The Effect of Quality Antecedents on the Acceptance of Learning Management Systems: A case of two Private Universities in Nigeria

Mohammed Nasiru Yakubu
American University of Nigeria, Nigeria

ABSTRACT

Research has shown that the use of technology for teaching and learning can be beneficial to both learners and instructors. Unfortunately, there are only a few universities in Nigeria that have been able to implement the use of technology for learning purposes, resulting in too few studies that investigate the factors that contribute towards the acceptance of eLearning systems in Nigeria. In this study, we develop a conceptual model to examine the influence of three quality antecedents on the behavioral intention to use learning management systems (LMS) by Nigerian students. An online survey was used to capture the students' perception of instructor quality, course quality, and system quality in regard to the use of the LMS in their respective institutions. 378 usable responses were received, and through use of the structural equation modeling (SEM) technique, the responses were analyzed. Our findings indicated that of the four hypotheses tested, all of the hypothesized relationships were supported. Our research model accounted for 33% of the variance in the students' behavioral intention to use the LMS. The results of this study will be informative to administration and governing bodies that adopt an LMS and will be relevant and beneficial to students in Nigerian universities.

Keywords: *course quality, system quality, instructor quality, learning management systems, structural equation modeling, eLearning acceptance, Nigeria.*

INTRODUCTION

The pervasive use of learning management systems (LMS) in tertiary institutions has had profound effects on teaching practices and the engagement of students in the learning process. An LMS is a web-based system that incorporates an extensive range of pedagogical and course administration tools. The features facilitate access to education by reducing costs and providing a flexible mode of learning (Callan & Bowman, 2010; Garrison, 2011).

In Africa, Nigeria specifically, only a handful of higher education institutions have adopted the use of a LMS for teaching and learning purposes. The high cost of Internet access and Internet-ready devices were initially attributed to the low adoption of LMS, but now that the prices of Internet-ready devices (phones, tablets, and laptops) are affordable, universities have started to consider the use of LMS especially to facilitate distance learning. The implementation of distance learning in Nigerian universities is based on the need to address the shortage of spaces available for students in Nigerian universities. The shortage of spaces is because there is a limited number of universities available to support Nigerian undergraduate applicants. According to the main governing body of all Nigerian universities, the National University Commission (NUC), there are 173 universities, and as of 2015, these universities could only accept a total of approximately 411,032 students from 1,428,579 applicants (JAMB, 2016), leaving over one million applicants without an opporurtunity to be admitted to a university.

A Learning Management System can also be used in conventional universities as, "learning systems, to support face-to-face has been shown to improve teaching and learning processes" (Wagner, 2008). There is, therefore, a need to understand what factors contribute towards the

acceptance of a LMS. Access to, and the presence of LMS does not guarantee that instruction and learning processes will improve or that access to education will be enhanced, Bouhnik & Marcus (2006) have shown that certain factors can cause learners to be dissatisfied with using web-based learning systems such as an LMS. There are other motivating factors (organizational, cultural, and social factors) that will facilitate the acceptance of LMS. Thus there is a need to understand the factors that contribute to the behavioral intention of Nigerian students to accept and use LMS. Understanding these important factors is critical for the successful implementation of the LMS.

The purpose of this study is to investigate higher education students' behavioral intention of using an LMS in two private universities in Nigeria. The study employed responses from 378 students, selected from two established private universities, and tested them on our proposed model using the structural equation modeling (SEM) technique.

CONTEXTUAL BACKGROUND

A learning management system (LMS) is a web-based application used to manage and facilitate the delivery of eLearning courses (Freire *et al.*, 2012). It allows for access to content at any time and from anywhere using any Internet-ready device. Like most software applications, LMS's can be grouped based on availability and access to the source codes (that is, open-source versus proprietary) as well as how the application is hosted (that is, cloud versus local hosting). Some popular examples include Moodle, an open source LMS that can be hosted locally or on the cloud, Google classroom a cloud-based LMS and Blackboard Learn, which is a proprietary LMS.

As mentioned in the previous section, this study focuses on the acceptance of LMS by the students of two private universities in Nigeria: Baze University (BU) and American University of Nigeria (AUN). These two universities were selected for this research as they both have excellent technological infrastructure in comparison to other universities in Nigeria, specifically the government-owned universities. Also, they have consistently used LMS for teaching and learning for a considerable number of years, whereas 90% of Nigerian universities do not have the infrastructure in place to implement LMS. AUN has used Canvas for over ten years, where all courses are mandated to be hosted on the Canvas LMS for quality assurance assessment. BU initially used Moodle as their main LMS, but they have just recently introduced Google Classroom as an alternative to the instructors.

Most government offices are yet to incorporate the use of technology into their core processes (Olatokun, 2006); this includes government-owned educational institutions as well. As a result, traditional Nigerian universities are faced with numerous challenges, especially when one considers the continuous increase in the number of students in Nigerian universities (Kamba, 2009). Nigeria has the largest population in Africa and is ranked as having the seventh-largest population in the world, with one of the fastest-growing population rates (The World Bank, 2019). Unfortunately, infrastructure and development initiatives in Nigeria do not support this rising population, and as a result, the universities are faced with two major problems: 1) overcrowding in the universities and 2) a high rate of admission rejection. Classes, in Nigerian universities, can be as large as 250 students to a single instructor, without the use of technology to aid in instruction; the instructors are easily overwhelmed, and this results in several challenges in the teaching and learning process. Some of these challenges can be addressed through the use of LMS (technology). The LMS can assist instructors in several ways such as grading, plagiarism checking, access to learning resources, access to the instructor via online discussions, and improved monitoring for quality assurance.

With regard to the high rate of students being rejected for admission, every year, approximately one million admission seekers are unable to further their education as there are not enough universities to cater for these students (JAMB, 2016). One way to overcome this problem is by the use of distance learning centers (DLC). In Nigeria, DLCs are affiliated to universities to provide access to education to students in an unconventional format. Students do not need to attend classes; they only need to go to the centers to pick up their learning materials (usually physical books) and to sit their exams. DLC's can improve these processes by the use of LMS, which will help to reduce the dependency on physical infrastructure. A very good example is the National Open University of Nigeria (NOUN), which has the highest number of active students (over 500,000).

ELearning systems such as LMS have been shown to improve instruction and learning, but for this to happen, the LMS must be accepted by the users and certain social, organizational and cultural factors must be considered. Numerous studies have tried to understand the factors that contribute towards the acceptance of eLearning systems such as an LMS (Boateng et al., 2016; Cheng, 2012; Lwoga, 2014; Yakubu & Dasuki, 2018; Yakubu & Dasuki, 2018b). In Nigeria, these studies are limited due to the few institutions that have adopted an LMS. The few studies that have been carried out on the students acceptance of LMS in Nigeria have used theories such as the technology acceptance model (TAM) (Davis, 1989), the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) and the DeLone and McLean Information Systems Success Model (DeLone & McLean, 2003) as theoretical lenses to understand the factors responsible for the students behavioral intention to use the LMS. While these theories are good at explaining why students use eLearning systems such as LMS, the theories were designed to be generic and can be used for all types of technologies. For this reason, certain factors, in the context of eLearning, are not taken into consideration. eLearning factors such as course design, course content, and the instructor influence have been added to the previously mentioned theories (TAM and UTAUT) to explain better why students use an LMS. Unfortunately, and to the best of our knowledge, there has not been any study that has investigated these significant factors in the context of Nigerian students acceptance of learning management systems.

In this study, we develop a model that incorporates three important factors that have been shown to influence students behavioral intention to use LMS in developed countries. These factors are course quality, system quality, and instructor quality.

The next section discusses the research model and its associated hypotheses.

RESEARCH MODEL AND HYPOTHESES

As mentioned in the previous section, the three most widely used models in studies that investigate the students' acceptance of technology are TAM, UTAUT, and the DeLone and McLean IS success model. These models have been extended by adding new variables to suit the context of eLearning systems. Based on a previous study that examines the learning experiences of students in a Nigerian university (Yakubu et al., 2019), three main factors were identified as being significant in enhancing the students learning experience, the three factors are: 1) course quality, 2) system quality and 3) instructor quality.

All three factors have been defined and used in literature to explain the acceptance of eLearning systems such as LMS. This study embraces these definitions and hypothesizes that all three factors will significantly influence the behavioral intention of students to use the LMS adopted by their respective institutions.

Also, this study excludes the factors used in the previously stated models, as they have already been shown to contribute towards the acceptance of LMS by Nigerian students (Adewole-Odeshi, 2014; Ayodele et al., 2016; Yakubu & Dasuki, 2018; Yakubu & Dasuki, 2018b). Thus, constructs such as perceived ease of use, perceived usefulness, social influence, and facilitating conditions are excluded from this study. It can also be argued that some of these constructs are captured in the three factors used in the research model, that is, course quality, instructor quality, and system quality. For example, instructor quality captures the effect of an "important other" (social influence) on the students use of the LMS. Similarly, the system quality captures the usefulness and ease of using the system.

Figure 1 below illustrates the research model showing the constructs in the model as well as the hypothethical relationships between the constructs.
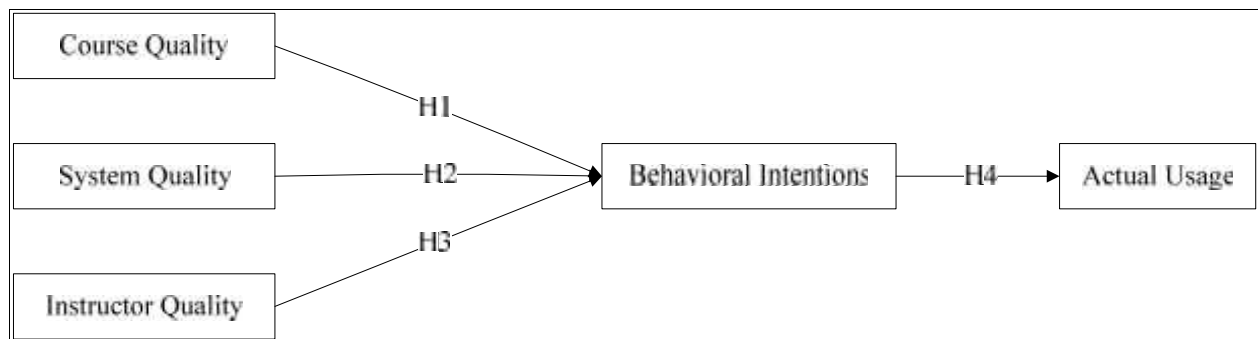

Figure1: Research Model

The hypotheses associated with this study are listed below:

Course Quality (CQ)

Information quality was identified as one of the success measures in the DeLone and McLean IS success model (DeLone & McLean, 2003). It is defined as the measure of the quality of an information system's output, which is usually in the form of reports. Information quality is measured based on "dimensions such as accuracy, completeness, currency, efficiency, relevance, scope, and timeliness of information" (Cheng, 2012). In the context of students' acceptance of LMS, the output that is of relevance to the students are the learning resources available from the course. So instead of reports, Cheng (2012) used course content quality (Choi et al., 2007; Lee et al., 2009) and course design quality (Liu et al., 2010) as a measure of information quality with regard to eLearning systems. "Course design quality includes both the content richness and update regularity of the resources in a course" (Lee et al., 2009), while course content quality is concerned with how the "content will prepare the learners to continue using the platform for learning activities" (Liu et al., 2010). In this study, we combine the design and content of the course to form course quality, which we define as the flexibility, richness, relevance, and currency of the course and its resources on the LMS.

If the students believe that the course quality is high, then it is expected that they will be more motivated to use the LMS. Thus we presume that:

> **H1:** *Course quality has a positive and significant effect on students' behavioral intention to use the LMS.*

System Quality (SQ)

System quality is also a construct used in the DeLone and McLean IS success model (DeLone & McLean, 1992; DeLone & McLean, 2003). In prior studies, based on the acceptance of eLearning systems, system quality has been defined as "a measure of the features of the LMS; these include ease of use, functionality, reliability, and efficiency" (Yakubu et al., 2019). In this study, we adopt this definition in corroboration with the software quality properties, as suggested by Jalote (2008). These qualities are usability, functionality, reliability, and efficiency. If the quality of the system (LMS) is high or meets the students' expectations, then they will be more inclined to use the system in comparison to an LMS that is not functional, reliable or efficient. Therefore we make the following proposition:

⟩ **H2:** *System quality has a positive and significant effect on students' behavioral intention to use the LMS.*

Instructor Quality (IQ)

The instructor is a "key person that is important to learners' behaviors in the e-learning process" (Cheng, 2012). A learners' attitude towards an e-learning system such as an LMS is dictated by the instructor's qualities (Ozkan & Koseler, 2009). Previous literature has shown that the acceptance of eLearning systems by students is influenced by the instructors' attitude (Cheng, 2012; Lwoga, 2014).

In measuring the attributes of the instructor, prior research has used qualities such as "instructor's response timeliness, teaching style, and explanation/help towards learners via the eLearning system" (Cheng, 2012). Thus, if the instructor is proficient in using the LMS for instruction, and promptly responds to students' needs on the LMS then it will be expected that the students will be more motivated to use the LMS, therefore we propose:

⟩ **H3***: Instructor quality has a positive and significant effect on students' behavioral intention to use the LMS.*

Behavioral Intention (BI)

The behavioral intention of an individual to use a specific technology has a significant influence on the actual usage of the technology (Venkatesh et al., 2003). This means that once the intention to use the LMS is formed, the students would be more likely to use it. The significant relationship between BI and actual usage in the context of eLearning systems has been established by prior literature (Tarhini et al., 2013; Yakubu & Dasuki, 2018). Thus we presume that:

⟩ **H4:** *The behavioral intention of students to use the LMS has a positive and significant effect on students' actual usage of the LMS.*

Actual Usage (AU)

Actual usage in this study measures the frequency of use and the dependence on the LMS by the students.

RESEARCH METHODOLOGY

As mentioned earlier, students from two private universities in Nigeria were selected to participate in this study. The universities are two of the most renowned private universities in Nigeria and are well known for being completely technology reliant, especially in the context of instruction and learning. Convenient sampling was the main method used to select registered students of the two universities.

An online questionnaire was designed using the Survey Monkey online tool, and a collection point was opened for three months. The questionnaire was designed to ensure anonymity and to prevent multiple responses (the use of IP addresses to ensure that the same device was not used to take part in the survey more than once). Also included in the survey was a consent form which 1) introduced the students to the study by stating the aims and objectives of the research, 2) mentioned the risks associated with participating in the research, and 3) listed the researcher's contact details in case the respondents required clarification on the survey questions. Furthermore, the students were informed that participation in the study was completely voluntary, and they could decide to end their participation at any time.

An email message was sent to all the students, via the students governing body, with the link to the survey as well as a short introduction to the researcher and the study. A reminder was sent every three weeks to solicit for responses.

The survey was divided into two sections. Section 1 was designed to capture the students' demographic characteristics as listed below:

- ⌡ Institution name
- ⌡ Age
- ⌡ Gender
- ⌡ Level of study (that is, undergraduate or postgraduate)
- ⌡ Experience in using the LMS (that is, over one year or under one year)
- ⌡ Training (that is, whether they were trained before the first use of the LMS).

The second section of the survey was used to capture student's responses to the five constructs used in the research model. This was achieved using a five-point Likert scale, where "1" represented "strongly agree" and 5 represented "strongly disagree". Table 1 below shows the measurement instruments used in section 2 of the survey.

The items for measurement instrument were adopted from prior research and were re-worded and modified to the context of this study.

A total of 402 responses were obtained from both institutions; 24 of these were deleted from the sample due to the presence of missing values. Missing data is problematic to analytical techniques such as structural equation modeling (Hair et al., 2010). As a result, the demographic information from 378 respondents was analyzed using the Statistical Package for Social Sciences (SPSS), version 21.

Table 1: *Items on the Measurement Instrument*

Construct	Code	Item	Source
System Quality	SQ1	The response time of the LMS system is reasonable	*Lwoga (2014)*
	SQ2	Overall, the LMS is highly reliable with minimal downtime	*Lwoga (2014)*
	SQ3	The layout of the LMS makes it easy to use	*Lwoga (2014)*
	SQ4	The LMS enables interactive communication between the instructor and learners	*Lwoga (2014)*
Course Quality	CQ1	The level of difficulty of using the learning content is appropriate	*Choi et al. (2007)*
	CQ2	The delivery schedule of the learning content is flexible	*Lee et al. (2009)*
	CQ3	The LMS can provide me with individualized learning management.	*Cheng (2012)*
	CQ4	The LMS often provides updated information.	*Lee (2006)*
	CQ5	The LMS provides me with sufficient learning content.	*Arbaugh (2000)*
Instructor Quality	IQ1	The instructor communicates well via the LMS	*Ozkan & Koseler (2009)*
	IQ2	The instructor's attitude is beneficial to my learning via the LMS	*Ozkan & Koseler (2009)*
	IQ3	The instructor promptly responds to me via the LMS.	*Ozkan & Koseler (2009)*
	IQ4	The instructor frequently updates resources for learners on the LMS	*Ozkan & Koseler (2009)*
	IQ5	The instructor is knowledgeable in using the LMS	*Ozkan & Koseler (2009)*
Behavioral Intentions	BI1	I intend to use the LMS this semester.	*Venkatesh et al.(2003)*
	BI2	I predict I will use the LMS next semester	*Venkatesh et al. (2003)*
	BI3	I plan to use the LMS frequently for my coursework	*Venkatesh et al. (2003)*
	BI4	When given a chance I will always try to use the LMS	*Venkatesh et al. (2003)*
Actual Usage	AU1	I use the LMS frequently	*Venkatesh et al. (2003)*
	AU2	I depend on the LMS for my studies	*Venkatesh et al. (2003)*
	AU3	I use many functions of the LMS***	*Venkatesh et al. (2003)*
		Note: *** deleted due to low factor loading.	

The Structural Equation Modeling (SEM) technique was used to analyze the data further using AMOS version 21.0 and the two-step approach, as recommended by Hair et al., (2010). First, Confirmatory Factor Analysis (CFA) was used to perform reliability and validity tests of the measurement model, and then the structural model was used to analyze the relationships hypothesized in the conceptual model.

RESULTS ANALYSIS

Demographic Information

Table 2 below shows the demographic information of the students that participated in this study. With regard to age group, 212 students (56.1%) were below 25 years of age, while the remaining 166 students (43.9%) were over 25 years old. The majority of the students were male (61.1%) while 38.9 percent were female. As a higher percentage of the students were under the age of 25, it was expected that the students would be mainly undergraduates. A total of 321 students (84.8%) were undergraduates, and only 57 students (15.1%) that participated in the study were graduate students.

To understand if experience or training before use, influenced the student's behavioral intention to use the LMS, they were asked how long they had used the LMS and also if they had prior training on the LMS before using the system. A total of 224 students (59.3%) claimed to have used the LMS for under one year while 154 students (40.7%) stated that they had used the LMS for over one year. This indicates that the majority of the students were not experienced users of the LMS. Also, the majority of the students (65.6%) did not have any training before using the system, while the remaining 34.4% of students were trained on using the LMS.

From the 378 respondents, 198 were from the American University of Nigeria (AUN) while the other 180 were from Baze University.

Table 2: Demographic Characteristics of the Respondents

Demographic Characteristic		Frequency	Percentage
Age	Under 25	212	56.1%
	Over 25	166	43.9%
Gender	Male	231	61.1%
	Female	147	38.9%
Educational Level	Undergraduate	321	84.9%
	Postgraduate	57	15.1%
Length of LMS Usage	Under 1 Year	224	59.3%
	Over 1 Year	154	40.7%
Training before use of the LMS	Prior Training	130	34.4%
	No Training	248	65.6%

The means and standard deviations were computed for each of the constructs and are shown in Table 3 below. The mean values indicate that the majority of the responses were positive, that is, agree or strongly agree, and the standard deviations indicate a very low spread of the responses.

Table 3: Descriptive analysis of the constructs

Construct	No of Items	Mean	SD	Cronbach's alpha
IQ	5	1.58	0.619	0.894
CQ	5	1.36	0.547	0.888
BI	4	1.50	0.782	0.878
SQ	4	1.44	0.469	0.811
AU	3	1.31	0.546	0.847

Reliability and Validity

Reliability tests are required to ensure the internal consistency of the items that represent each factor used in our research model while validity is a measure of the extent to which the analysis of the results of a test is guaranteed. In our study, we used Cronbach's alpha coefficients for each of the constructs to establish internal consistency. Table 3 shows that the Cronbach's alpha coefficients for all the constructs are above 0.8. The recommended value, according to the literature, should be above 0.7 (Nunnally, 1978) and values within the range of 0.8 and 0.9 are considered to be good, (George & Mallery, 2003).

After the internal consistency of the measurement items was established, composite reliability (CR) values for each construct was measured to confirm their reliability. As indicated in Table 4, all the constructs have a CR that exceeds the recommended value of 0.7 (Hair et al., 2010). Convergent and discriminant validity were established using the following values: the average variance extracted (AVE), the MSV (maximum shared variance), and the ASV (average shared variance). Convergent validity for each construct is established when AVE is over 0.5 and less than its corresponding CR value (Hair et al., 2010). For divergent validity, the MSV and ASV values must be lower than their respective AVE values, and the square root of the AVE should be higher than the correlation value of the corresponding construct (Bagozzi & Yi, 1988; Hair et al., 2010). Based on these requirements, both convergent and divergent validity are supported in this study.

Table 4: Construct reliability, convergent validity, divergent validity, and the factor correlation matrix

	CR	AVE	MSV	ASV	IQ	BI	SQ	CQ	AU
IQ	0.822	0.607	0.092	0.05	**0.779**				
BI	0.882	0.653	0.198	0.14	0.238	**0.808**			
SQ	0.824	0.551	0.151	0.05	-0.061	0.388	**0.742**		
CQ	0.810	0.517	0.198	0.09	0.169	0.445	0.224	**0.719**	
AU	0.854	0.745	0.137	0.08	0.303	0.370	0.120	0.253	**0.863**

Measurement and Structural Model

A two-step approach, as recommended by Kline (2015), was adopted in this study. For structural equation modeling techniques, it is important to confirm a good fit of the data for both the measurement model as well as the structural model. Thus a goodness-of-fit test was applied using

the recommended indices and values shown in Table 5. To make certain that the data fits the model, three of the measurement items, IQ2, IQ5, and CQ1, were removed from the instructor quality and course quality constructs, respectively. Also, the item AU3 was removed due to a factor loading of less than the 0.5 threshold as recommended by Hair et al., (2010).Table 5 shows the data fit the model as all the measured indices are within the recommended values (Hair et al., 2010; Kline, 2015).

Table 5: *Model Fit indices*

Fit Index	Recommended Value	Measurement Model	Structural Model
Chi Square	Non-significant at p <0.05	335.87	339.844
DF	n/a	142	145
CMIN/DF	< 5	2.365	2.344
CFI	> 0.90	0.95	0.95
GFI	> 0.90	0.91	0.91
AGFI	> 0.80	0.89	0.89
RMSEA	< 0.08	0.06	0.06
RMSR	< 0.10	0.02	0.02
NFI	> 0.90	0.91	0.91
PNFI	> 0.60	0.76	0.77

DF: Degree of Freedom; CFI: Comparative fit index, GFI: Goodness-of-fit index, AGFI: Adjusted goodness-of-fit; RMSEA: Root mean square error of approximation; RMSR: Root mean square residuals; NFI: Normed fit index; PNFI: Parsimony Normed Fit Index.

The structural model depicted in Figure 2 below was used to examine the hypothetical relationships discussed in the research model and hypotheses section. Table 5 illustrates the goodness of fit test applied to the structural model, showing that all the measured indices fall inside the recommended range of values.
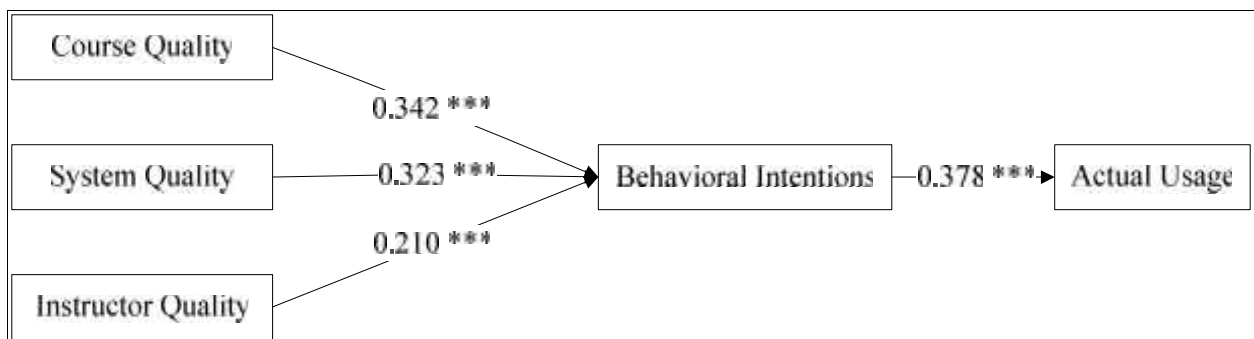

Figure 2: Structural model

The results from the hypotheses testing are shown in Table 6. A total of four hypotheses were tested out of which all four were supported. Figure 2 illustrates the standardized path coefficients for the constructs in the research model; it also shows the significance of each of the relationships. The results show that course quality has a positive and significant effect on the behavioral intention

of the students to use the LMS; thus, H1 was supported (= 0.342; p, 0.001). Of the three quality antecedents, course quality was observed to have the strongest effect on behavioral intention. There was also support for H2 (= 0.323; p, 0.001) indicating that system quality has a positive and significant effect on the students' behavioral intention to use the LMS, and system quality was observed to have the second-highest effect on behavioral intention. Table 6 and Figure 2 also show that instructor quality has a positive and significant effect on the students' behavioral intention to use the LMS (= 0.210; p, 0.001) supporting H3. H4 proposed a positive and significant effect of behavioral intention to use the LMS on the actual usage of the LMS; again, this relationship was supported (= 0.378; p, 0.001.

Table 6: *Results of the hypotheses testing*

Hypothesis	Path			Estimate	P	Significance
H1	CQ	→	BI	0.342	***	Supported
H2	SQ	→	BI	0.323	***	Supported
H3	IQ	→	BI	0.210	***	Supported
H4	BI	→	AU	0.378	***	Supported

Notes: (*** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10)
Estimate = standardized regression coefficient; P = significant level

DISCUSSION

The aim of this study was to examine the eLearning quality antecedents that cause students to accept and use learning management systems in two private Nigerian higher education institutions. Our results show that all three of the eLearning quality antecedents are positively and significantly related to students' behavioural intention to use the LMS' in their respective institutions. With regard to the relationship between course quality and behavioural intention, the results show that this construct has the strongest influence on the students' behavioural intention to use the LMS. Unfortunately, we cannot compare this result with other studies as, to the best of our knowledge; no other study has examined the direct relationship between CQ and BI. However, prior literature has shown that there is an indirect relationship between CQ and BI via the "perceived ease of use" and "perceived usefulness" constructs (Cheng, 2012). The positive and significant relationship between CQ and BI indicates that students in the two Nigerian private universities believe that the course hosted on the LMS is flexible and provides them with individual learning content. Also, the learning resources are up to date and relevant to their studies. To reinforce this belief, the quality assurance departments should continue to monitor and suggest improvements to the learning resources hosted on the LMS.

The system quality construct has the second strongest influence, in our conceptual model, on the students' behavioural intention to use the LMS. Consistent with the results from previous studies (Ramayah et al., 2010; Yakubu & Dasuki, 2018b), this study reveals that system quality has a positive and significant relationship with students behavioural intention to use the LMS. This result suggests that the reliability and response time of the LMS contribute toward the students' behavioural intention to use the LMS. Furthermore, the ease of using the LMS and the ability of the LMS to facilitate interactive communication between the instructor and learners are key factors that encourage the students to use the LMS. Thus LMS developers should ensure that the LMS is easy to use, reliable, and enables students to interact with their instructors and other students.

The instructor plays a vital role with regard to the students' use of the LMS and the results from the hypotheses testing shows that the instructor quality has a positive and significant effect on the students' behavioral intention to use the LMS. This means that the students believe that their instructors are knowledgeable in using the LMS. Also, the instructors' communication and responses via the LMS encourages the students to use the LMS. Prior research has shown that the instructor quality indirectly influences the behavioral intention of students to use eLearning systems; Cheng (2012) and Yakubu et al. (2019b) showed that instructor quality influenced students' perceived usefulness of an eLearning system which in turn influenced the intention to use the eLearning system. University administrators should ensure that adequate training is given to instructors on how to use the LMS effectively and efficiently to ensure that the students benefit from using the system.

Finally, there was support for the relationship between behavioral intention and actual usage. This means that the students' behavioral intention to use the LMS results in the actual use of the system. This finding is consistent with previous studies (Yakubu & Dasuki, 2018; Yakubu & Dasuki, 2018b).

CONCLUSION

This study developed a conceptual model based on the findings of prior research (Yakubu et al., 2019) to examine the eLearning factors that contribute toward acceptance of learning management systems by students of two private universities in Nigeria. The developed model comprised of five variables: course quality, system quality, instructor quality, behavioral intentions, and actual usage. The results indicate that two of the quality antecedents (instructor quality and system quality) were found to significantly predict the student's behavioral intention to use the LMS.

Furthermore, the students' behavioral intention to use the LMS was a key determinant of the students using the LMS. There was no support for the relationship between course quality and the students' behavioral intention to use the LMS. Understanding how these factors influence the use of LMS may help higher education institutions in sub-Saharan Africa, specifically Nigeria, to encourage the use of LMS for instructions and learning. Based on these findings, it is imperative that university administrators, instructors and university governing bodies, such as the NUC and the Tertiary Education Trust Fund (TETFund), consider these factors when deciding on adopting and implementing the use of LMS for instruction and learning.

LIMITATIONS AND FURTHER RESEARCH

There are several limitations identified in this study. The first limitation is that the study surveyed only students of two private universities and did not consider students at public universities. The reason for this, as mentioned earlier, is that the two institutions considered for this study have used the LMS for a total 16 years (in a mandatory setting) compared to the public institutions that are just beginning to implement the use of LMS. Secondly, the study excluded several factors such as attitude towards technology (Davis, 1989) and facilitating conditions (Venkatesh et al., 2003) that have been identified as factors that contribute towards the acceptance of technology. Thus, future research should take into consideration (as well as the factors used in this study) other factors that have been found to influence the acceptance of eLearning systems, for example, learning value (Ain et al., 2016). Third, the study is based purely on quantitative methods, and it is recommended that future research considers adopting either a qualitative or a mixed-method approach to produce a better understanding of the students' acceptance of LMS. Finally, 59.3% of the students that participated in this study have used the LMS for under one year. Considering that an individuals' perception will change over time as the individual gains experience (Venkatesh et al., 2003), longitudinal studies can be applied in future research to take into consideration how the students perceptions change as they gain more experience in using the system.

REFERENCES

Adewole-Odeshi, E. 2014. "Attitude of students towards e-learning in south-west Nigerian universities: An application of technology acceptance model".

Ain, N., Kaur, K. & Waheed, M. 2016." The influence of learning value on learning management system use: An extension of UTAUT2", *Information Development,* vol. 32, no 5, pp. 1306-1321.

Ayodele, S. O., Oga, O. E., Bundot, Y. G. & Ogbari, M. E. 2016. "*Role of power supply towards e-learning acceptance: VBSEM-AMOS",* Hatfield, IEEE, pp. 151-155.

Bagozzi, R. P. & Yi, Y. 1988. "On the Evaluation of Structural Equation Models", *Journal of the Academy of Marketing Science,* vol. 16, no 1, pp. 74-94.

Boateng, R, Mbrokoh, AS, Boateng, L, Senyo, PK & Ansong, E. 2016. "Determinants of e-learning adoption among students of developing countries", *The International Journal of Information and Learning Technology,* vol. 33, no. 4, pp. 248-262.

Bouhnik, D. & Marcus, T. 2006. "Interaction in distance-learning courses", *Journal of the American Society for Information Science and Technology,* vol. 57, pp. 299-305.

Callan, V. & Bowman, K. 2010. "*Sustaining E-learning Innovations: A review of the evidence and future directions",* Canberra: The Australian Flexible Learning Framework, DEEWR, Commonwealth of Australia.

Cheng, Y. M. 2012. "Effects of quality antecedents on e-learning acceptance", *Internet Research,* vol. 22, no. 3, pp. 361-390.

Choi, D. H., Kim, J. & Kim, S. H. 2007. "ERP training with a web-based electronic learning system: the flow theory perspective", *International Journal of Human-Computer Studies,* vol. 65, no. 3, pp. 223-243.

Davis, F. 1989. "Perceived Usefulness, Perceived Ease of Use, and Acceptance of Information Technology", *MIS Quarterly,* pp. 319-340.

DeLone, W. H. & McLean, E. R. 1992. "Information systems success: The quest for the dependent variable", *Information systems research,* vol. 3, no. 1, pp. 60-95.

DeLone, W. H. & McLean, E. R. 2003. "The DeLone and McLean model of information systems success: a ten-year update", *Journal of management information systems,* vol.19, no. 4, pp. 9-30.

Freire, L. L., Arezes, P. M. & Campos, J. C. 2012. "A literature review about usability evaluation methods for e-learning platforms. Work", *A Journal of Prevention, Assessment and Rehabilitation,* vol. 41, pp. 1038-1044.

Garrison, D. R. 2011. "*E-learning in the 21st century: A framework for research and practice",* Routledge.

George, D. & Mallery, P. 2003. "*SPSS for Windows step by step: A simple guide and reference",* Boston: Allyn and Bacon.

Hair, J. F. J., Black, W. C., Babin, B. J., Anderson, R. E. & Tatham, R. L. 2010. "*Multivariate data analysis",* Upper Saddle River, NJ: Prentice Hall.

Jalote, P. 2008. "*A concise introduction to software engineering",* London: Springer-Verlag.

JAMB, 2016. "*Statistics 2010-2016",* [Online]
Available at: https://www.jamb.gov.ng/Statistics.aspx

Kamba, M. 2009. "Problems, challenges and benefits of implementing e-learning in Nigerian universities: An empirical study", *International Journal of Emerging Technologies in Learning,* vol. 4, no. 1, pp. 66-69.

Kline, R. B. 2015. "*Principles and Practice of Structural Equation Modeling",* New York, NY:Guilford publications.

Lee, B. C., Yoon, J. O. & Lee, I. 2009. "Learners' acceptance of e-learning in South Korea: Theories and results", *Computers & Education,* vol. 53, no. 4, pp. 1320-1329.

Lee, Y. C. 2006. "An empirical investigation into factors influencing the adoption of an e-learning system", *Online information review,* vol. 30, no. 5, pp. 517-541.

Liu, I. F., Chen Meng Chang, Sun Yeali S., Wible, D., Kuo, Chin-Hwa. 2010. "Extending the TAM model to explore the factors that affect Intention to Use an Online Learning Community", *Computers & Education,* vol. 54, no. 2, pp. 600-620.

Lwoga, E. T. 2014. "Critical Success Factors for the Adoption of Web-Based Learning Management Systems in Tanzania", *Internationa Journal of Education and Development using Information and Communication Technology,* vol. 10, no. 1, pp. 4-21.

Nunnally, J. 1978. "*Psychometric Theory",* New York: McGraw-Hill.

Olatokun, W. M. 2006. "National Information Technology Policy in Nigeria: Prospects, Challenges and a Framework for Implementation", *African Journal of Library Archives & Information Science,* vol. 16, no 1.

Ozkan, S. & Koseler, R. 2009. "Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation", *Computers & Education,* vol. 53, no. 4, pp. 1285-1296.

Ramayah, T., Ahmad, N. H. & Lo, M. C. 2010. "The role of quality factors in intention to continue using an e-learning system in Malaysia", *Procedia-Social and Behavioral Sciences,* vol. 2, no. 2, pp. 5422-5426.

Tarhini, A., Hone, K. S. & Liu, X. 2013. "Factors affecting students' acceptance of e-learning environments in developing countries: A structural equation modeling approach", *International Journal of Information and Education Technology,* vol.3, no. 1.

The World Bank, 2019. "*The World Bank: Data",* [Online]
Available at: https://data.worldbank.org/indicator/SP.POP.TOTL

Venkatesh, V., Davis, M. M. & Davis, F. D. 2003. "User acceptance of information technology: Toward a unified view", *MIS quarterly,* pp. 425-478.

Wagner, E. D. 2008. "*Minding the Gap: Sustaining eLearning Innovation",* Las Vegas, Nevada, USA, AACE.

Yakubu, M. N. & Dasuki, S. I. 2018b. "Assessing ELearning Systems Success in Nigeria: An Application of the DeLone and McLean Information Systems Success Model", *Journal of Information Technology Education: Research,* vol. 17, pp. 183-203.

Yakubu, M. N. & Dasuki, S. I. 2018. "Factors Affecting the Adoption of eLearning Technologies among Higher Education Students in Nigeria: A Structural Equation Modeling Approach", *Information Development.*

Yakubu, M. N., Kah, M. O. & Dasuki, S. I. 2019. "Students' Acceptance of Learning Management Systems: A Case of the National Open University of Nigeria", In: *Sustainable ICT, Education and Learning,* s.l.:Springer.

Yakubu, M. N., Kah, M. O., Dasuki, S. I. & Quaye, A. 2019. "*Learning Management Systems: The Nigerian Students Experience".* Swaziland, s.n., pp. 181 – 190.

_____