Original Research Article

Students' Perception of Online Learning Quality and Preference for the Online Learning Model

ABSTRACT

AimsThe traditional face-to-face learning approach at tertiary institutions was replaced by an online learning model as a result of the novel coronavirus (COVID-19) pandemic. This greatly impacts tertiary students, teachers, and administrators, especially in Ghana, where online learning hasn't been used much in the past. ~~During~~ Preand ~~after~~ postthe ~~-~~COVID-19 epidemic, the current study looked at how students' perceptions of the calibe~~r~~r~~e~~ of their online learning experiences affected their acceptance of the paradigm.

Study design: The study contributes to the corpus of knowledge by evaluating how effectively the modified DeLone and McLean information systems success model relates to online learning.

Place and Duration of Study: Sample: Department of Medicine (Medical Unit IV) and Department of Radiology, Services Institute of Medical Sciences (SIMS), Services Hospital Lahore, between June 2009 and July 2010.

Methodology: Structured questionnaires were used to collect primary data from 1043 students at technical universities in Ghana. The hypotheses were tested to ascertain the effects of class and gender on students' perceptions of the quality of and preferences for the online learning model.

Results: The analysis entails using a multiple linear regression model to determine the impact of student preference for the program on their perception of the value of the online learning system. [RE-WRITE THE RESULT WITH CLEAR SENTENCES]

Conclusion:~~According to the study's conclusions~~, students must be encouraged to adopt online education, which must be appropriate, cutting-edge, and useful if they are to succeed in the digital age and remain relevant. [ADD OTHER WORDS TO EXPLAIN THE CONCLUSION WELL]

Keywords: Learning preference, online learning model, information quality, service quality, systems quality.

1. INTRODUCTION

COVID-19, which originated in China, was so rapid and severe that several nations throughout the world were forced to close schools, including academic institutions. As a result, it affected about a billion pupils were affected by school closures around the world [1]. Due to the COVID-19 pandemic, institutions were under pressure to stop in-person instruction and send students home. Universities had no choice but to create online courses as a replacement to keep teaching and learning going. As a result, educational institutions began implementing teaching and learning technologies to improve online learning throughout the globe,~~such~~ such as digital video conferencing platforms ~~such as~~ (Zoom, Microsoft Platform, ~~Moddle~~Moodle, Webex, Blackboard, and Google Classroom)[2, 3, 4]. Like many other nations impacted by the COVID-19 pandemic, Ghana was forced to switch to online education as an immediate replacement to finish the school year. Due to the

inability to use standard face-to-face learning methods, web-based technologies and electronic learning have become well-known resources to solve any learning loss. Due to the COVID-19 epidemic, several universities worldwide have embraced online education [35].

Education authorities had no choice but to implement online learning if only as a stop-gap to ensure that tertiary education did not cease, as it makes traditional classroom learning nearly impossible due to its health effects. Tertiary education administrators accepted and developed online learning as a substitute for traditional classroom instruction to suit the needs and expectations of students. The institutions primarily intended to implement this new computer-mediated teaching and learning technique during the coronavirus epidemic [4]. However, as the pandemic worsens, it has become important to take into account online education as a long-term replacement for conventional classroom instruction at the nation's postsecondary institutions. However, using online learning is common in many regions of the world, particularly when providing distance learning [3]. Numerous studies have compared the efficacy of in-person and online learning in this context [46]. According to some research, students do better online than in person since the former is more likely to guarantee course completion, a higher rate of information acquisition, and happiness [57]. Other research has confirmed the efficiency of online learning as a teaching and learning strategy that provides a superior learning outcome to face-to-face learning [4, 68, 79].

Despite the incentives cited for online learning, other research contends that it has numerous drawbacks that make face-to-face instruction preferable. According to a study by [810] that looked at students' motivation, contentment, and involvement, online learning was less effective academically for students than face-to-face instruction. Similar research comparing how well students performed in face-to-face and online learning revealed that online learners generally received worse grades [911]. Additionally, research has identified several factors that influence students' preferences for online learning systems in institutions [1012]. They include a lack of qualified lecturers; sluggish internet speeds; WiFiWi-Fi availability; infrastructure; the design of the interface;, the caliberre of the materials; system usage; and student adoption. In this context, Ghana's sudden shift to online education raises concerns about the caliberre of instruction and students' choice of it over in-person instruction. This is so because there is disagreement among academics as to whether online learning limits quality learning or ensures it [4, 68,810]. There is a knowledge vacuum in the existing literature as a result of the disagreement on the effectiveness of online learning as a substitute for face-to-face instruction. As a resultAs a result, the current article focuses on the investigation of students' perceptions of the quality of online learning and how that affects their acceptance of the online learning model as a substitute for traditional classroom instruction in Ghanaian tertiary education, particularly since the practice is not yet widely used in the nation. This should contribute to the ongoing discussion on the quality of online education from the viewpoint of the student, who is the end user.

2. LITERATURE REVIEW

The traditional face-to-face learning model had to give way to online learning in tertiary institutions. In this regard, the institutions were required to develop measures to guarantee the level of service quality of their online instruction. It was crucial to research the effectiveness of the online service from the standpoint of the pupils. Studies of student acceptance of the online learning system and student views of online learning are important indicators of the quality of the learning experience and Quality research service is essential to install an online learning system that students choosethe results attained [11]. For the installation of an online learning system that students choose, quality re, search service is essential.

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According to earlier research, the idea of quality in the online learning model predicts several well-known quality outcomes, including system quality, information quality, and service quality, as well as learning and continuance intention [~~12~~14, ~~13~~15,~~14~~16, ~~15~~17]. Online learning is a recognized and accepted practice around the world, even though it is not a common component of the Ghanaian educational paradigm and several higher education regulatory authorities in Ghana have questioned online diplomas [~~13~~15, ~~15~~17]. When a teacher and student engagement with one another using the internet, it is referred to as "online learning" because the contact takes place online [~~16~~18]. The rise of online education in the computer-based industry cannot be emphasized enough. Researchers have discovered that it has not always been easy to engage students online, maintain their interest throughout the course, and attempt to reduce their attention rate[~~15~~17, ~~17~~19]. The elements that draw and impact learners' desire for online learning as a viable option ~~have~~ haveben the subject of research [~~14~~16,~~17~~19].This research has verified a direct link between the success of online learning and the perceived quality of the service by the learners. We cannot overlook how learning is delivered via the internet while the COVID-19 pandemic continues into the new school year. This necessitates that educational institutions evaluate the online learning model to look at learning quality and how it can affect students' perceptions of the online learning service's service quality and learners' preference for using the online learning platform.

Ghana must concur with the rest of the world that technological advancements are fundamentally altering how individuals learn and the connection between students and teachers. The online learning revolution is particularly notable for the rising use of Internet technology to create and deliver learning[~~18~~20]. The model for online learning systems is an interactive network system made up of different features that support a virtual classroom to improve the quality of teaching and learning. The use of Internet technology in educational institutions offers an efficient learning model that addresses the problem of time and space and also produces many associated benefits, such as being learner-centered and self-paced, being economical for learners, and providing the archival capability to facilitate knowledge reuse and sharing [6, 12, 15, 18, 19]. Tertiary institutions in Ghana made significant investments in online learning systems during the move to online learning during the COVID-19 epidemic. The benefits of such systems can only be realized if students think the instruction is of high quality and choose to use them instead of face-to-face instruction [20, 21]. To help academic institutions and course designers create systems that are more likely to support the online learning model, it makes academic sense to evaluate the quality of the online learning system from the perspective of the students.

valuated the effectiveness of online learning by highlighting some key characteristics of high-quality online education service delivery. They consist of the context's quality, the online program's structure, and the online learning model. Other factors include the course's content and communication methods, the nature of the interactions and relationships between educators and learners, and the degree to which students master the subject matter. Other studies have identified flexibility, responsiveness, student support, self-reported interaction, perceived technology utility and simplicity of use, technical help, and student happiness as qualities of great online learning [~~22~~24]. Student reflection was identified by Means [~~23~~25], as a crucial success component in an online learning approach. [~~23~~25, ~~24~~26] identified pedagogies, resources, and delivery strategies as essential for quality in online education. The research found a link between students' reflective behaviour and the success of their online learning. This indicates that to ascertain students' preferences for online learning, it is important to include perceived quality, a psychological construct that shapes experience and reflection.

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[2527] discovered that an executive committee, technology infrastructure, student services, and teacher services were among the criteria for quality in online learning. As crucial aspects of high-quality online education, [2527, 2628] included institutional support; course development; teaching and learning; course structure; student support; faculty support; and evaluation and assessment. According to [2729] the instructor's attitude, enthusiasm, and real dedication toward instruction delivery via online education courses determine much of the quality of instruction. [2729, 2830] highlighted timely feedback, consistency in information delivery, relevance, learning objectives, and technical assistance as factors that contribute to the quality of online education. This claim was made in collaboration with [2930], who said that administrative, teaching and learning support are all useful indicators of the quality of online learning. According to the relevant literature, improving student expectations and experience is necessary to improve the quality of online learning service delivery and make it more student-centered [2527, 2931]. To make students content with the online learning model, institutions must see students as consumers and do their utmost to provide the greatest online educational services that satisfy their quality expectations [30, 31]. To put it another way, the quality of online learning may refer to the discrepancy between the student's service expectations and his or her learning expectations [3234, 3335].

School management might need to create customer service techniques that offer students the finest online service quality as students become more complicated and online learning becomes a standard component of university education [3133, 3335]. The DeLone and McLean information systems success model may hold the key to comprehending and putting those tactics into practice. This study concentrated on the updated DeLone and McLean information systems success model in the context of online learning and proposed a research model to examine how three quality dimensions (system quality, information quality, and service quality) affect learners' perceptions of the quality of online learning and preferences to use the online learning service based on the learners' expectations and experiences [3436, 3537]. This study's purpose was to provide a theoretical basis and empirical evidence for predicting and explaining antecedents of online learning service usage and to provide important guidelines for academic institutions in their designing and implementing online learning systems. The following research queries need to be resolved to accomplish this: 1) How do students in Ghana's tertiary institutions feel about the quality of the country's online learning system? 2) How does the choice of using the online learning model depend on how well students perceive the quality of the online learning environment? 3) Do gender and class affect students' opinions on the quality of their education and their preferred online learning model? 4) What is the overall impact of students' preferences for online learning models on their perception of the quality of online learning? To what extent may students who learn online use the updated DeLone and McLean information systems success, model?

The updated DeLone and McLean information systems success model's relevance to the online learning model was examined in this study [3537]. The research model assumes that system, information, and service quality all have an impact on how well students perceive the value of online learning, which in turn has an impact on how much students choose to utilize online learning platforms. These justifications result in students' perceptions of the system's quality, information quality, service quality, and the impact of quality (system, information, and service) on students' preferences.

3. METHODS

One thousand nine hundred and eighty (1980) questionnaires were given out to participants in this study, and of them, 70% (1386) were totally completed and submitted for further data analysis. The sampling technique was aided by the convenience sampling technique. The

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sample is not representative of the entire population, so the method does have limits. As a result, there is a consistent discrepancy between the sample results and the results predicted for the total population. The constructs for the measurement scales were adapted from the updated DeLone and McLean information systems success model, that is, perceived information quality, perceived service quality, and perceived system quality as independent variables; and online learning preference as the dependent variable. The questionnaires were designed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This study sought to investigate the impact of students' perceived quality of online learning on their preference for the online learning model, and data were gathered through an online survey of 1386 students from seven of Ghana's ten technical universities.

3.1 Multiple Regression

We consider a multiple linear regression model when the study variable y depends on more than one explanatory or independent variable. This model is a generalization of the simple linear regression model which allows the mean function $E(y)$to depend on more than one explanatory variable[36, 37]. We assume our model to be of the form $y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \cdots + \alpha_k X_k + \varepsilon$, then it is assumed that the n observations will also follow the same model satisfying the following equations:

$$\begin{aligned} y_1 &= \alpha_0 + \alpha_1 X_{11} + \alpha_2 X_{12} + \cdots + \alpha_k X_{1k} + \varepsilon_1 \\ y_2 &= \alpha_0 + \alpha_2 X_{21} + \alpha_2 X_{22} + \cdots + \alpha_k X_{2k} + \varepsilon_2 \\ &\vdots \\ y_n &= \alpha_0 + \alpha_1 X_{n1} + \alpha_2 X_{n2} + \cdots + \alpha_k X_{nk} + \varepsilon_n \end{aligned}$$

These equations can also be written as

$$\begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix} = \begin{bmatrix} 1 & x_{11} & x_{12} & x_{13} & \cdots & x_{1k} \\ 1 & x_{21} & x_{22} & x_{23} & \cdots & x_{2k} \\ 1 & x_{31} & x_{32} & x_{33} & \cdots & x_{3k} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ 1 & x_{n1} & x_{n2} & \cdots & \cdots & x_{nk} \end{bmatrix} \begin{bmatrix} \alpha_0 \\ \alpha_1 \\ \alpha_2 \\ \vdots \\ \alpha_k \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \vdots \\ \varepsilon_n \end{bmatrix}$$

or $y = X\alpha + \varepsilon$ where $y = (y_1, y_2, \ldots \ldots y_n)^{'}$ is a n x 1vector of n observation on the study variable

$$X = \begin{bmatrix} 1 & x_{11} & x_{12} & x_{13} & \cdots & x_{1k} \\ 1 & x_{21} & x_{22} & x_{23} & \cdots & x_{2k} \\ 1 & x_{31} & x_{32} & x_{33} & \cdots & x_{3k} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ 1 & x_{n1} & x_{n2} & \cdots & \cdots & x_{nk} \end{bmatrix}$$

is a n x k matrix of the n observations of each of the k explanatory variables. The first column of X is taken to be $(1,1, \ldots \ldots, 1)$ if the intercept is considered in the model. $\alpha = (\alpha_1, \alpha_2, \ldots \ldots, \alpha_k)$ is k x 1 vector of the regression coefficients and $\varepsilon = (\varepsilon_1, \varepsilon_2, \ldots, \varepsilon_n)$ is a $n \times 1$ vector of the random error component of the model. We assume C to be the set of all possible vectors α, where C is a k –dimensional real Euclidean space. Our aim is to find a vector $C^{'} = (c_1, c_2, \ldots \ldots, c_k)$ from C that minimises the sum of squares deviation of the $\varepsilon_i{}'s$. That is:

$S(\alpha) = \sum_{i=1}^{n} \varepsilon_i^2 = \varepsilon^{'}\varepsilon = (y - X\alpha)'(y - X\alpha)$ for any given $X and y$

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A minimum is obtained as $S(\alpha)$ is a real-valued and a differentiable function. We can therefore write

$$S(\alpha) = y^{'}y + \alpha^{'}X^{'}X\alpha - 2\alpha'X'y$$

Differentiating $S(\alpha)$ with respect to α

$$\frac{dS(\alpha)}{d(\alpha)} = 2X^{'}X\alpha - 2X^{'}y$$

$$\frac{d^2S(\alpha)}{d\alpha^2} = 2X'X$$

This gives the normal equation given by

$$\frac{dS(\alpha)}{d(\alpha)} = 0$$

$$\Longrightarrow 2X^{'}X\alpha - 2X^{'}y = 0$$
$$\Longrightarrow X^{'}XC = X^{'}y$$

It is assumed that the rank$(X) = k$, then $X'X$ is a positive definite and the unique solution of the normal equation is:

$$C = (X^{'}X)^{-1}X^{'}y$$

Since $\frac{d^2S(\alpha)}{d\alpha^2} = 2X^{'}X$ is at least a non-negative definite, C minimize $S(\alpha)$. Therefore, $C = (X^{'}X)^{-1}X^{'}y$ is known as Ordinary Least Square Estimator of α.
The goodness-of-fit for an Ordinary Least Square regression can be measured as:

$$R^2 = 1 - \frac{SSR}{SST} = \frac{SSE}{SST}$$

Where,

$$SST = \sum_{i=1}^{n}(y_i - \bar{y})^2$$

SST is the total sum of square deviation and is a measure of the variations of $y_i's$ around the mean $\bar{y}$

$$SSE = \sum_{i=1}^{n}(y_i - \hat{y}_i)^2 = \sum_{i=1}^{n}\varepsilon_i^2$$

SSE is the residual or error sum of squares and measures the lack of the regression model.

$$SSR = \sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2$$

SSR is the sum of squares of the ~~regression.~~regression? This measures the variations in y that can be explained by the regression model. The $R^2$is called the coefficient of determination and measures the percentage of variation of Y around $\bar{Y}$ that is explained by the regression equation. The closer the observed points are to the estimated regression line,

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the better the fit, the higher the R^2. R^2 lies between $0\ and\ 1$.The test for the significance of the regression model in the case of multiple linear regression analysis is carried out using the analysis of variance. The test is used to check if a linear statistical relationship exists between the response variable and at least one of the predictor variables. It tests for the overall adequacy of the model.

Hypothesis

$$H_0: \alpha_1 = \alpha_2 = \cdots = \alpha_k = 0$$

H_a: at least one of the $\alpha_i's \neq 0$

Test Statistics

$$F = \frac{MSR}{MSE} = \frac{\frac{SSR}{k}}{\frac{MSE}{n-k-1}}$$

The test has $F(k, n-k-1)$distribution. Thus, we reject H_0 if $F_{cal} > F_{\theta,(k,n-k-1)}$, θ is the level of significance of the test.

3. RESULTS AND DISCUSSION

A reliability/validity test using Cronbach Alpha; resulting in a reliability/validity coefficient of 0.928 which is above the recommended minimum of 0.7 (Santos & Reynolds, 1999[PUT NUMBER OF REFERENCE INSTEAD OF COMPLETE NAME]; Twenefour, 2017)[PUT NUMBER OF REFERENCE INSTEAD OF COMPLETE NAME] was conducted on all 20 test items (variables) used in the study (see Table 1).

Table 1: Reliability/Validity test

N	%	Cronbach's Alpha	Number of Items
1386	100	0.928	20

It can be inferred from Table 1 that the variables assigned for the study were about 93% reliable to be used for descriptive-exploratory analysis of the study (Twenefour, 2017)[PUT NUMBER OF REFERENCE INSTEAD OF COMPLETE NAME]. The study achieved a response rate of 73%.

4.1 Respondents Profile

This section of the study identifies respondents by their gender, year of study and use of communication device

Table 2: Respondents Profile

Attributes	N	Frequency	Percentage
Gender	**1386**		
Male		785	57.0
Female		559	40.0
Prefer not to say		42	3.0

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Year of study	**1386**		
Year one		616	45.0
Year two		463	22.0
Year three		242	18.0
Year four		65	5.0
Device use	**1386**		
Mobile Phone		1301	93.8
Tablet		17	1.2
Laptop Computer		50	4.0
Desktop Computer		14	1.0

Table 2 presents the demographics of the respondents. 785 (57%) of those who responded were males whiles 559 (40%) were females. However, 42 of the respondents representing 3% refuse to declare their sex. A majority of 616 (45%) of the students are in their first year of study, 463(22%) are in year two, 242(18%) are in their third-year whiles 65 of the students representing only 5% are in their final year. On the use of device, a high of the students (1301) forming about 94% use mobile phones, 50(4%) use laptop computer, 17 (1%) student use tablet whiles the remaining 14 of the students use desktop computer representing just 1% of the total respondents. We can say most of the students at has only mobile phone which is not the best device for online learning.

4.2 Perceived System Quality

This section of the study sought to determine how respondents perceived the quality of the online learning system as done in their various institutions. The findings are ~~as~~ shown in Table (3).

Table 3: Perception of System Quality

S/N	Statement/Item	Rating				
		SD	**D**	**N**	**A**	**SA**
1	Operation of an online learning system is reliable.	201 (14.5%)	301 (21.7%)	357 (25.8%)	329 (23.7%)	198 (14.3%)
2	Online learning system allows information to be readily accessible to me.	129 (9.3)	261 (18.8%)	296 (21.4%)	470 (33.9%)	230 (16.6%)
3	It takes too long for using online learning system to respond to my requests.	153 (11.0%)	304 (21.9%)	335 (24.2%)	453 (32.7%)	141 (10.2%)
4	I find online learning system easy to use	226 (16.3%)	311 (22.4%)	270 (19.5%)	409 (29.5%)	170 (12.3%)

SD = Strongly Disagree, D = Disagree, N = Neutral A = Agree, SA = Strongly agree

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An assessment of how students perceived the online learning system was determine using set of statements in which the respondents were asked to indicate the extent to which they agreed with them. The statement "Operation of online learning system is reliable" saw most of the students (357) representing the greater percentage of 26% remaining neutral, 329 (24%) and 198 (14%) of the student agree and strongly agree respectively to the statement whiles 301(22%) and 201 (15%) of the student also disagree and strongly to the statement. This indicates that about 859 of the students representing 63% of the respondent do not think the operation of the online learning system is reliable. 470 (33.9%) and 230 (16.6) agree and strongly agree respectively to the statement "Online learning system allows information to be readily accessible to me". 261(18.8%) and 129 (9.3%) also disagree and disagree strongly respectively to the statement whiles 296 (21.4%) could not agree or disagree ~~to~~ withthe statement. We therefore say a majority of the students (700) forming about 51% of the student attest to the fact that the online learning system allows information to be readily accessible to them easily. There was diverse opinion to the statement "It takes too long for using online learning system to respond to my requests" as 335 forming a majority of 24% remained neutral to it, 453 (32.7%) and 141 (10.2%) agree and agree strongly to the statement whiles 304 (21.9) and 153 (11.0%) also disagree and disagree strongly to the statement. Since we could not ~~get~~ takeat least 50% of the students ~~agreeing to~~to agree the statement, it suggests that it does not takes too long ~~using~~ to usean online learning system to respond to their requests. The students were partly divided as 579 (41.8%) agree and strongly agree with ~~to~~ the statement "I find online learning system easy to use" whiles 537 (38.7%) disagree and disagree strongly ~~to~~ withthe statement. 270 (19.5%) however, could take a decision on the statement. We can say that most of the students find the online learning system not easy to use as we could not find at least 50% of the students agreeing to the statement. The findings in Table 3 show that respondents were generally satisfied with the online learning system and thus students have a positive perception about the system quality of the online learning model.

4.3 Perceived Information Quality

This section sought to find out how the respondents perceived the quality of information on the online learning system. The responses are ~~as~~ shown ~~on~~ inTable (4) below.

Table 4: Perceived Information Quality

S/N	Statement/Item	Rating				
		SD	D	N	A	SA
1	The information provided by online learning system is accurate	62 (4.5%)	151 (10.9%) 90	349 (25.2%)	612 (44.2%)	212 (15.3%)
2	The information from online learning system is up-to-date enough for my purpose.	91 (6.6%)	293 (21.1%)	348 (25.1%)	485 (35.0%)	169 (12.2%)
3	The information content in online learning system meets my needs.	130 (9.4%)	300 (21.6%)	370 (26.7%)	426 (30.7%)	160 (11.5%)

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4	Online learning system provides me with a complete set of information.	146 (10.5%)	307 (22.2%)	326 (23.5%)	436 (31.5%)	171 (12.3%)

SD = Strongly ~~Disagree,~~ Disagree, D = Disagree, N = Neutral A = Agree, SA = Strongly

About 612 (44.2%) and 212 (15.3%) respectively agree and strongly agree to the statement "The information provided by online learning system is accurate", 349 (25.2%) remained neutral about the statement, while 62 (4.5%) and 151 (10.9%) respectively disagree and disagree strongly to the statement. We can therefore conclude that most (60%) of the students believe the information provided by online learning system is accurate. The statement "The information from online learning system is up-to-date enough for my purpose" saw 91 (6.6%) and 293 (21.1%) respectively of the respondents saying they disagree and disagree strongly to it. However, 485 (35.0%) and 169 (12.2%) of the students respectively agree and agree strongly to the statement while quite a number of 384 forming 25% of the respondent remained neutral. Since only 47% (less than 50%) agree and agree strongly to the statement we cannot confidently say that the information from online learning system is up-to-date enough for their purpose. Less than half of the respondents (42.2%) together agree and agree strongly to the statements "The information content in online learning system meets my needs", 430 (30.5%) of the respondents together also disagree and disagree strongly to this statement while 370 (26.7%) remained neutral to the statement. With only 42% of the respondents together agreeing and agreeing strongly we cannot firmly say that the information content in online learning system meets needs of the respondents. About 603 (33.8%) only of the respondents together agree and agree strongly to the statement "Online learning system provides me with a complete set of information", 326 (23.5) were neutral to the statement whiles 453 (32.7%) of the respondents together also disagree and strongly disagree to the statement. We have varied views about this statement, as such we cannot say that the online learning system provides students with a complete set of information. We can therefore infer from Table 4 and conclude that the information and the content of the information provided by the online learning system is not up-to-date, not complete and does not meet the needs of students, however the little information it does provides is very accurate.

4.4 Perceived Service Quality

We continue to find out respondent's perception on the quality of service provided by the online learning system. It is believed that when quality service is provided, the student will continue to use the online learning system. Table 5 below gives the results.

Table 5: Perceived Service Quality

Statement/Item	MRV	SD
Grading in the course was fair and consistent.	4.10	0.260
Assignments were distributed fairly throughout the semester.	374	0.050
Graded assignments, test, etc., were returned promptly	4.00	0.209
The instructor could be contacted for consultation	4.52	0.105
The instructor satisfactorily answered questions.	3.70	0.188

MRV = Mean response value, SD = Standard deviation

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Statements concerning the quality of service provided by the online learning system were asked and respondents were asked the extent to which they agree to these statements. The mean responses values and standard deviation of the responses to these statements were used to evaluate how responded perceived the quality of service provided by the online learning system The higher the mean response value and the lower the standard deviation values of the responses to these statements the more they the students agree to the statement. Table 5 records a high mean response value with 3.70 being the minimum and 4.52 the maximum out of a mean value of 5.00. The responses also produce low standard deviation values indicating that the responses are not widely spread from the average response concerning the quality of service. This also showed that all these statements received a favorable response from the students. Hence, we can conclude that the online earning system provide quality service to the students.

4.5 Perceived Quality of online learning and Students Preference of the Online Learning Model

Regression analysis was applied to establish the impact of perception of the quality of the online learning system on the preference of students for the program. The quality of the online learning was perceived in terms of system quality, quality of information and quality of service. These were the independent variables in our regression analysis.

Table 6: Regression Coefficient

Model 1	Un standardized Coefficients		Standardized Coefficients	T-value	P-value
	B	Std. Error	Beta		
Constant	0.466	0.337		1.383	0.051
1. System quality	0.461	0.098	0.401	4.704	0.000
2. Information quality	0.151	0.078	0.228	1.936	0.001
4. Service quality	0.213	0.033	0.218	6.455	0.000

a. Dependent variable: Preference of online learning

The regression coefficient (see Table 6) shows that there is a positive linear relationship between the independent variables (System quality, Information quality and Service quality) with the dependent variable (preference of students toward the online learning). An increase in System quality, Information quality and Service quality by one unit would increase preference of students toward the online learning by 0.461, 0.151 and 0.213 respectively.
The regression equation is given by:

Preference of online learning = 0.466 + 0.461 system quality + 0.151 information quality + 0.213 service quality.

The results also indicate all the independent variables (System quality, Information quality and Service quality) are all statistically significant at 5% level of significant in determining the preference of students toward the online learning as shown by their respective p-values of 0.000, 0.001 and 0.000

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Table 7: Analysis of Variance [PLEASE COMPLETE THE TITLE OF THE TABLE]

Model	Source	Sum of Squares	D.F	Mean square	F	Sig.
1	Regression	42.875	3	14.292	11.6006	0.000
	Residual	8.621	7	1.232		
	Total	51.496	10			

a. *Predictors: (Constant), system quality, information quality and service quality*
b. *Dependent variable: Preference of online learning*

Analysis of variance (ANOVA) test revealed an F-value of 11.6006 and a P-value of 0.000. As observed, the P-value is far less than the alpha level ($\propto_{0.05}$) thus implying that the independent variables contributed significantly to the variations in the dependent variables. That is the overall model is statistically significant. We can therefore say that system quality, information quality and service qualityreally influence preference of students toward the online learning at 5% level of significance. (See Table 7).

Table 8: Summary of Regression Model [PLEASE COMPLETE THE TITLE OF THE TABLE]

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.717 (a)	0.723	0.701	0.1214

Predictors: (Constant), system quality, information quality and service quality

Results from Table 8, show that system quality, information quality and service quality accounted for 72% (R Square, 0.723) of the total variation in preference of students toward ~~the~~ online learning. Hence, we can say that system quality, information quality and service quality have a great impact on ~~student's~~students' preference ~~on~~ foronline learning.

4. CONCLUSIONAND RECOMMENDATION

According to the study's findings, the majority of students solely use their mobile phones for online learning, which is not the most efficient method. Although it makes materials easily accessible, the online learning system's functionality is not very trustworthy. According to the study, students have a favorable opinion of the system quality of the online learning model and are generally satisfied with it. The study's findings indicated that the little information the online learning system does provide is extremely accurate, but that neither the information nor the quality of the information it does provide is current, complete, or tailored to students' requirements. The study also shows that the online earning system offers pupils high-quality services. Students' preferences for online learning are positively correlated with system quality, information quality, and service quality. At a 5% level of significance, the whole model is statistically significant. In other words, system quality, information quality, and service quality all positively affect students' choices for online learning, with system quality, information quality, and service quality accounting for around 72% of the overall difference in students' preferences for online learning. The study also showed that neither a student's gender nor class had any bearing on the favorable association between their perceived quality and desire for online learning. The modified DeLone and McLean information systems success model can be applied to students' online learning, according to the research.

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It is advised that the management of tertiary institutions take all necessary steps to raise the caliber of online education because students' perceptions of that education's quality influence their desire for it. By doing this, educators can support students' decision to use an online learning approach in place of or in addition to face-to-face instruction during and after the COVID-19 pandemic. The policy for online learning in Ghana must be included by those who oversee tertiary education. This ought to cover the rules governing the internet and the system infrastructure that will support high-quality online education. In order to provide the finest online learning environment for students, teachers should take advantage of the current learning environment to upgrade their skills in electronic-based instructional facilities.

The study has some limitations. First, the results beg for generalization due to the convenient sampling method utilized to get the data. Future research can employ stricter sampling techniques to make the results more broadly applicable. Second, only technical universities were utilized, even if other educational institutions were impacted by the move to online learning. This indicates that generalizing the findings of the present study to educational institutions and online learning would be problematic. Other institutions, such as traditional universities, colleges of education, private universities, and non-tertiary education, may be included in future studies.

Finally, although the updated DeLone and McLean information systems success model was used in this study to measure perceived quality, other methods, such as the e-TailQ scale, the E-S-Qual framework for service quality, or the E-RescS-Qual online recovery service quality scale, may be used in future research.

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