Contemporary Educational Technology, 2023, **15**(4), ep456
ISSN: 1309-517X (Online)

OPEN ACCESS

Research Article

Fostering technology integration and adaptability in higher education: Insights from the COVID-19 pandemic

Premika Farsawang [1]
0009-0006-8193-6979

Noawanit Songkram [1,2*]
0000-0002-7616-2132

[1] Department of Educational Technology and Communication, Faculty of Education, Chulalongkorn University, Bangkok, THAILAND
[2] Learning Innovation for Thai Society Research Unit (LIFTS), Chulalongkorn University, Bangkok, THAILAND
[*] Corresponding author: noawanit.s@chula.ac.th

Citation: Farsawang, P., & Songkram, N. (2023). Fostering technology integration and adaptability in higher education: Insights from the COVID-19 pandemic. *Contemporary Educational Technology, 15*(4), ep456. https://doi.org/10.30935/cedtech/13513

ARTICLE INFO

Received: 16 Apr 2023
Accepted: 16 Jul 2023

ABSTRACT

The COVID-19 pandemic led to a rapid transition to online learning, thereby significantly impacting higher education. This study examines the experiences of students, instructors, and university administrators from 22 Thai universities during the pandemic and explores the potential consequences for the future of higher education. Utilizing a mixed-methods approach, data were gathered through focus group discussions with 30 participants and a survey conducted with 510 undergraduate, graduate, and postgraduate students. The findings highlight the importance of flexibility, technology integration, and adaptability in curricula and instructional methods to enable effective online learning. Additionally, the study emphasizes the need for continuous improvement in the education sector, driven by the rapidly changing demands of the job market and the evolving nature of technology. Practical steps to be taken include prioritizing student learning outcomes, fostering digital literacy among instructors and students, and promoting collaboration across disciplines. Future research should examine the long-term impact of the pandemic on higher education and explore additional strategies for supporting students and instructors in the next normal.

Keywords: online learning, higher education, flexibility, technology integration, COVID-19, adaptability

INTRODUCTION

Acquiring 21st-century skills is vital for individuals to engage in lifelong learning in today's fast-paced world. The COVID-19 pandemic has posed significant challenges for education systems globally, prompting many countries to shift to online learning to ensure continuity and efficiency in education (Sahu, 2020). Teachers faced difficulties in adapting lesson plans swiftly and students struggled with adjusting to online learning (Milosievski et al., 2020). While technological advancements provide flexible learning environments accessible anytime and anywhere, students still struggle to achieve learning goals, especially for those who lack self-responsibility (Mamun et al., 2020). Furthermore, instructors may be unfamiliar with online teaching tools and lack the necessary skills deploy well (Inthason, 2020). Nevertheless, research during the pandemic has shown that students who are receptive to online learning technology are more likely to continue to use it (Thongsri et al., 2021).

Increasing reliance on technology enhances social development and usher in a new era of normalcy (Sneader & Singhal, 2020). Online learning is crucial for accessing the ever-evolving information. Therefore, it is important to improve learners' motivation, efficiency, and satisfaction because improvements on these

aspects influence their future learning decisions (Wu et al., 2015). Thus, fostering learning abilities and maintaining a commitment to learning are essential for establishing a sustainable foundation for lifelong learning in the 21st century.

Building on our pilot study (Farsawang & Songkram, 2022), this work addresses the limitations of that earlier study by broadening the investigation of the factors that influence students' intention to continue online learning. The pilot study emphasized readiness for online learning; however, it did not sufficiently explore other factors or their effects on continuance intention in depth. The current study fills these gaps, aiming to provide insights for designing more effective and user-friendly online learning strategies in the landscape of higher education.

Research Objectives

The study primarily investigates the factors influencing university students' intention to continue learning online in the next normal. The study's objectives include identifying impact factors, developing and validating a causal model, comparing differences in average intention to continue learning online among university students based on demographic factors, and analyzing instructional strategies that align with students' intentions. With these objectives, the study aims to offer valuable insights to instructors and policymakers to enable them to design better online learning systems and pedagogical strategies that support students' needs and preferences in the higher education.

Research Questions

RQ1. What are the key factors that influence university students' intention to continue learning online in the next normal?

RQ2. How do these factors interact to form a causal model to predict students' intention to continue online learning?

RQ3. Are there differences in average intention to continue online learning among university students based on demographic factors, such as age, gender, or major?

RQ4. What are the experiences and perceptions of students and instructors regarding online learning during the pandemic?

RQ5. What instructional strategies align with students' intentions and preferences for online learning in the next normal?

RQ6. How can the insights from the analysis of students' experiences and preferences be used to inform the design of better online learning systems and pedagogical strategies?

LITERATURE REVIEW

Theories and Models

A total of six theories and models were used for investigating the factors that contribute to the development of behavioral intentions. The theory of reasoned action (TRA) (Ajzen & Fishbein, 1980) and its extension, the theory of planned behavior (TPB) (Ajzen, 1991), emphasize the importance of individuals' attitudes, subjective norms, and perceived behavioral control for predicting their intentions and actual behaviors. These theories have been used to understand students' attitudes toward online learning and how they may influence their engagement and continuance intention with regard to online learning.

The technology acceptance model (TAM) (Davis, 1989) and its extensions, such as TAM2 (Venkatesh & Davis, 2000), focus on the perceived usefulness and ease of use of technology, along with social influence and cognitive instrumental processes, which can directly impact users' attitudes and intentions to use technology. These models have been employed to explore how students perceive the usefulness of online learning tools and platforms and how this perception influences their satisfaction and continuance intention.

The expectation-confirmation theory (ECT) (Oliver, 1980) and the post-acceptance model (Bhattacherjee, 2001) emphasize the significance of satisfaction with regard to users' intentions to persist in utilizing a product or service. These theories suggest that satisfaction in online learning is affected by the alignment between

students' expectations and experiences, which leads to a higher likelihood of students' continued engagement in online learning.

Applying these theories and models to online learning can provide a holistic understanding of the elements that influence university students' intention to continue using this mode of education. By considering various aspects of aspects student's interaction, educational institutions and instructors will be able to design and deliver online learning experiences tailored to their changing needs in the next normal (Alraimi et al., 2015). This approach can yield valuable insights for future research and implementation, contributing to the enhancement of online education (Kim et al., 2014; Luo et al., 2017; Sun et al., 2008).

Factors

Online learning readiness (OLR) describes the learner's ability to independently manage their education, driven by self-directed learning, learning motivation, and learner control. The concept also includes computer/internet self-efficacy and online communication self-efficacy, laying an emphasis on digital tool proficiency and online interaction skills (Hung et al., 2010). Developing these skills could have a crucial influence on continuance intention in online learning with critics noting that potential variations in the depth and intensity of these components could influence the learning experience.

Online learning engagement (ENG), crucial for effective learning outcomes, entails consistent learner attentiveness and dedication to learning goals. Incorporating cognitive, emotional, and behavioral engagement (Fredricks et al., 2004), its impact on continuance intention is pivotal. However, engagement discrepancies could develop learning inequities, entailing the need for platforms to uniformly enhance these components for sustained intent.

Perceived online learning outcomes (PLO), considering perceived usefulness and performance (Davis, 1989), significantly impact continuance intention in online learning. However, it is crucial to address potential cognitive biases as perceptions may not always align with outcomes (Ding & Zhao, 2020). In addition, the perceived benefits could conflate learning processes with the influence of technology. Therefore, integrating objective measures could offer a more accurate view of learning outcomes, helping distinguish the effects of online learning from the learning process, and their roles in fostering continuance intention.

Online learning satisfaction (SAT) is derived from work satisfaction concepts (Oliver, 1980). It is seen as an emotional reaction to perceived learning outcomes (Bhattacherjee, 2001; Kuo et al., 2014), and influences continuance intention. The context-specific nature of satisfaction assessment is often centered on instruction and service quality (Greiner, 2000; Kuo et al., 2014; Wu et al., 2015). Tools like the student evaluation of educational quality (SEEQ), combined with the limitations of tools like SEEQ (Corbalán et al., 2013; Marsh, 1987) are complex measures for online learning, where factors like engagement and technical issues play a significant role.

Attitudes toward online learning (ATT) are influenced by experiences (Ostrom, 1969). They play a vital role in learners' continuance intention. ATT has cognitive, affective, and behavioral components (Ostrom, 1969; Rosenberg & Hovland, 1960). Positive attitudes enhance engagement and satisfaction, but negative ones could impede learning. Thus, measuring and improving attitudes is crucial in sustaining online learning.

Online learning continuance intention (INT) reflects an individual's inclination to persist in specific behaviors or activities (Ajzen, 1991). Within online learning, INT is influenced by an interactive medium that encourages the reuse of the platform (Pereira et al., 2015; Watjatrakul, 2016) and informal communication on the learning experience (Duarte et al., 2012; Ketut et al., 2021). Fostering such intentions is pivotal to sustaining online learning engagement.

This study addresses the research gap in understanding the interconnected factors affecting students' online learning continuance intention. by examining the relationships among various factors as highlighted in previous studies (Bhattacherjee, 2001; Hung et al., 2010; Sun et al., 2008). It seeks to overcome the limitations of past research, which often focused on specific populations, institutions, or regions, lacking a comprehensive approach (Kirmizi, 2015; Paechter et al., 2010). Recent developments in online learning, driven by an increased reliance on technology and a shift toward remote education due to the COVID-19 pandemic, have highlighted the need for a deeper understanding of these complex relationships. Such understanding can improve the design of online learning systems and pedagogical strategies in higher education.

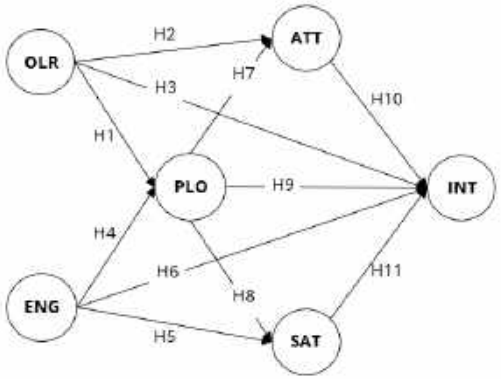

Figure 1. Hypothesized research framework (Source: Authors)

Based on the research framework illustrated in **Figure 1**, this study posits the following hypotheses to explore the relationships between the identified factors:

H1. OLR→PLO (Horzum et al., 2015; Liu & Pu, 2020)

H2. OLR→ATT (Chou et al., 2021; Ferrer et al., 2022; Thanuttamanon & Onputtha, 2019)

H3. OLR→INT (Ajzen, 1991; Thongsri et al., 2021)

H4. ENG→PLO (Chu et al., 2021; Liu & Pu, 2020; Thanuttamanon & Onputtha, 2019)

H5. ENG→SAT (El-Sayad et al., 2021)

H6. ENG→INT (Maheshwari, 2021; Tsai et al., 2018)

H7. PLO→ATT (Ashrafi et al., 2020; Chu et al., 2021; Davis, 1989; Liu & Pu, 2020)

H8. PLO→SAT (Ashrafi et al., 2020; Bhattacherjee, 2001; Chu et al., 2021; Virtič et al., 2021; Zhou et al., 2021)

H9. PLO→INT (Horzum et al., 2015; Lin et al., 2021; Liu & Pu, 2020; Maheshwari, 2021; Venkatesh & Davis, 2000)

H10. ATT→INT (Ajzen, 1991; Ashrafi et al., 2020; Chu et al., 2021; Davis, 1989; Fishbein & Ajzen, 1975)

H11. SAT→INT (Ashrafi et al., 2020; Bhattacherjee, 2001; Oliver, 1980; Virtič et al., 2021)

The hypotheses presented above guided the investigation and provided a framework for understanding the complex interplay of factors affecting university students' online learning continuance intention. By examining these relationships, valuable insights into the factors that drive students to persist with online learning can be obtained. This provided suggestions for the design of effective online learning systems and pedagogical strategies for higher education institutions as well.

METHODS

This study employed a two-stage mixed-methods research design. The first stage followed a quantitative approach using structural equation modeling (SEM) to explore causal relationships among the variables. The second stage employed a qualitative approach to gather in-depth insights from university administrators, online learning experts, and students in Thailand (Creswell & Plano Clark, 2017). **Figure 2** represents the research methodology.

Stage 1: Quantitative Method

The quantitative stage targeted Thai university students from 22 different universities enrolled in undergraduate, master's, and doctoral programs during the 2022 academic year. The focus was on institutions that did not primarily use online teaching methods before the COVID-19 pandemic. The data were collected through a confidential, anonymous online survey using Google Forms from April 4 to June 11, 2022, which yielded 510 successful completions out of 691 attempts, showing a response rate of 73.81%. A multistage sampling method ensured a representative sample and equal probability for each unit (Nachmias & Nachmias, 1993).

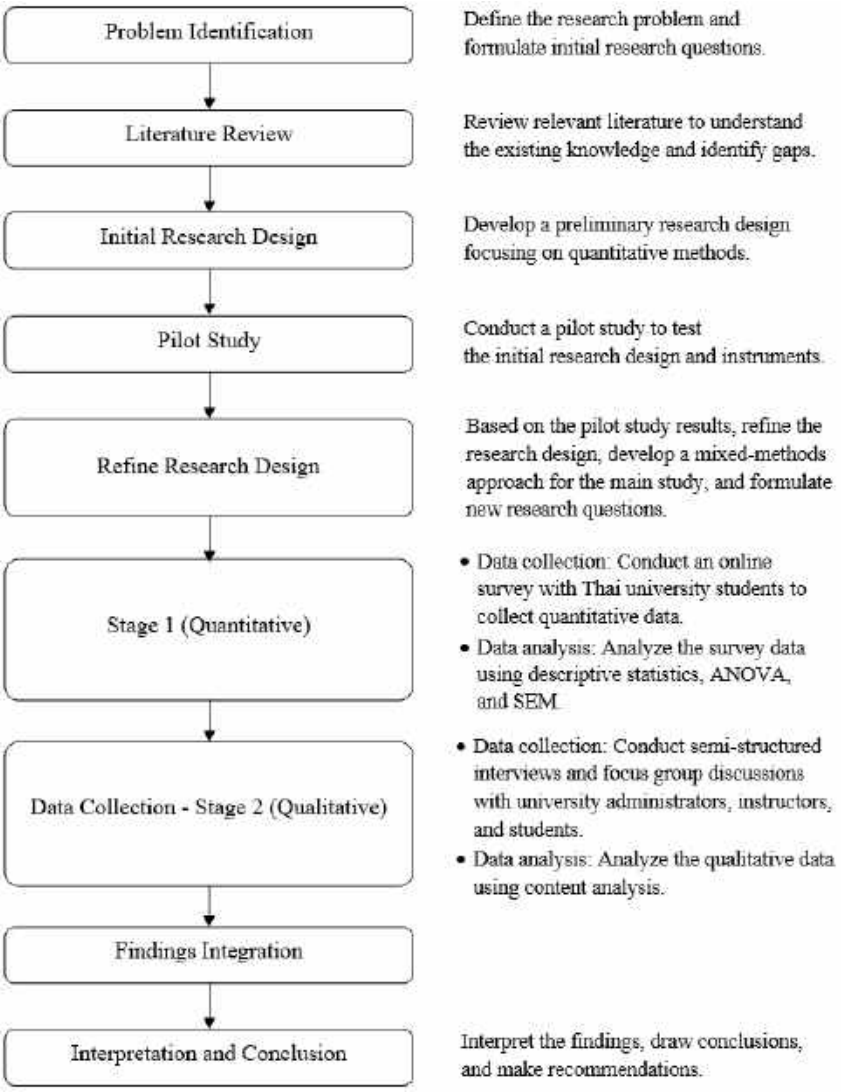

Figure 2. Flow chart of the research methodology (Source: Authors)

82-item questionnaire, adapted from existing scales, consists of three sections: demographic information, internet access behavior and devices, and opinions on factors influencing continuance intention. The questionnaire utilizes a 7-point Likert scale and was pilot-tested with 160 students to ensure its reliability and validity (Hair et al., 2010). Reliability was assessed using Cronbach's alpha coefficients (.618-.895), and construct validity was evaluated through confirmatory factor analysis and convergent and discriminant validity tests.

The data analysis involved three stages. First, a preliminary analysis and an initial agreement assessment were conducted with descriptive statistics and SPSS software to check for normality, homogeneity, linearity, and multicollinearity (Tabachnick & Fidell, 2013). Second, Pearson's product moment correlation coefficients and SEM with Mplus software were used to examine the relationships between variables and to test the proposed causal model's fit (Kline, 2011). Finally, SPSS was used for group comparisons using observable variables' average scores across demographic categories, such as gender, institutional affiliation, academic discipline, and program level (Field, 2013).

Stage 2: Qualitative Method

In qualitative analysis, semi-structured interviews were conducted with five university administrators from four universities whose average length of university management experience was 15.60 years, and 11 instructors across various disciplines from seven universities with average teaching experience of 7.55 years.

Table 1. Descriptive statistics of factors

Variables	Number of items	*M*	*SD*	CV (%)
Online learning readiness (OLR)	24	80.04	10.88	13.57
Online learning engagement (ENG)	14	77.03	12.32	15.97
Perceived online learning outcomes (PLO)	10	75.06	15.14	20.17
Online learning satisfaction (SAT)	14	80.08	13.53	16.89
Attitudes toward online learning (ATT)	12	79.76	11.71	14.30
Online learning continuance intention (INT)	8	69.80	18.79	22.26

Table 2. Factor loading, reliability, & correlation between variables

Variable	λ	α	CR	AVE	R^2	OLR	ENG	PLO	SAT	ATT	INT
OLR	.870	.912	.637	.669	-	.818					
ENG	.860	.871	.718	.740	-	.781**	.860				
PLO	.849	.895	.812	.757	0.503	.601**	.668**	.870			
SAT	.818	.941	.844	.721	0.575	.532**	.657**	.661**	.849		
ATT	.772	.751	.583	.596	0.559	.522**	.587**	.573**	.620**	.772	
INT	.653	.842	.737	.426	-	.347**	.411**	.652**	.418**	.442**	.653

Note. **p<.010 & square root of AVE values is shown on diagonal

Focus group discussions were held with 14 students from four Thai universities, representing undergraduate, graduate, and postgraduate levels. These students were selected through purposive sampling and divided into three groups based on their average scores for online learning intention (i.e., high, moderate, and low). Qualitative data were collected from May 30 to June 19, 2022, via Zoom and assessed using content analysis. This stage allowed for an in-depth view of university students' continuance intentions for online learning in the next normal and potential avenues for improvement.

This study addressed ethical considerations by obtaining informed consent, ensuring confidentiality, and following established guidelines such as the Declaration of Helsinki and the Belmont Report. Despite its rigor, the research faced methodological limitations, including potential sampling bias and challenges in data collection methods. These limitations could have affected the interpretation of the results; therefore, there is a need for caution when generalizing the findings and acknowledging the potential influence of these factors on the study's conclusions.

RESULTS

Descriptive Statistics

An overview of the descriptive statistics for the factors examined in this study is presented in **Table 1**. The mean scores for each factor indicate that the students generally had positive perceptions of all factors.

Addressing RQ1: What are the key factors influencing university students' intention to continue learning online in the next normal?

Table 2 displays the factor loadings (λ), Cronbach's alpha (α) values, composite reliability (CR), average variance extracted (AVE), R-square (R^2) values, and correlations between variables. All variables demonstrate satisfactory reliability and convergent validity, with α, CR, and AVE values meeting the recommended thresholds. Significant positive correlations between all variables ranged from 0.347 to 0.781, indicating strong relationships among the factors.

SEM analysis results, presented in **Figure 3**, exhibiting a satisfactory model fit with goodness-of-fit indices: χ^2/df=1.750, CFI=0.914, TLI=0.901, SRMR=0.056, and RMSEA=0.038. These indices confirm the adequacy of the proposed model. R-square values provide explanatory power for online learning outcomes perception, satisfaction, attitudes, and intention to engage, explaining 55.90% of the variance in students' intention to engage in online learning. The significant relationships (p<.05) provide a response to **RQ1** by identifying the key factors influencing students' intention to continue learning online.

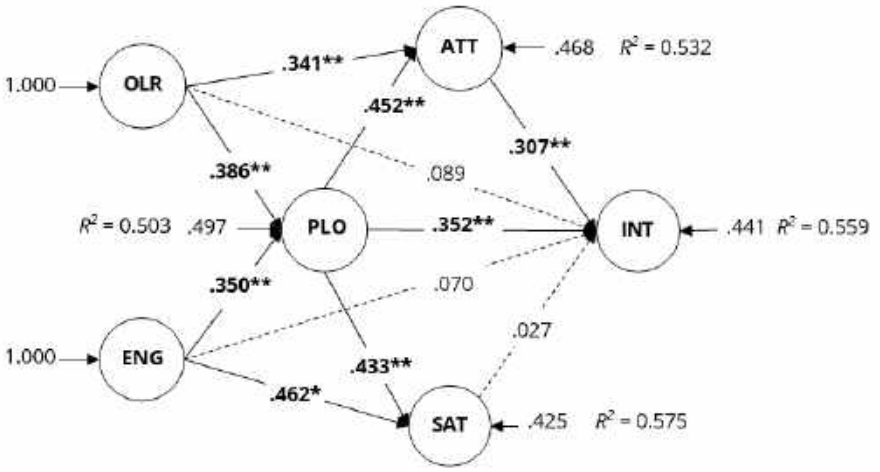

Figure 3. Results of the structural model (*p<.05, ** p<.01, solid lines indicate paths significant at p<.05, whereas dashed lines indicate non-significant paths, & β values are displayed) (Source: Authors)

Table 3. SEM path analysis results for direct, indirect, & total effects

Path	DE	IE	TE	Est.	β	SE	z	Decision
OLR→PLO	0.650	-	0.650	0.650	0.386	0.117	5.562**	Accepted
OLR→ATT	0.569	0.292	0.861	0.569	0.341	0.093	6.116**	Accepted
OLR→INT	0.089	0.299	0.388	0.158	0.089	0.138	1.150	Rejected
ENG→PLO	0.373	-	0.373	0.373	0.350	0.074	5.048**	Accepted
ENG→SAT	0.557	0.183	0.739	0.557	0.462	0.062	8.951**	Accepted
ENG→INT	0.128	0.131	0.259	0.079	0.070	0.086	0.918	Rejected
PLO→SAT	0.489	-	0.489	0.489	0.433	0.051	9.520**	Accepted
PLO→ATT	0.449	-	0.449	0.449	0.452	0.058	7.805**	Accepted
PLO→INT	0.374	0.160	0.535	0.374	0.352	0.062	6.031**	Accepted
SAT→INT	0.026	-	0.026	0.026	0.027	0.045	0.567	Rejected
ATT→INT	0.329	-	0.329	0.329	0.307	0.060	5.473**	Accepted

Note. **p<.010

Addressing RQ2: How do these factors interact to form a causal model to predict students' intention to continue online learning?

SEM path analysis results (**Table 3**) answer **RQ2** by revealing the direct effects (DE), indirect effects (IE), and total effects (TE) of each path. Significant relationships (p<.01) include OLR to PLO, OLR to ATT, ENG to PLO, ENG to SAT, PLO to SAT, PLO to ATT, and PLO to INT.

Table 3 also displays standardized path coefficients (β), indicating the strength and direction of these relationships, thus forming a causal model that can predict students' intention to continue online learning. For example, path OLR→PLO has a β-value of 0.386, suggesting a positive, moderately strong relationship. Insignificant paths (OLR→INT, ENG→INT, and SAT→INT) were not considered in further model interpretations. The decision column in **Table 3** indicates whether the relationship between the variables is accepted (statistically significant) or rejected (not statistically significant).

Addressing RQ3: Are there differences in the average intention to continue online learning among university students based on demographic factors such as age, gender, or major?

Table 4 displays the demographic data and group comparisons for online learning continuance intention, featuring mean scores from the pilot study (M_{pilot}), main study (M), and their change (ΔM). Among the 510 participants in the study, the majority were female (62.27%), enrolled in public universities (62.16%), students of social sciences and humanities (68.63%), and pursuing bachelor's degrees (50.39%).

The group comparison results revealed a general increase in mean scores between the pilot and main studies across various demographic categories. Independent t-tests were conducted to determine the statistical significance of these differences in mean scores. A significance level of p<.050 was used to determine whether the differences were statistically significant. For example, female participants experienced

Table 4. Demographic information & comparison of online learning continuance intention

Profile	Subgroup	n	%	M_{pilot}	M	ΔM	t-value	p-value
Gender	Female	338	62.27	2.77	4.81	2.04	16.99	.000**
	Male	129	25.29	3.29	4.98	1.69	8.12	.000**
Type of institution	Public university	317	62.16	3.01	4.73	1.72	14.33	.000**
	Local university	147	28.83	2.33	5.10	2.77	13.45	.000**
	Private university	46	9.02	3.20	4.86	1.66	3.30	.002**
Field of study	Physical sciences	116	22.75	2.61	4.67	2.06	9.85	.000**
	Health sciences	44	8.63	2.97	4.51	1.54	1.76	.135**
	Social sciences	350	68.63	2.98	4.94	1.96	16.34	.000**
Program	Bachelor's degree	257	50.39	2.27	4.55	2.28	20.33	.000**
	Master's degree	155	30.39	4.01	5.15	1.14	5.82	.000**
	Doctoral degree	98	19.22	5.24	5.14	−0.10	0.29	.774**
Overall		510	100.00	2.90	4.84	1.94	18.83	.000**

Note. *p<.05 & **p<.01

Table 5. Internet access, online learning behavior, & continuance intention mean scores

Factors	Categories	%	M	Test statistics	p-value
Internet access devices and connectivity of participants					
Device	Laptop	70.00	4.90	1.73	.159**
	Tablet & smartphone	30.00	4.72		
Privacy of device	Personal use	92.16	4.86	0.39	.760**
	Shared	7.84	4.61		
Device quality	High	47.06	4.94	5.81	.028**
	Moderate	48.82	4.78		
	Low	4.12	4.56		
Signal quality	High	42.94	5.04	8.09	.015**
	Moderate	53.14	4.72		
	Low	3.92	4.43		
Online learning behavior of participants					
Daily online study time	1-3 hours	25.69	4.80	0.69	.557**
	4-6 hours	53.33	4.87		
	More than 7 hours	20.98	4.85		
Daily homework time	1-3 hours	56.67	4.74	1.14	.331**
	4-6 hours	34.51	5.03		
	More than seven hours	8.82	4.56		
Instructor support	Low	20.59	4.56	2.97	.031**
	Moderate	43.33	4.83		
University support	None	43.14	4.83	1.78	.149**
	Low	29.80	4.73		
Additional responsibilities	None (only studying)	42.55	4.54	4.30	.000**
	Regular job	32.75	5.28		
Prior online learning experience	No	70.98	4.75	2.27	.024**
	Yes	29.02	5.08		

Note. *p<.05; **p<.01; either F-value (for ANOVA) or t-value (for independent t-tests) depending on comparison being made

a 2.04 increase in mean scores (p < .001), whereas male participants experienced a 1.69 increase (p<.001). The largest change in mean scores was observed among students who attended local universities, with a 2.77 increase (p<.001). Mean scores also improved across fields of study. Notably, the mean scores for undergraduate students increased by 2.28 (p<.001) and postgraduate students experienced a lower increase of 1.14 (p<.001 for master's students; p=.774 for doctoral students), indicating a different trend for this specific group (**Table 4**).

Table 5 presents the relationship between participants' internet access, devices, online learning behavior, and continuance intention mean scores. Most participants used laptops (70.00%, M=4.90) and had devices for personal use (92.16%, M=4.86). High-quality devices (47.06%, M=4.94) and high signal quality (42.94%, M=5.04) were associated with higher scores. Participants who studied 4–6 hours daily (53.33%, M=4.87) and spent four-six hours on daily homework (34.51%, M=5.03) also had higher scores. Prior online learning experience positively impacted scores (M=5.08).

ANOVA and independent *t*-tests showed significant differences in device quality (p=0.028); signal quality (p=0.015); instructor support (p=0.031); additional responsibilities (p<0.001); and prior online learning experience (p=0.024). These results provide answers to **RQ3** by identifying the differences in the average intention to continue learning online among university students based on various demographic factors.

Addressing RQ4: What are the experiences and perceptions of students and instructors regarding online learning during the pandemic?

Issue 1: Impact of the COVID-19 pandemic on university-level education management: The transition to online learning was characterized by three phases: panic, experimentation, and familiarization. At the beginning, universities, instructors, and students struggled with the sudden shifts. One administrator highlighted the initial challenges: "the university faced criticism for the abrupt shift to online learning despite inadequate internet infrastructure." Over time, universities explored various approaches, and eventually, with the integration of traditional and online learning methods, a new normal emerged.

Issue 2: Online learning management during the pandemic: The management of online learning was multifaceted. Interaction is crucial, and various tools and platforms were used to support education. One student stated that "the absence of face-to-face interaction negatively affects my engagement with the course material and collaboration with fellow students." Teaching strategies varied with class size, and practical subjects faced unique challenges. Students' experiences varied, some found online learning beneficial, whereas others faced technological or social obstacles.

Issue 3: Assessment methods for learning outcomes in online education: Assessment methods were mostly the same as that of offline learning, albeit with certain necessary modifications to accommodate the digital formats. However, the assessment of learning outcomes in an online environment presented unique challenges. An instructor highlighted key issues, stating, "online exams pose challenges due to misunderstandings of exam objectives, plagiarism, and the difficulties in verifying answers or collecting evidence."

Issue 4: Directions and recommendations for teaching and learning management: Universities should focus on student learning outcomes, leveraging technology and a wide array of teaching methods. Both learners and teachers require significant adaptation to technological tools for effective education course delivery. An administrator highlighted that "in the forthcoming phase, our university will focus on learning outcomes, flexible curricula, and instructor adaptability. We aim to harness technology for effective online teaching and learning, while also accommodating the ongoing changes in the education sector due to disruptive technology."

Addressing RQ5: What instructional strategies align with students' intentions and preferences for online learning in the next normal?

Table 6 presents a synthesis of the study's key findings, organized by the main themes that emerged from both the quantitative and qualitative research. Juxtaposing these findings, **Table 6** facilitates a clear comparison and integration, offering a comprehensive understanding of the research topic.

The triangulated findings address **RQ5** by highlighting the multifaceted nature of the factors influencing continuance intention in online learning. Key elements such as student engagement, assessment methods, and technology use play significant roles. The qualitative data further illuminate future directions in teaching and learning management. These insights collectively provide a comprehensive understanding of continuance intention in online learning, offering valuable guidance for future educational strategies.

FINDINGS AND DISCUSSION

Addressing RQ6: How can the insights from the analysis of students' experiences and preferences be used to inform the design of better online learning systems and pedagogical strategies?

Group comparison findings reveal significant differences in terms of online learning intentions among various demographic and educational groups. For example, undergraduate students showed a more substantial increase in online learning intention than postgraduate students, possibly due to differing levels

Table 6. Triangulation of quantitative & qualitative findings

Theme	Quantitative findings	Qualitative findings	Common findings
Awareness of learning outcomes	Higher awareness led to increased intentions to engage in online learning.	Importance of clearly specifying and communicating learning outcomes.	Clear learning outcomes is crucial for student engagement.
Attitudes toward online learning	Positive attitudes resulted in greater involvement in online learning.	Students' experiences and emotions influenced their attitudes.	Positive attitude toward online learning increases student engagement.
Technology integration & adjustment	Efficient technology utilization is inherently related to online learning outcomes and attitudes.	Necessity for universities and instructors to improve their digital literacy and adaptability.	Effective use and integration of technology is key to successful online learning.
Interaction & engagement in online learning	Increased interaction and engagement led to better perceived learning outcomes and overall satisfaction.	Importance of interaction and collaboration between students and instructors in online learning environments.	Interaction and engagement are essential for successful online learning and student satisfaction.
Assessment methods & learning outcomes	Appropriate and effective assessment methods contributed to higher satisfaction and improved learning outcomes.	Challenges in assessing learning outcomes in online education.	Effective assessment methods are crucial; however, adjustments may be required for online learning
Directions & recommendations for next normal	-	Importance of focusing on student learning outcomes, adaptation by learners and teachers, and leveraging the role of technology in online teaching and learning management.	-

of digital technology familiarity and adaptability to new learning methods (Alraimi et al., 2015; Ajzen, 1991). This insight suggests that online learning systems should be developed and implemented considering user adaptability and digital literacy, to provide additional support and guidance to those who are less familiar with digital learning tools.

Moreover, local university students exhibited the most significant increase in online learning intention, suggesting that institutional support and resources had an impact on student experiences (Wu et al., 2015; Thongsri et al., 2021). This finding underscores the importance of institutional backing for the successful provision of online learning, indicating the necessity for sufficient resources and support systems for students.

The results also revealed a greater degree of online learning intentions in engineering and technology students than arts and humanities students (Alhabeeb & Rowley, 2018). This difference could be due to the nature of the subject, as certain disciplines are better suited to online learning formats and require less face-to-face interaction. Thus, this calls for a more flexible and discipline-specific approach in designing online learning systems, considering the unique needs and preferences of students from different academic disciplines.

The study found that most learners (59.02%) with additional responsibilities, such as part-time jobs or family obligations, exhibited a higher-than-average online learning intention (Khalil et al., 2020). This suggests that the flexibility offered by online learning is particularly appealing to students who balance their studies with other commitments. The ability to manage their time effectively and multitask is a significant advantage of online learning for these students (Alqurashi, 2019). This finding underscores the importance of flexibility in online learning design, allowing students to learn at their own pace and at a suitable time (Colucci et al., 2017).

In addition, the analysis showed that students with prior online learning experience were more likely to engage again, indicating the importance of familiarity and comfort in online course navigation (Johnson et al., 2019). This insight suggests that providing adequate training and support required for the use of online learning platforms can enhance the comfort and confidence in students. Also, it highlights the importance of user-friendly design for online learning platforms to ensure easy and effective navigation of courses.

SEM results offer quantitative insights into a range of factors affecting students' online learning intentions. The awareness of online learning outcomes and positive attitudes are significant predictors that align with qualitative findings, which emphasize outcome-focused experiences and a supportive online environment. SEM results also indicated the roles of perceived ease of use and perceived usefulness, although these are less significant compared with outcome awareness and positive attitudes (Davis, 1989). This suggests that although the practical aspects of online learning are important, universities and instructors should prioritize creating outcome-oriented learning experiences with the aim of producing a supportive and positive online learning environment. Unexpectedly, SEM results showed a limited impact in relation to social influence and satisfaction with online learning on student intentions. This complexity highlights the need for further research on the factors that shape students' online learning intentions.

Qualitative findings further illuminate the impact of the pandemic on education management. Response to the pandemic necessitated a swift pivot to online learning, compelling the adaptation to new technology and teaching methods (Hodges et al., 2020). This sudden change exposed the weaknesses of online learning and spurred the development of coping strategies. As the pandemic persists, universities are investing in online learning infrastructure and focusing on enhancing teaching quality and efficiency (Daniel, 2020). These insights highlight the need for continuous improvement and adaptation in online learning systems and strategies, considering the evolving challenges and opportunities developed due to the pandemic and other potential disruptions.

The transition from the classroom to online learning presents challenges in course content, learning outcomes, activities, and assessment methods (Zhang et al., 2020). However, various platforms, tools, and learning management strategies address these challenges, enabling better interaction, resource provision, and practical subject management. As both instructors and students adapt, the potential for improved online learning management grows, particularly with increased institutional investment in technology and resources (Bozkurt et al., 2020).

Assessing learning outcomes in online education can be challenging, particularly in practical subjects requiring hands-on experience (Aristovnik et al., 2020). While traditional assessment methods persist, new adjustments accommodate the online environment. Universities and instructors should focus on defining clear learning outcomes and designing accurate assessments, considering potential issues such as plagiarism and ethical concerns (Crawford et al., 2020).

As universities move toward the next normal, it is crucial to prioritize learning outcomes and integrate technology into teaching and learning management (Garrison & Vaughan, 2008). Institutions should develop policies and strategies that prioritize outcome-based education (OBE), adapt to learners' and instructors' needs, and support continuous online learning improvement. This includes fostering positive attitudes toward online learning and ensuring students understand what the expected learning outcomes are.

Triangulation of quantitative and qualitative findings emphasizes the need to focus on learning outcomes and foster a positive attitude toward online learning, which significantly affects students' intention to engage. In addition, technology's role in managing online teaching and learning and the ongoing changes indicate a permanent transformation in the education sector due to technological disruption (Selwyn, 2011). This transformation requires a rethinking of the traditional teaching and learning approaches.

Practical Considerations and Recommendations

In response to **RQ6**, the study's findings provide a comprehensive understanding of students' experiences and preferences. These insights can be instrumental in designing more effective online learning systems and pedagogical strategies. Based on these findings, the following recommendations are proposed for universities and instructors:

1. Design and execute adaptive, flexible curricula that accommodate a variety of student needs and preferences.
2. Equip instructors with online teaching methodologies, digital tools, and platforms to deliver effective learning experiences.
3. Cultivate a lifelong learning mindset among instructors and students, stressing the significance of adaptability and ongoing development.

4. Promote collaboration and integration across disciplines and departments, fostering interdisciplinary learning opportunities.
5. Periodically assess and refine evaluation methods, ensuring alignment with intended learning outcomes and the online learning context.
6. Allocate resources to technology infrastructure and support services to enable uninterrupted online teaching and learning experiences.

Limitations and Future Research Directions

While this study offers valuable perspectives on the changing landscape of higher education, it is essential to recognize its limitations. Namely, the research was conducted during the COVID-19 pandemic, which could limit the applicability of the findings to other situations or future disruptions. Nevertheless, this study lays the groundwork for future research in various domains. Researchers could explore student experiences and perceptions of online and blended learning post-pandemic, pinpoint areas for enhancement and best practices, examine the long-term effects of the pandemic on higher education, analyze the efficacy of different online teaching and assessment approaches, and investigate the role of technology in promoting collaboration, engagement, and critical thinking skills among students in online learning settings.

CONCLUSIONS

This study delved into the consequences of the COVID-19 pandemic on higher education, focusing on the transition to online learning and the future of educational practices. Insights gathered from university administrators, instructors, and students emphasize the importance of prioritizing student learning outcomes, evaluation techniques, and curricula and instructor adaptability while capitalizing on technology to facilitate effective online education. Blended learning and ongoing advancements in the education sector are crucial for addressing technological disruptions and evolving student demands.

Author contributions: PF & NS: conceptualization, methodology, data collection & analysis, & review & editing; **PF:** writing original draft & visualization; & **NS:** supervision. All authors approve final version of the article.

Funding: This article was supported by the 90th Anniversary of Chulalongkorn University Scholarship.

Acknowledgements: The authors would like to thank the following individuals and organizations for their invaluable non-financial support during this research project: (1) Department of Educational Technology and Communication for providing access to essential resources and facilities that facilitated the completion of this study, (2) Professor Dr. Noawanit Songkram for offering constructive feedback and suggestions on earlier drafts of this manuscript, & (3) Associate Professor Dr. Wannee Kamgate and Assistant Professor Dr. Kanit Srikleub for their guidance and advice on data analysis and interpretation.

Ethics declaration: Authors declared that the study received ethical approval from The Research Ethics Review Committee for Research Involving Human Subjects: The Second Allied Academic Group in Social Sciences, Humanities and Fine and Applied Arts at Chulalongkorn University (COA No. 090/65), in accordance with the Declaration of Helsinki, the Belmont Report, CIOMS guidelines, and the International Conference on Harmonization–Good Clinical Practice (ICH-GCP) principles. All participants provided informed consent before participating in the study.

Declaration of interest: Authors declare no competing interest.

Data availability: Data generated or analyzed during this study are available from the authors on request.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice-Hall.

Alhabeeb, A., & Rowley, J. (2018). Critical success factors for eLearning in Saudi Arabian universities. *International Journal of Educational Management, 32*(2), 374-390. https://doi.org/10.1108/IJEM-01-2016-0006

Alqurashi, E. (2019). Predicting student satisfaction and perceived learning within online learning environments. *Distance Education, 40*(1), 133-148. https://doi.org/10.1080/01587919.2018.1553562

Alraimi, K. M., Zo, H., & Ciganek, A. P. (2015). Understanding the MOOCs continuance: The role of openness and reputation. *Computers & Education, 80*, 28-38. https://doi.org/10.1016/j.compedu.2014.08.006

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability, 12*(20), 8438. https://doi.org/10.3390/su12208438

Ashrafi, A., Zareravasan, A., Rabiee Savoji, S., & Amani, M. (2020). Exploring factors influencing students' continuance intention to use the learning management system (LMS): A multi-perspective framework. *Interactive Learning Environments, 30*(8), 1475-1497. https://doi.org/10.1080/10494820.2020.1734028

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly, 25*(3), 351-370. https://doi.org/10.2307/3250921

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S., Al-Freih, M., Pete, J., Olcott, Jr., D., Rodes, V., Aranciaga, I., Bali, M., Alvarez, A. J., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N., de Coëtlogon, P., ... & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education, 15*(1), 1-126.

Chou, C.-P., Chen, K.-W., & Hung, C.-J. (2021). A study on flipped learning concerning learning motivation and learning attitude in language learning. *Frontier in Psychology, 12*, 753463. https://doi.org/10.3389/fpsyg.2021.753463

Chu, A. M. Y., Liu, C. K. W., So, M. K. P., & Lam, B. S. Y. (2021). Factors for sustainable online learning in higher education during the COVID-19 pandemic. *Sustainability, 13*(9), 5038. https://doi.org/10.3390/su13095038

Colucci, E., Smidt, H., Devaux, A., Vrasidas, C., Safarjalani, M., & Castaño Muñoz, J. (2017). *Free digital learning opportunities for migrants and refugees: An analysis of current initiatives and recommendations for their further use*. Publications Office of the European Union. https://doi.org/10.2760/684414

Corbalán, M. F., Plaza, I. G., Hervas, E., Aldabas, E., & Arcega, F. (2013). Reduction of the students' evaluation of education quality questionnaire. In *Proceedings of the 2013 Federated Conference on Computer Science and Information Systems* (pp. 713-719). IEEE.

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P. A., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching, 3*(1), 9-28. https://doi.org/10.37074/jalt.2020.3.1.7

Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research*. SAGE.

Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects, 49*, 91-96. https://doi.org/10.1007/s11125-020-09464-3

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340. https://doi.org/10.2307/249008

Ding, Y., & Zhao, T. (2020). Emotions, engagement, and self-perceived achievement in a small private online course. *Journal of Computer Assisted Learning, 36*(4), 449-457. https://doi.org/10.1111/jcal.12410

Duarte, P. O., Raposo, M. B., & Alves, H. B. (2012). Using a satisfaction index to compare students' satisfaction during and after higher education service consumption. *Tertiary Education and Management, 18*(1), 17-40. https://doi.org/10.1080/13583883.2011.609564

El-Sayad, G., Saad, N. H., & Thurasamy, R. (2021). How higher education students in Egypt perceived online learning engagement and satisfaction during the COVID-19 pandemic. *Journal of Computers in Education, 8*(4), 527-550. https://doi.org/10.1007/s40692-021-00191-y

Farsawang, P., & Songkram, N. (2022, March 8-11). Factors influence students' continuance intention toward online learning transition after the COVID-19 pandemic unfolds. In N. Callaos, S. Lunsford, B. Sanchez, & A. Tremante (Eds.), *ICSIT 2022 13th International Conference on Society and Information Technologies* (pp. 91-96). International Institute of Informatics and Cybernetics, IIIC. https://doi.org/10.54808/ICSIT2022.01.91

Ferrer, J., Ringer, A., Saville, K., Parris, M. A., & Kashi, K. (2022). Students' motivation and engagement in higher education: The importance of attitude to online learning. *Higher Education, 83*, 317-338. https://doi.org/10.1007/s10734-020-00657-5

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. SAGE.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Addison-Wesley.

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

Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. John Wiley & Sons. https://doi.org/10.1002/9781118269558

Greiner, K. R. (2000). *A study of academic service quality and instructional quality in a midwestern higher education environment* [Doctoral dissertation, Drake University].

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective*. Pearson.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review, 3*, 1-12.

Horzum, M. B., Kaymak, Z. D., & Gungoren, O. C. (2015). Structural equation modeling towards online learning readiness, academic motivations, and perceived learning. *Educational Sciences: Theory & Practice, 15*(3), 759-770. https://doi.org/10.12738/estp.2015.3.2410

Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: Scale development and student perceptions. *Computers & Education, 55*(3), 1080-1090. https://doi.org/10.1016/j.compedu.2010.05.004

Inthason, S. (2020). Kho wid-19: Kạb kār reīyn kār s̄xn xxnlịn̒ krṇī ṣ̄ụks̄ʹā rāywichā kār k̄heīyn porkærm wĕb [COVID-19 and online teaching case study: Web programming course]. *Journal of Management Science Review, 22*(2), 203-214.

Johnson, N., Veletsianos, G., & Seaman, J. (2019). U.S. faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning, 24*(2), 6-21. https://doi.org/10.24059/olj.v24i2.2285

Ketut, A., Suryani, N., & Putra, I. (2021). The influence of information system quality, e-learning quality, and motivation on students' satisfaction and loyalty. *Journal of Physics: Conference Series, 1807*(1), 012062.

Khalil, R., Mansour, A. E., Fadda, W. A., Almisnid, K., Aldamegh, M., Al-Nafeesah, A., & Al-Wutayd, O. (2020). The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: A qualitative study exploring medical students' perspectives. *BMC Medical Education, 20*, 285. https://doi.org/10.1186/s12909-020-02208-z

Kim, J., Park, J. H., & Cozart, J. (2014). Affective and motivational factors of learning in online mathematics courses. *British Journal of Educational Technology, 45*(1), 171-185. https://doi.org/10.1111/j.1467-8535.2012.01382.x

Kirmizi, O. (2015). The influence of learner readiness on student satisfaction and academic achievement in an online program at higher education. *Turkish Online Journal of Educational Technology, 14*(1), 133-142.

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. The Guilford Press.

Kuo, Y. C., Walker, A. E., Schroder, K. E., & Belland, B. R. (2014). Interaction, internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The Internet and Higher Education, 20*, 35-50. https://doi.org/10.1016/j.iheduc.2013.10.001

Lin, C.-L., Jin, Y. Q., Zhao, Q., Yu, S.-W., & Su, Y.-S. (2021). Factors influence students' switching behavior to online learning under COVID-19 pandemic: A push-pull-mooring model perspective. *The Asia–Pacific Education Researcher, 30*(3), 229-245. https://doi.org/10.1007/s40299-021-00570-0

Liu, N., & Pu, Q. (2020). Factors influencing learners' continuance intention toward one-to-one online learning. *Interactive Learning Environments, 31*(3), 1742-1763. https://doi.org/10.1080/10494820.2020.1857785

Luo, N., Zhang, M., & Qi, D. (2017). Effects of different interactions on students' sense of community in e-learning environment. *Computers & Education, 115*, 153-160. https://doi.org/10.1016/j.compedu.2017.08.006

Maheshwari, G. (2021). Factors affecting students' intentions to undertake online learning: An empirical study in Vietnam. *Education and Information Technologies, 26*, 6629-6649. https://doi.org/10.1007/s10639-021-10465-8

Mamun, M. A., Lawrie, G., & Wright, T. (2020). Instructional design of scaffolded online learning modules for self-directed and inquiry-based learning environments. *Computers & Education, 144*, 103695. https://doi.org/10.1016/j.compedu.2019.103695

Marsh, H. W. (1987). Students' evaluations of university teaching: Research findings, methodological issues, and directions for future research. *International Journal of Educational Research, 11*(3), 253-388. https://doi.org/10.1016/0883-0355(87)90001-2

Milosievski, M., Zemon, D., Stojkovska, J., & Popovski, K. (2020, 19 May). Learning online: Problems and solutions. *UNICEF Young Reporters*. https://www.unicef.org/northmacedonia/stories/learning-online-problems-and-solutions

Nachmias, R., & Nachmias, C. (1993). *Research methods in the social sciences*. St. Martin's Press.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research, 17*(4), 460-469. https://doi.org/10.2307/3150499

Ostrom, T. M. (1969). The relationship between the affective, behavioral, and cognitive components of attitude. *Journal of Experimental Social Psychology, 5*(1), 12-30. https://doi.org/10.1016/0022-1031(69)90003-1

Paechter, M., Maier, B., & Macher, D. (2010). Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Computers & Education, 54*(1), 222-229. https://doi.org/10.1016/j.compedu.2009.08.005

Pereira, F. A. d. M., Ramos, A. S. M., Gouvêa, M. A., & da Costa, M. F. (2015). Satisfaction and continuous use intention of e-learning service in Brazilian public organizations. *Computers in Human Behavior, 46*, 139-148. https://doi.org/10.1016/j.chb.2015.01.016

Rosenberg, M. J., & Hovland, C. I. (1960). Cognitive, affective, and behavioral components of attitudes. In M. J. Rosenberg, C. I. Hovland, W. J. McGuire, R. P. Abelson, & J. W. Brehm (Eds.), *Attitude organization and change: An analysis of consistency among attitude components* (pp. 1-14). Yale University Press.

Sahu, P. (2020). Closure of universities due to coronavirus disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. *Cureus, 12*(4), e7541. https://doi.org/10.7759/cureus.7541

Selwyn, N. (2011). *Education and technology: Key issues and debates*. A&C Black.

Sneader, K., & Singhal, S. (2020). Beyond coronavirus: The path to the next normal. In *The path to the next normal: Leading with resolve through the coronavirus pandemic* (pp. 6-10). McKinsey & Company.

Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education, 50*(4), 1183-1202. https://doi.org/10.1016/j.compedu.2006.11.007

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. Pearson.

Thanuttamanon, P., & Onputtha, S. (2019). The effect of motivation, behavior and confidence on learning performance of students in the faculty of business administration, RMUTT, in learning English through social media. *International Journal of Applied Computer Technology and Information Systems, 9*(1), 20-28.

Thongsri, N., Chootong, C., Tripak, O., Piyawanitsatian, P., & Saengae, R. (2021). Predicting the determinants of online learning adoption during the COVID-19 outbreak: A two-staged hybrid SEM-neural network approach. *Interactive Technology and Smart Education, 18*(3), 362-379. https://doi.org/10.1108/ITSE-08-2020-0165

Tsai, Y.-H., Lin, C.-H., Hong, J.-C., & Tai, K.-H. (2018). The effects of metacognition on online learning interest and continuance to learn with MOOCs. *Computers & Education, 121*, 18-29. https://doi.org/10.1016/j.compedu.2018.02.011

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204. https://doi.org/10.1287/mnsc.46.2.186.11926

Virtič, M. P., Dolenc, K., & Šorgo, A. (2021). Changes in online distance learning behavior of university students during the coronavirus disease 2019 outbreak, and development of the model of forced distance online learning preferences. *European Journal of Educational Research, 10*(1), 393-411. https://doi.org/10.12973/eu-jer.10.1.393

Watjatrakul, B. (2016). Online learning adoption: Effects of neuroticism, openness to experience, and perceived values. *Interactive Technology and Smart Education, 13*(3), 229-243. https://doi.org/10.1108/ITSE-06-2016-0017

Wu, Y.-C., Hsieh, L.-F., & Lu, J.-J. (2015). What's the relationship between learning satisfaction and continuing learning intention? *Procedia-Social and Behavioral Sciences, 191*, 2849-2854. https://doi.org/10.1016/j.sbspro.2015.04.148

Zhang, W., Wang, Y., Yang, L., & Wang, C. (2020). Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak. *Journal of Risk and Financial Management, 13*(3), 55. https://doi.org/10.3390/jrfm13030055

Zhou, X., Chai, C. S., Jong, M. S.-Y., & Xiong, X. B. (2021). Does relatedness matter for online self-regulated learning to promote perceived learning gains and satisfaction? *The Asia–Pacific Education Researcher, 30*(3), 205-215. https://doi.org/10.1007/s40299-021-00579-5