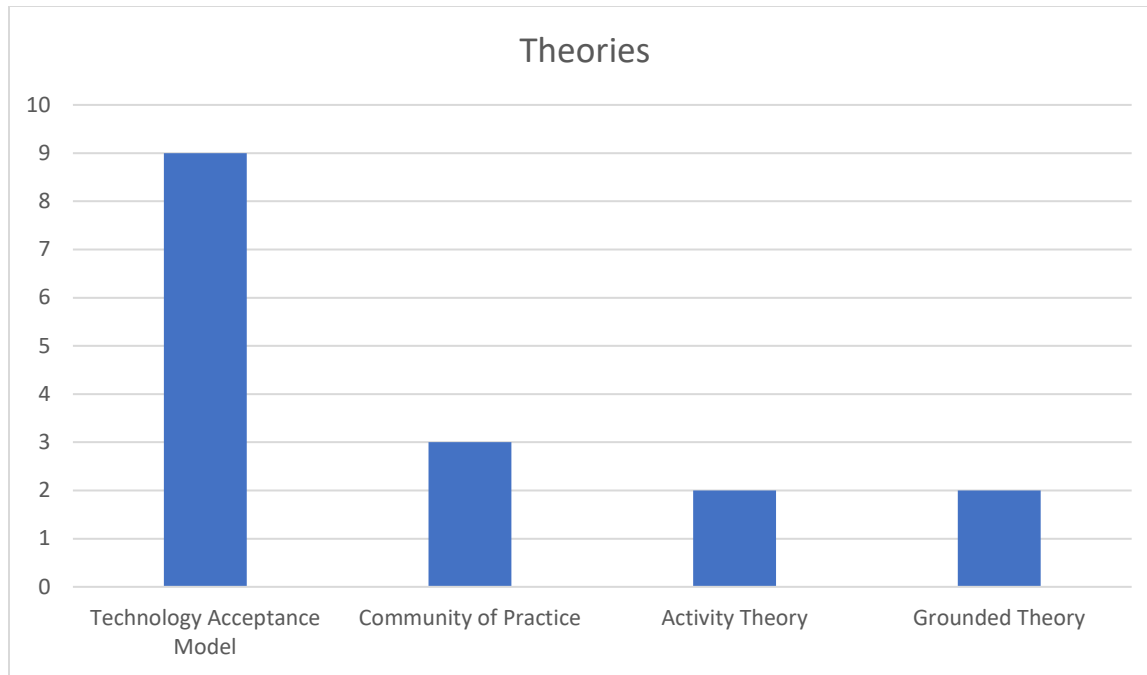
Research method	Number of articles
Quantitative	48
Qualitative	24
Mixed-methods	19
No original data	8

The eight articles that did not belong to any of the categories were either position papers or literature reviews. This contrasts with Sosa et al.’s (2019) findings that most of the research surveyed was qualitative, though the research was on emerging technologies rather than focused on VLEs and was not limited to studies of higher education.

The paucity of theorized accounts of VLEs was noticeable. Very few of the articles declared an explicit theoretical lens in their title, abstract, or keywords. Instances of two or more articles adopting a specific theoretical approach are summarized in Figure 2.

**Figure 2**

*Theories Used to Analyse Articles From the Sample*



The most popular theoretical lens was the Technology Adoption Model (Davis, 1989). This is not surprising, as this model analyses how people engage with technologies and the criteria they apply to evaluate technologies' usefulness, rooted in Fishbein and Ajzen's (1977) theory of reasoned action. The Technology Adoption Model is well suited to analysing engagement with VLEs.

The Community of Practice Theory (Lave & Wenger, 1991; Wenger, 1998) is suitable for analysing VLEs from a social perspective and monitoring learners' progress in learning communities, as the theory focuses on how learning communities evolve and on how people establish effective identities in communities of practice. Data collected by VLEs can illuminate patterns of engagement within communities. Activity Theory (Leontiev, 1978, 1981) is more suitable for analysing technical and social aspects of technologies and how they interact, by anatomizing systems into interactive nodes. Grounded Theory (Strauss & Corbin, 1998) takes a different approach, gestating a theory from the data gathered.

The data suggest that certain, generally affluent countries tend to dominate scholarship on VLEs, as they dominate production of VLEs (Jones, 2014). Furthermore, articles on VLEs tend to get published in technology-enhanced learning journals, such as *Computers & Education* and the *British Journal of Educational Technology*, both of which also featured as prolific journals in the study by Hung (2012), rather than get published in education journals more widely, despite the ubiquity of VLEs.

## Conclusion

This article, a literature review with analysis, has surveyed research on VLEs in higher education over the period 2014–2018, identifying patterns in the sample as well as areas that have been under-explored, with a view to informing future research.

Research on VLEs over the period from 2014 to 2018 tends to be quantitative. It also tends to be focused on students and on the micro level of learning and teaching. It is not likely to have an explicit theoretical focus, an issue identified by Latchem (2006) in a review of 374 published items in the *British Journal of Educational Technology*, as well as by Oliver (2011) in relation to research in technology-enhanced learning published from 2001 to 2011.

Some countries published a higher-than-average volume of research on VLEs (UK, Spain, and Australia) over the period studied, and two journals averaged more than one article per year on VLEs (*International Journal of Emerging Technologies in Learning* and *Computers & Education*). VLEs are embedded technologies in higher education, but they are not a frequent subject of interest. Furthermore, articles on VLEs leave numerous areas under-explored, including comparison of active and relatively inactive geographical concentrations of research, which may, in turn, reflect unequal relationships in the design and implementation of VLEs and technology-enhanced learning more widely. Ferreira et al. (2020) argue that technological solutionism has supported marketization of the education system in Brazil, comprising a form of digital colonialism, which this paper largely reinforces through a survey of articles on VLEs that indicates dominance by affluent countries in systems and research.

The data from the present study indicate opportunities exist for more theorized approaches to VLEs because different theoretical lenses can illuminate different aspects of technologies and practice. There are also opportunities for more qualitative approaches to data gathering and analysis, as well as for research focusing on instructors, who play a notable role in designing interfaces and implementing levels of VLE functionality (McGill & Hobbs, 2008). In addition, opportunities exist to explore in-depth interactions on VLEs, using content analysis as a methodological approach, as well as to extend research on VLEs beyond the end of 2018.

A limitation of the present study is that despite the use of specific search terms, some relevant articles are likely to have been missed. One database (Web of Science, originating in the US) was used, but additional databases would probably have produced additional articles. However, the articles used are cited in Appendix A, helping to identify notable omissions for the benefit of future researchers, and the sample comprises a range of relevant articles from across the world, albeit all the articles are published in English. A further limitation of the present study is the relatively short period of time surveyed, but similar time periods were studied by Latchem (2006) and de Oliveira et al. (2016).

This article contributes to research on VLEs by identifying prevalent practices regarding research in 2014–2018 and identifying gaps. VLEs are embedded technologies in higher education, but research on their use is weighted towards particular methodological approaches (quantitative) and particular stakeholders (students). Moreover, VLE scholarship (and VLE design) is weighted towards affluent countries. Segooa and Kalema (2015) argue that “many VLEs are not contextualized to meet the needs of educational

institutions in developing countries ... elearning implementation should focus more on the social contexts rather than the technological solution” (pp. 353–354). Surveys of publications on VLEs show considerable continuity of findings in terms of research methodologies and areas of focus. That said, this paper also notes the dominance of Western companies in the provision of VLEs and, consequently, the application of Western pedagogic models globally, comprising digital colonialism. This research thus argues that geopolitical aspects of implementation and usage of VLEs are under-explored. Moreover, the VLE is an object of increased interest because it has become a dominant mode of learning and teaching during the COVID-19 pandemic, with more students learning at a distance. There is more to talk about when we talk about VLEs.

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## Appendix A

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## Appendix B

### Coding Sheet

Author:

Title & Journal:

Abstract:

Research Method

Quantitative	
Qualitative	
Mixed-methods	
Other	

Classification of Research

Macro level (education systems and theories)	
Meso level (management and organisation)	
Micro level (learning and teaching with VLEs)	

Area of Interest

Students	
Instructors	
Both	
Other	

VLE Type

Moodle	
Blackboard/WebCT	
Other (specify)	
Not specified	

Theoretical Lens (if applicable):

