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Understanding the perspectives of pre-service teachers on online learning system usage experiences during the COVID-19 pandemic

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ABSTRACT

During the COVID-19 pandemic, schools all over the globe had to move from traditional teaching to electronic instruction. Until the abrupt eruption of COVID-19, all universities in Ghana were adopting a face-to-face mode of teaching. Three hundred and fifteen pre-service teachers who studied online during the pandemic were randomly selected for this inquiry. The goal of this inquiry was to examine pre-service teachers' perspectives on electronic educational management system experiences during the COVID-19 epidemic. Descriptive statistics and inferential statistics were adopted to compute the data. The results showed that the online learning system was simple, provided instructional quality, and improved user satisfaction. Further analysis revealed that system quality**,** instructional quality, and ease of use contributed substantially to pre-service teachers' satisfaction with the digital instructional system. Furthermore, the results indicated that system quality**,** instructional quality, ease of use, and learner satisfaction added substantially to learners' real use of the electronic instructional system. Yet, information quality and interaction quality did not contribute substantially to the actual use of the digital instructional system. This inquiry contributed to the current discourse on students' electronic instructional system usage for learning during the COVID-19 pandemic in developing countries.

Keywords: *COVID-19 pandemic; pre-service teachers; information system framework; online learning system; universities*

INTRODUCTION

The COVID-19 pandemic brought significant issues for humanity generally, but particularly for educational systems around the world (Viner et al., 2020). Even though the concept of remote instruction is not recent (Simonson et al., 2019), no remote learning standards have yet been devised within the educational system of Ghana. Without any prior notice, instructors had to alter their instruction and guardians had to increase their aid for their wards when all state owned and privately owned schools at all stages were closed in Ghana on March 16, 2020. Knowledge and proficiency attainment had to be restructured and developed in new, largely electronic ways in a brief amount of time (Brown, 2020).

At the University of Education, an online learning system called the Virtual Classroom (VCLASS) was implemented. It is a program that simulates face-to-face instruction methods to facilitate management, records, and accounting. Additionally, it serves as a hub for material sharing in e-lectures, online tutorial programs, and preparation. For instance, all components (that is, course administration, instructional resources, medium for dialogue, grading, and e-assessment) for the management of instructional methods are available electronically. Students can use the platform to study educational materials, to perform research, and to participate in group conversations. Moreover, it enables students to check their academic progress, access extra information, and take assessments. This shift from traditional teaching to teaching using technology support provided a once-in-a-lifetime chance to understand trainee teachers' perceptions of digital learning experiences at a period when students were not ready for such an unexpected condition. Learners' perspectives on online learning systems have been assessed with the information system model (IS model) which asserts that individuals' perspectives on the system quality, information quality

and service quality determine their perspectives of satisfaction, which impacts their utilization (DeLone & McLean, 1992).

The IS model has been scientifically tested for online learning system assessment and can be utilized as a framework to analyze learners' online learning system experiences. Current online learning system assessment studies, on the other hand, have discovered the need to look at the pedagogical roles of online learning systems beyond the three quality characteristics (Mtebe & Raphael, 2018; Ozkan & Koseler, 2009). Even though the framework has stated that satisfaction determines usage (DeLone & McLean, 1992), it does not deal with how individuals' perspectives of quality and satisfaction determine usage. Moreover, most studies adopted the IS model to study students' perceptions of the online learning system in Western nations, but there is a dearth of studies that have adopted the IS model to investigate the perspectives of pre-service teachers' experiences of electronic learning systems during the period of the COVID-19 pandemic in Ghana. Therefore, the primary focus of this study is to explore pre-service teachers' perspectives on their online learning system experiences during the COVID-19 pandemic. In addition, there is a paucity of studies that particularly examine the distinct viewpoints and experiences that pre-service teachers in Ghana have when using online learning platforms during this time. The viewpoints of pre-service teachers are essential since they are the prospective instructors who will mould the educational experiences of the next generations. Therefore, there is a need to conduct this study. Knowledge of this occurrence provides an understanding of how pre-service teachers cope with online teaching and learning, and tactfully, how teachers respond to their requirements.

To conduct a more thorough assessment of the online learning system usage, this study expanded on the three components of the information system framework to include ease of use, instructional quality, and interaction quality (Ozkan & Koseler, 2009). to better comprehend the didactic features of e-learning that VCLASS supports The modified model is shown in Figure 1 below.

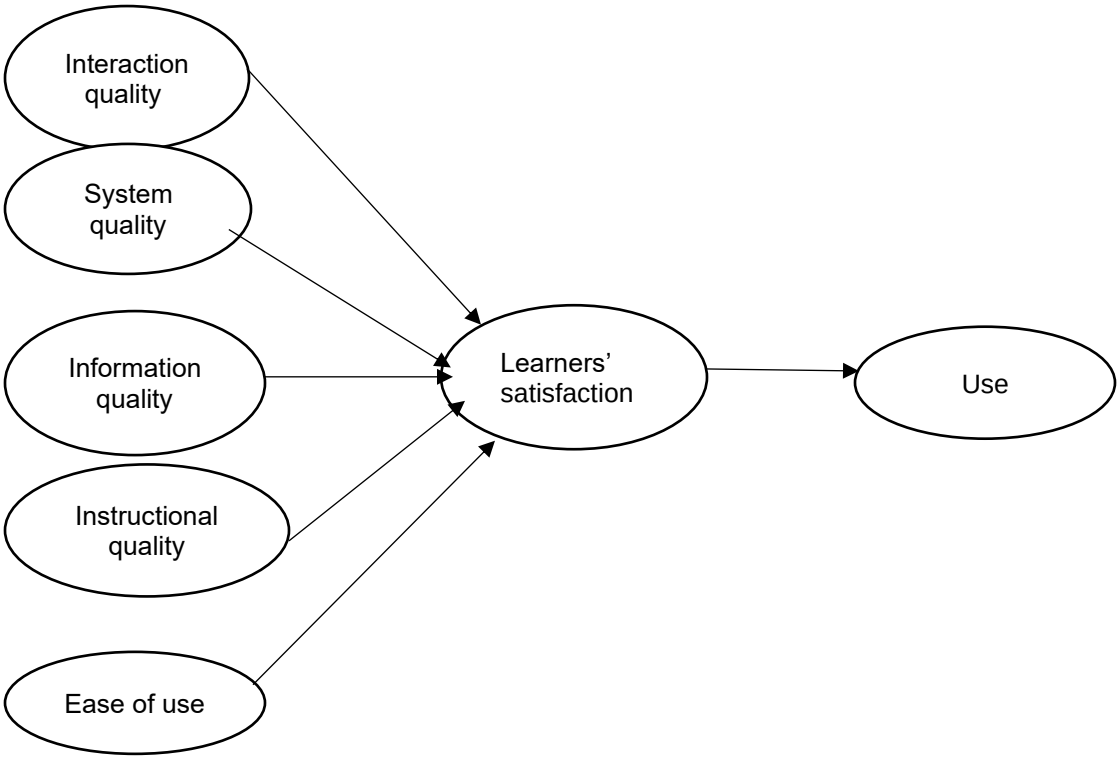

Figure 1: Study model

RELATED STUDIES

Interaction quality

In response to the fast development of open and distance learning and the huge quantity of electronic materials made accessible by the web and digital learning platforms, early studies indicated that the quality of collaboration between students and online-supported content has become one of the most important elements in ascertaining the efficiency of digital pedagogy (Anderson et al., 2001). Bernard et al. (2004) defined , defined online interaction as the capacity to cooperate with classmates and a teacher. Studies have shown that online learning systems facilitate education through teacher-learner and learner-learner interactions (Moore, 2007). Research on electronic learning systems have examined teacher quality regarding their responsiveness to teacher-learner interactions and discovered that it improved student pleasure (Mtebe & Raphael 2018; Ozkan & Koseler 2009. The findings of Wanstreet (2006) indicated that online collaboration between learners, as well as between learners and educators, help students to study in the manner that they choose. Furthermore, the form of collaboration is a significant issue in the creation of electronic learning as well as in learners' assessments of their learning practices in such programmes, as a result of their participation. However, while many characteristics of digital coursework encourage interaction, the extent to which they meet students' expectations for contact and immediate feedback might differ greatly. In Malaysia, Goh et al. (2017) examined students' Internet-based learning proficiencies concerning their learning outcomes and contentment. The authors examined three types of learning proficiencies such as course design, instructor interaction, and classmates' interaction as predictors of learning results and contentment. They found that interactions with classmates were the most significant element of learning results and contentment. As further academic organizations continue to increase their programmes online, instructors and institutions are starting to concentrate on enhancing the quality of electronic content. According to Alqurashi (2019), learners' satisfaction or contentment is a key determinant in assessing the quality of online courses. The significance of interaction in digital education contexts is the focal point of several prior studies (Brinthaupt et al., 2011; Hogg & Lomicky, 2012; Watts, 2016). Though the findings of prior studies have realized the relevance of interaction in online learning, it is observed that there are no detailed studies on the effect of quality of interaction on learners' satisfaction in digital learning (Wang et al., 2024).

System quality

System quality refers to an information system's necessary characteristics or attributes. These characteristics have been identified as, friendliness; flexibility of the system; consistency of the system; ease of learning; insight; complexity; and reaction time (DeLone & McLean, 2016). The quality of the system is a key component of the achievement of information system measurement (DeLone & McLean, 2016). The system quality is key to students' contentment and adoption of any technology, including the LMS. In the web-based education context, it was disclosed that system quality had a substantial consequence on user contentment, benefits, and user-friendliness in the context of the use of online learning systems (Roca et al., 2006; Cheng, 2012). Also, Pham et al. (2019) discovered that higher education institutions must critically pay attention to system quality. Information system factors which comprise service quality, information quality and system quality were discovered to influence the user's intention to accept a learning management system, mediated by educators' perceived usefulness and perceived ease of use. However, former studies have revealed that few studies offer a thorough investigation of system elements that affect the adoption of the technology (Abdallah et al., 2016).

Information quality

It has been noted in the findings of prior studies that information quality determines the correctness, promptness, completeness, importance, and reliability of the content delivered by an information system (DeLone & McLean, 2016). In addition, the quality of information illustrates the output qualities of the information system by ensuring that prompt communication is sent to all sectors within the organization; and the communication should be appropriate to the specific individual or sector (Muda & Erlina, 2019; Pham et al., 2019). According to Li & Belkin (2008), the correctness and significance of the subject matter were relevant constituents of information quality in digital learning. Further, Kim & Mclean, (2016) noted that for effective learning experiences, the subject matter needs to be current, accurate, and pertinent to the learning goals. Additionally, the quality of information was found to be greatly influenced by the digital learning platform's architecture (Jung & Latchem, 2011). Efficient information distribution was also facilitated by user-friendly interfaces, simple navigation, and well-organized material (Park & Choi, 2009).

Lin (2007) and Al-Samarraie et al. (2017) discovered that the quality of information had a greater substantial consequence on satisfaction than system quality, however; Pham et al. (2019) noted that the quality of the system had a greater significant result. Additionally, Shahzad et al. (2020) found that both the quality of information and the quality of the system reinforced user contentment and system implementation. But, Lin & Wang (2012), indicated that the quality of a system was not a significant item that impacts learners' persistent use of web-based instructional systems.

Despite, the current studies offering insightful evidence on the variables affecting the quality of information in digital learning settings, there are still some gaps in the research. According to Wang & Liu (2019), little attention has been paid to students' views on information quality in digital learning settings. Knowing how students view and assess information quality can inform the development of more efficient digital learning systems. Even though the importance of high-quality information is widely acknowledged, there are still gaps in researcher knowledge of the best ways to guarantee and assess the quality of digital learning resources.

Instructional quality

The instructional quality of students' online education experiences indicates how the electronic learning system supports learning tasks (Chen et al., 2008). With the increasing usage of online learning settings, it is critical to characterize the elements that determine their success. Experts have asserted that the instructional quality of web-based programmes might contribute to their efficacy (Czerkawski & Lyman, 2016; Terras & Ramsay, 2015). According to technology acceptance research, perceived quality of instruction has a substantial impact on learners' approval of a web-based learning environment (Yang et al., 2017). Larmuseau et al. (2018), for example, conducted research on students' views of instructional quality. One hundred and sixty-one (161) university students participated in the study. SEM analysis revealed that perceived instructional quality had a considerable favourable effect on students' approval. A similar study was conducted by Cornillez (2019). The object of this inquiry was to ascertain learners' experiences of the instructional quality of online-based courses. The findings indicated that the majority of respondents had a favourable opinion of the pedagogical quality of web-based programmes. The website's pictorial attractiveness and the relevance of the course resources obtained the highest scores. The least favourable scores were given to clearness and purpose in the introduction of content components. These findings were highly associated with students' opinions about critical components of online course instructional quality. Investigations on technology acceptance showed the significant effect of the perceived instructional quality on learners' acceptance of a digital learning context (Lee et al., 2009; Liaw & Huang, 2013; Yang et al., 2017). Though, the studies mentioned above examined the perceptions of learners on the quality of the instructional design and the acceptance of technology by learners, studies on perceptions about the quality of

use are limited (Larmuseau et al., 2018). In addition, limited information is provided on the instructional design of the electronic learning settings (Lee et al., 2009; Liaw & Huang, 2013; Yang et al., 2017). Exploring student perspectives, levels of satisfaction and liking can offer a useful understanding of enhancing the quality of instruction and creating student-centred digital materials (Tallent-Runnels et al., 2006).

Ease of use

Ease of use expresses a human's belief that utilizing a web-based learning management system will be simple (Davis, 1989). The technology acceptance model asserts that ease of use affects how people use information systems. Numerous studies, including those on web-based instructional system use (Islam, 2011; Larsen et al., 2009), have corroborated this. The researchers asserted that an intuitive web-based learning platform can aid learners in their studying and add to the development of a cooperative society. The technical layout and structure were found to affect the learners' ability to cooperate and share study materials effectively (Lim et al., 2007). Additionally, when students consider a web-based instructional platform to be simple to operate, they concentrate on their learning rather than on figuring out how to utilize it. The system enables them to team up easily with one another, hence facilitating teamwork. Also, past technology experience and the technical competence of the students play a significant part in changing their views on ease of use (Almaiah et al., 2020). Ease of use is an important element in technology acceptance (Davis, 1989). However not much is known concerning the dynamic nature of ease of use in the emerging form of digital learning platforms. As innovations progress and user interfaces continue to emerge, comprehending how ease of use conforms to these modifications is significant for developing user-friendly systems (Venkatesh et al., 2003).

Learners' Satisfaction

This concept refers to a user's impression of satisfaction with a system in comparison to what the individual anticipated upon initial practice of the system (Seddon, 1997). It is a metric applied to find out the performance of an information system (DeLone & McLean, 1992) and is a substantial element in determining whether or not learners will keep on utilizing a learning system (Arbaugh & Duray, 2002). Research studies have demonstrated a considerable positive correlation between user satisfaction and the intention to continue operating electronic educational platforms (Al-Samarraie et al., 2017; Lin & Wang 2012; Roca et al., 2006; Yakubu & Dasuki, 2018). Teo (2014) sought to ascertain the extent to which instructors were satisfied with the implementation of an electronic learning program. The study discovered that educator quality, usefulness, simplicity of use, programme delivery, and programme satisfaction were substantial elements of Internet-based learning satisfaction. Additionally, Ozkan & Koseler (2009) identified four dimensions associated with student satisfaction: student attitudes, teacher quality, system quality, and information quality.

Relatively few academic institutions have investigated the variables that affect learning outcomes and online student satisfaction (Eom et al., 2006). In a related study, learner satisfaction in online learning environments and conventional learning environments was assessed (Piccoli et al., 2001). The outcome of the study was that learners in an online learning setting were noticeably less satisfied. This is because the experience was new and many of the students lacked the learner control and competency required for digital learning.

RELATED WORK ON ONLINE LEARNING SYSTEM USAGE

Ghazal, Aldowah & Umar (2018) conducted a study on key elements that determine users' acceptance and satisfaction of learning management systems in a hybrid learning setting. They sampled 174 participants for the study. They also employed partial least squares structural equation modeling to perform the data analysis. The study revealed that system quality significantly

influenced acceptance and satisfaction. In a related study, Salloum et al. (2018) examined the element that impacted usage of online learning systems in a university. A total of 215 participants were selected for the study. The study aimed to find out the effect of innovativeness, trust and knowledge sharing on online learning system usage. The study indicated that knowledge sharing and quality contributed positively to the use of the online learning system. Moreover, in a longitudinal study which was made up of 249 students, Islam (2013), concluded that perceived usefulness and perceived ease of use influenced students' use of an online learning system. Al-Amin et al. (2022) explored the antecedents of students' electronic learning continuance intention in the era of COVID-19. Four hundred and forty (440) participants were involved in the investigation. The authors adopted a structural equation modelling (SEM) approach to compute the data analysis. The outcome of the inquiry indicated that student's continuous intention to use the online learning system was impacted by usefulness, ease of use, and attitudes while their behavioural intention was influenced by usefulness, ease of use, attitudes, contextual, psychological, and student support-related factors.

Furthermore, Habibi et al. (2022) examined the driving forces behind student-teachers intention to adopt mobile learning. A total of 772 respondents completed the survey questionnaires. They also applied SEM and t-tests to analyze their data. The findings of their investigation indicated that perceived usefulness and attitude predicted student-teachers intention to use mobile learning. In addition, the inquiry indicated that self-confidence, ease of use and subjective norms were predictors of perceived usefulness. Moreover, the researchers observed that female student-teachers used mobile learning less than their male colleagues. In a similar study, Al-Samarraie et al. (2017) explored digital learning contentment from the perspectives of learners and teachers. The study found that continuance satisfaction was impacted by the quality of information, quality of the system, task–technology fit, utility value, and usefulness. In another related study, Koh (2020) extended the information success model to investigate students' views of learning management in terms of system quality, satisfaction, and usage. The total number of respondents who participated in the study was three hundred and seventy-six (376). It was revealed that instructional quality influenced satisfaction for the student group. However, the quality of information significantly impacted satisfaction for only occasional and average regular users. The quality of the system also significantly predicted satisfaction for average frequency and regular users, while only regular users recognized the learning quality results to be an important factor of satisfaction.

Moreover, Chen (2012) examined the influences of antecedents of quality on online learning acceptance. The study aimed to survey whether the determinants of quality as the precursors to student philosophies can influence their intention to use an online learning system. Eight high-technology organizations in Taiwan were involved in this inquiry. Six hundred and eighty questionnaires were randomly given to the learners, and 483 questionnaires were completed and analyzed. Data analysis was accomplished by applying the SEM approach. The study revealed that the quality factors such as quality of information, quality of service, quality of the system, and quality of instruction, as the precursors of acceptance of online learning, influenced learners' perceptions on their beliefs such as perceived usefulness, perceived ease of use, and perceived enjoyment, and these improved intentions of users to use the online learning system. Also, Cornillez (2019) explored the relationship between students' opinions on the quality of instruction and academic contentment. The research design for this study was correlational. Survey questionnaires were distributed to 1,303 undergraduate students. The authors adopted a stratified random sampling technique to select the learners. The results indicated that the quality of instruction and academic satisfaction constructs were connected. Conversely, the perceptions of learners concerning learning motivation and classroom management had the slightest influence on the quality of instruction constructs on students' academic satisfaction. The researcher concluded that the quality of instruction has a direct link to the academic satisfaction of students. This implies that as instructional quality improves, students' academic satisfaction also improves. The

researcher recommended that future studies should consider quality of instruction factors that were not considered in this study.

In a related study, Goh et al. (2017) investigated whether learners' experiences in online learning have a relationship with learning outcomes and satisfaction. Curriculum design, instructor collaboration and peer collaboration were chosen as the determinants of learning outcomes and satisfaction. Paper-based questionnaires were completed by learners at a Malaysian University. In total, there were six hundred and seventy participants. Exploratory factor analysis and regression analysis were adopted to analyze the data. It was found that curriculum design, instructor collaboration and peer collaboration significantly correlated to learning outcomes and satisfaction. In addition, it was revealed that interaction with peer students was the strongest determinant of learning outcomes and satisfaction. The study recommended that educators should develop online learning courses to improve learners' experiences to enhance their learning outcomes and satisfaction.

In addition to the above-mentioned studies, Larmuseau et al. (2018) investigated students' perspectives on instructional quality. The objectives of their work were to discover the effect of the perceived instructional quality on learners' approval and the influence of learners' approval and the perceived quality of instruction on the course activity and course performance. A web-based digital learning environment was adopted for studying French. One hundred and sixty-one university students took part in the study. The result of SEM analysis indicated that the perceived quality of instruction significantly influenced students' acceptance. In addition, learners' perceived quality of instruction was positively related to course activity, but not course performance, while students' approval of the electronic learning setting did not affect the use of the learning environment. In addition, Lin & Wang (2012) investigated the factors that would motivate students to continue using an online learning system in traditional and online learning instruction. The study adopted a mixed-method research approach to gather data from the respondents. The outcomes of the study showed that the information quality and task-technology fit significantly contributed to the affirmation of system acceptance. Also, continuous intention was significantly affected by perceived usefulness and system satisfaction.

Furthermore, Mtebe & Raphael (2018) examined the main predictors that influenced users' satisfaction when using an electronic learning system. The research work adopted the information success model which was developed by DeLone & McLean (1992) and modified it. One hundred and fifty-three (153) students took part in the study. It was revealed that system quality, quality of instruction, and quality of service substantially impacted students' satisfaction. Among the factors, quality of service was found to be the strongest determinant. However, the quality of the course did not influence students' satisfaction concerning the use of the digital learning system. The researchers suggested that schools should prepare or execute digital educational systems to improve users' satisfaction and, subsequently, enhance the success of the systems. Similarly, Nguyen (2021) studied the factors that determined students' satisfaction regarding the use of learning management platforms. The population for the study was 300 students. The SEM approach was employed to analyze the data. The findings indicated that interaction, instruction quality, information quality, technology quality and system content influenced students' satisfaction.

Pham et al. (2018) investigated learners' perspectives on digital learning service quality, e-satisfaction and e-loyalty. The study sought to find the connections among service quality, satisfaction and loyalty as viewed by digital learners in the school context. The findings of the study revealed five key predictors of digital learning service quality. These were the quality of online learning administrative and support service, quality of online learning instructor, quality of online learning accuracy, quality of online learning course materials, and online learning security and privacy. The online learning administrative and support service quality, instructor performance quality, and course materials quality contributed significantly to the entire online study service

quality, with online learning instructor quality being the greatest contributor. There was a significant relationship between the entire quality of online learning service and online learning loyalty and between online learning satisfaction and online learning loyalty. Moreover, Teo (2014) in his study examined the primary determinants of student-teacher online learning satisfaction. Three-hundred and eighty-seven participants completed questionnaires. Data analysis was computed by adopting SEM. It was revealed that satisfaction was substantially determined by perceived usefulness, course delivery, tutor quality, and perceived ease of use. In addition, the study found that perceived ease of use and perceived usefulness were substantially determined by course delivery, tutor quality, and facilitating conditions respectively. Finally, facilitating conditions were substantially elucidated by tutor quality.

Lastly, Yakubu & Dasuki (2018) assessed the success of electronic learning in Nigeria. The study was premised on DeLone & Maclean's (1992) Information systems success model. Three hundred and sixty-six students took part in the research. SEM was employed to compute the data. It was found that system quality, information quality, and service quality were predictors of users' behavioural intention and satisfaction to use electronic learning systems.

Several institutions of higher learning have implemented Internet-based learning systems for their online learning programmes. However, limited empirical research has been done on the elements that influence students' acceptance of online learning systems (Ngai et al., 2007). Effective adoption of a system and acceptance by students demands a thorough grasp of user acceptance procedures and methods of convincing learners to interact with these innovations (Saadé & Bahli, 2005). In addition, since research on e-learning usage is in its embryonic stage (Tarhini et al., 2017) noted that studying the elements that influence users' adoption of online learning systems will help to better understand their needs, and finally contribute to the effective use of the online learning system. In addition, the issues relating to the use of online learning systems differ from one nation to another nation because of differences in beliefs, backgrounds, and learners' willingness (Almaiah et al., 2020; Baker et al., 2010; Salloum et al., 2019). Because the triumph of online learning system hinges on users' readiness and acceptance to use, this study will explore the factors that influence use of electronic systems.

RESEARCH QUESTIONS

Given that students are responsible for their learning and are also directly involved in electronic learning, it is vital to assess their perspectives on utilizing the electronic learning system during the COVID-19 pandemic. This study aims to answer the following research questions:

1. What are pre-service teachers' perspectives of experiences with electronic learning system use during the COVID-19 pandemic in the Department of ICT Education at the University of Education, Ghana?
2. What factors contribute significantly to pre-service teachers' satisfaction with the digital learning system?
3. What factors significantly influence pre-service teachers' utilization of the electronic learning system?

METHOD

Participants and sample size

The study adopted a quantitative research design. A cross-sectional survey method was adopted to gather firsthand data. The target population for the study was one thousand five hundred (1500) pre-service teachers who were studying in the ICT education programme at the University of

Education, Winneba in Ghana. Of the 1500 population, six hundred respondents were randomly selected. The selection of the participants was done based on Gay et al.'s (2009) recommendation on sample size selection. Gay et al. (2009) proposed that if the population number 100 or fewer, then the entire population is chosen, if the population is 500, then a sample of 250 people is recommended, if the population is 1,500, then a sample of 300 people is recommended and lastly, if the population number is equal to or more than 5000, then a sample of 400 people is sufficient (p. 133). Gay et al. (2009) asserted that simple random sampling is the best single method to get a descriptive sample. In addition, a table of random numbers approach was applied to choose the study participants. In this approach, each participant in the population was given a serial number identification. Then 600 arbitrary numbers were chosen from the population. 315 participants responded to the 600 questionnaires distributed, indicating a 52.5 percent response rate. This study's sample size is equivalent to that of previous research (Tan et al., 2012). Males constituted 88.9% of the sample, while females constituted 11.1%. With regard to the age of the participants, three (3) participants were in the age bracket of 17-19 years, 59 participants were in the age range of 20-22 years, 93 of them were in the age range of 23-25 years, and 160 participants were above 25 years. The participants' mean age was 22 years (standard deviation = 0.82). The respondents were student-teachers who were being trained in Information and Communication Technology programmes at the University of Education, Winneba Campus in Ghana.to become prospective teachers in primary and secondary schools. These participants were picked for this inquiry because they adopt mLMS daily; they decide the place, time and means to adopt mLMS, and they have the potential to be a channel of change in the application of technology at their institutions in the future.

Instrumentation and Data Collection

The questionnaire that was used to collect data from the respondents was developed from those used in preceding educational research (Koh, 2020; Yakubu & Dasuki, 2018). The questionnaire was in two parts. The first part measured the personal data of the participants. The second part comprised 48 statements on the eight constructs. The system quality included thirteen items, the information quality included seven, the interaction quality included five, the instructional quality included eight, the usefulness included four, the ease of use included four, user satisfaction included four, and actual usage included three items. In this research, Likert-style scale items were used with a five-point range. The measure started from 1 to 5, with 1 symbolizing 'strongly disagree' and 5 symbolizing 'strongly agree'. To optimize the validity of the questionnaire, two experts in instructional technology research were approached to enrich the face and content validity of the questionnaire. Second, the survey instrument was piloted using 30 students from a non-participating faculty to ensure its consistency. The comments from the students who took part in the pilot study were incorporated into the final questionnaire. Third, Cronbach's alpha reliability of the instrument was determined. The internal reliability of the variables was 0.95. This value indicated that the constructs had strong reliability. Before the revised survey instrument was given to the actual participants to complete, the study's aims were communicated to the participants. Then the survey instrument was read to the students to clear any ambiguity. All participants were notified that their participation was not obligatory. The students were also given assurance that the information they would provide would not be disclosed. Individual participants spent an average of around 30 minutes to complete the questionnaire. To enhance response rates, two teaching assistants together with the researcher helped in the distribution and collection of the questionnaires.

Data Analysis

IBM SPSS software version 21 was used for the data analysis. Descriptive statistics and standard multiple regression analysis were used to analyze the data. Descriptive statistics were used to depict and sum up the characteristics of the vast amount of data from the respondents (Gay &

Airasian, 2000). The participants' biographical data and research question 1 were computed using descriptive analysis. In addition, the link between the endogenous variables and the exogenous variables was examined using standard multiple regression analysis (Tabachnick & Fidell, 2012). Standard multiple regression analysis was used to analyze research question 2 and research question 3.

RESULTS

This section details the findings of the study beginning with research question 1, followed by research questions 2 and 3.

Research Question 1:

> What are pre-service teachers' perspectives of experiences with electronic learning system use during the COVID-19 pandemic in the Department of ICT Education at the University of Education, Ghana?

Participants were requested to respond to their experiences with the online education system during the COVID-19 epidemic on a five-point Likert scale beginning from 'strongly disagree (1)' to 'strongly agree (5)'. The data in Table 1 shows that they strongly agreed that the online education system was easy to use (M = 5.07, SD = 0.91). They also agreed that the system was useful (M = 4.84, SD = 1.08). Again, they also agreed that the electronic learning system provided instructional quality (M = 4.79, SD = 0.80), and user satisfaction (M = 4.67, SD= 1.26). However, the teachers revealed that they were unconvinced of the system quality (M = 3.42, SD = 0.52) and interaction quality (M = 3.82, SD = 0.65).

Table 1**:** *Pre-service teachers' experiences with online education*

Item	**Mean (M)**	**Standard deviation (SD)**
System Quality (SQ)	3.42	0 .52
Information Quality (INFQual	3.84	0 .65
Interaction Quality (INTQual)	3.54	0 .99
Instructional Quality (INSQual)	4.79	0.80
Usefulness	4.84	1.08
Ease of Use	5.07	0.91
User Satisfaction	4.67	1.26

Scale: 1 = "strongly disagree', 2 = 'disagree', 3 = 'neutral', 4 = 'agree', 5 = 'strongly agree'

Research Question 2:

> What factors contribute significantly to pre-service teachers' satisfaction with the digital learning system?

To answer the above question, outliers, multicollinearity, and normality assumptions of standard multiple regression were validated. First, the assumptions of outliers were determined by Cook's distance. The statistical results showed that the value of Cook's distance was 0.147. this value was below 1, indicating that outliers were not violated (Tabachnick & Fidell, 2012). Second, the assumption of multicollinearity was determined by the variance inflation factor (VIF) and tolerance values. The values of VIF ranged from 1.80 to 3.14. These values were less than the suggested value of 10 (Field, 2012). Also, the values of tolerance ranged from 0.32 to 0.68. These values

were smaller than 1 (Field, 2012), indicating that the assumptions of multicollinearity were not breached. Third, the assumption of normality was tested. Skewness and Kurtosis values were used to determine the normality. Curran et al. (1996) suggested that skewness <± 2 and kurtosis <± 7 are adequate. The values of skewness and kurtosis displayed in Table 2 below indicated that normality was not violated.

Table 2: *Skewness and Kurtosis values*

Variables	**Skewness**	**Kurtosis**
System Quality	-0.64	0.78
Information Quality	-0.41	0.33
Interaction Quality	0 .77	6.24
Instructional Quality	-0.73	0.35
Usefulness	-1.09	1.22
Ease of use	-1.27	1.58
User satisfaction	0 .38	6.37
Actual use	-0.92	0.80

The data in Table 3 shows the outcome of the analysis of the standard multiple regression. The data illustrates the correlations between the variables, the standardized coefficients (β), the t-values and the p-values. The entire variance explicated by the entire model was $R^2 = 0.638$ indicating that all the six predictors explained 63.8% of the variance in user satisfaction with the digital learning system. The entire model was statistically significant F (6, 246) = 72.27, p = .000). To determine the relative importance of the independent variables, the standardized β values were used. As Table 3 shows, the results of the standard multiple regression revealed that three elements impacted user satisfaction at the 0.05 level of significance. The β values of these elements were as follows: SYSQual (β = .110, t = 2.134, p = .034), INSTRUCTQual (β = .248, t = 3.098, p = .000) and ease of use (β = .409, t = 6.510, p = .000). Of the three variables, 'ease of use' significantly contributed to user satisfaction with the digital learning system. This was followed by instructional quality. System quality contributed less to user satisfaction with the digital learning system. However, information quality (β = .107, t = 1.768, p = .078) and interaction quality (β = .070, t = 1.499, p = .135) did not significantly contribute to user satisfaction.

Table 3: *Results of Multiple Regression Analysis*

Variable	**R^2**	**Adj R^2**	***F***	**β**	**t**	***p***
Model	.638	.629	72. 271			.000***
SYSQual				.110	2.134	.034***
INFQual				.107	1.768	.078
INTQual				.070	1.499	.135
INSTRUCTQual				.248	3.098	.000***
Ease of use				.409	6.510	.000***

SYSQual = System quality, INFQual = Information quality, INTQual = Interaction quality, INSQual = Instructional quality, ****p* < .005.

Research Question 3:

What factors significantly influence pre-service teachers' utilization of the electronic education system?

To answer the above question, the same assumptions of multiple regression analysis were tested. The results showed that none of the assumptions were breached. First, the outliers were determined by Cook's distance. The statistical results showed that the value of Cook's distance was 0.147. This value was below 1, showing that outliers were not violated (Tabachnick & Fidell, 2013). Second, to determine multicollinearity, the variance inflation factor (VIF) and tolerance values were computed. The values of VIF ranged from 1.80 to 3.14. These values were less than the suggested value of 10 (Field, 2012). Also, the values of tolerance ranged from 0.32 to 0.68). These values were smaller than 1 (Field, 2012), indicating that the assumptions of multicollinearity were not breached. Third, the assumption of normality was tested. Skewness and Kurtosis values were used to determine the normality. The values of skewness and kurtosis displayed in Table 2 indicated that normality was not violated.

Table 4 shows the result of the analysis of multiple regression. The data in the table illustrates the correlations between the variables, the standardized coefficients (β), the t-values, and the p-values. The variance explicated by the entire model was $R^2 = 0.479$, indicating that all six predictors explained 47.9% of the variance in user satisfaction with the digital learning system. The entire model was statistically significant, F (6, 246) = 72.27, p = .000). To determine the relative importance of the independent variables, the standardized β values were used. As Table 4 shows, the results of multiple regression revealed that four elements impacted actual use at the 0.05 level of significance. The β values of these elements were as follows: SYSQual (β = -.135, t = -2.143, p = .033), INSTRUCTQual (β = .199, t = 2.460, p = .015) and ease of use (β = .196, t = 2.389, p = .018) and USat (β = .309, t = 4.013, p = .000). Of the four variables, 'user satisfaction' significantly contributed to actual use of the digital learning system. This was followed by instructional quality and ease of use respectively. System quality contributed less to the actual use of the digital learning system. However, information quality (β = .006, t = .075, p = .094) and interaction quality (β = .071, t = 1.261, p = .209) did not significantly contribute to the actual use of the electronic learning system.

Table 4: *Results of Multiple Regression Analysis*

Variable	**R^2**	**Adj R^2**	***F***	**β**	**t**	***p***
Model	.479	.464	31. 913			.000***
SYSQual				-.135	-2.143	.033***
INFQual				.006	.075	.940
INTQual				.071	1.261	.209
INSTRUCTQual				.199	2.460	.015***
Ease of use				.196	2.389	.018***
USat				.309	4.013	.000***

SYSQuality= System quality, INFQual = Information quality, INTQual = Interaction quality, INSTRUCTQual = Instructional quality, USat = User satisfaction, ***p < .005.

DISCUSSION

The objective of this inquiry was to examine pre-service teachers' perspectives on online learning system usage experiences during the COVID-19 pandemic.

From the outcome of the study, the pre-service teachers had a better perspective on ease of use, instructional quality, and learner satisfaction with the electronic learning platform. The discoveries of this work confirmed the outcome of Islam & Azad (2015) in that users have a positive perspective on the ease of use, usefulness, access, reliability, and compatibility of the electronic learning platform. Further, Islam & Azad (2015) asserted that both learners and instructors had favourable opinions on the online learning system's value, which contributed to their happiness with its continued use. However, pre-service teachers had a moderately positive perception on the system

quality, information quality, and interaction quality of the system. Anderson et al. (2001) held the view that the quality of interaction between students and online-based content was among the most important elements in ascertaining the efficiency of digital teaching and learning and the absence of such system interaction was one of the major hindrances to digital education (Ferri et al., 2020).

Further analysis of the findings of this study showed that system quality**,** instructional quality, and ease of use were determinants of students' satisfaction with the online education system. This finding indicated that if learners view the digital learning platform as friendly, flexible, dependable, easy to learn and support learning tasks, they tend to find the electronic learning system valuable for learning and they will be satisfied. This finding was consistent with the outcomes of preceding studies on predictors of user satisfaction with digital learning systems (Teo, 2014; Ozkan & Koseler, 2009). However, information quality, interaction quality, and usefulness of the electronic learning system did not predict learners' satisfaction. This implies that, if learners see digital learning as interactive, and as providing for prompt, correct, complete, and useful course content, they will become satisfied to adopt it. This finding was in contrast to preceding academic work (Mtebe & Raphael, 2018; Nguyen, 2021; Shahzad et al., 2020).

Further analysis revealed that system quality, instructional quality, ease of use, and learner satisfaction predicted pre-service teachers' utilization of the online education system. This implies that learners would use a digital learning system when they are satisfied with the reliability, promptness, simplicity, and quality of instructional activities of the system. This confirms the outcomes of preceding research studies (Cheng, 2012; Larmuseau et al., 2018; Islam, 2011). Generally, the results of the study disclosed that the online learning system was efficient.

IMPLICATIONS FOR PRACTICE

The findings of this study suggest some implications for practice. First, the creators and developers of the online instructional system must create an accessible, straightforward, and easy-to-use online education platform. If learners and educators perceive the electronic education platform to be simple, they will use it efficiently. Second, decision-makers in the universities must implement new rules to encourage learners and educators to use online learning systems. They will also need to make certain changes to instructional guidelines to guarantee that the transition from conventional to electronic learning is as smooth as possible. Administrative support, preparation plans, and educators conforming to school norms for using the electronic education system in the instruction process can all help to bring about these improvements. Third, institutions must concentrate on developing the online learning beliefs of learners through training programmes on the benefits of digital learning systems and the development of their IT abilities. Learners with adequate technology use abilities and positive thoughts about interacting with the digital instructional platform are more likely to embrace it successfully. Lastly, it is also crucial to improve the information quality and interaction quality. This can be accomplished by arranging resources for convenient access and removing extraneous tools and links. Quizzes and conversations are examples of interactive tools that can help learners prepare for a lesson (Lonn & Teasley, 2009). These could be approaches to improve learners' perception on educational attainment and, as a result, the quality of their learning.

LIMITATIONS AND FUTURE STUDY

This study had some limitations. To begin, the inquiry was conducted at a university. The study should be replicated in other higher education institutions. Because the sample size was too small to generalize the results, future investigations should use a larger sample size. Second, the inquiry did not take into account how elements such as learner's experience or academic workload may affect their use of an online instructional system. Future research that incorporates these criteria into learner dialogues to complement research outcomes could provide a more thorough picture of

online learning system quality and utilization. Finally, while the attention of this inquiry has been on the learners' l practices in the system, it is acknowledged that the didactic approaches of academic staff may affect learners' adoption of an electronic learning platform. The electronic learning platform experiences of the academic staff were not examined as part of this survey. Future research might look at the perceptions of academic staff.

CONCLUSION

The COVID-19 pandemic compelled academic institutions all across the globe to embrace online education. On the other hand, the pandemic reignited the urge to investigate online education options. The experience of the spread of COVID-19 may provide a prospect for schools to measure and upgrade their digital learning and training capabilities. By extension this could be a springboard for Ghana's digital revolution of the education sector if they by constantly incorporate this study style into their system. To constantly integrate digital learning into the system, infrastructure, course design, instructor preparation, and learner preparation must all be improved. Incorporating the electronic education method will necessitate a comprehensive cost-benefit analysis. If academic institutions recognize the benefits after conducting a cost-benefit analysis, then the COVID-19 pandemic would have served as an excellent springboard for altering education. If academic institutions are properly equipped, and if changing from a traditional to an electronic education system is required in the future, then it may be simple to adapt in the event of a crisis, as well as beneficial in meeting future expectations.

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