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REASONS FOR POOR ACCEPTANCE OF WEB-BASED LEARNING USING AN LMS AND VLE IN GHANA

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ABSTRACT

Aim/Purpose	This study investigates the factors that affect the post implementation success of a web-based learning management system at the University of Professional Studies, Accra (UPSA).
Background	UPSA implemented an LMS to blend Web-based learning environment with the traditional methods of education to enable working students to acquire education.
Methodology	An explanatory sequential mixed method was adopted, under the pragmatic paradigm, to investigate the level of acceptance of web-based learning by students. The effects of perceived usefulness, perceived ease of use, and other social factors were investigated. In all, 4500 final and third-year undergraduate students of UPSA made up the population. A sample size of 870 was used for this study.
Contribution	This paper contributes to the body of knowledge by identifying the factors that hinder post-implementation of LMS at the tertiary level in Ghana and adds to the general literature available.
Findings	The level of acceptance of LMS seems very low due to poor IT infrastructure, inadequate training, and the relevance of the system to quality lecture delivery. However, students' intention to use LMS and the usefulness of LMS were perceived to be high, especially among students in higher levels.

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Recommendations for Practitioners	The authors recommend that IT infrastructure, especially reliable and fast internet connectivity, and adequate training should be provided.
Recommendation for Researchers	Further research should be done to confirm if the provision of a more reliable internet system will boost students' internet proficiency, which in turn will improve their utilisation of the LMS.
Impact on Society	Help create awareness of schooling while pursuing a career and also improve interactions between students and lecturers. It will also improve enrolment and possibly reduce the cost of education in the long-run.
Future Research	Researchers can look at the possibility of implementing total virtual learning systems at the tertiary level in Ghana.
Keywords	web-based learning, information system, information technology, IT infrastructure, web-based learning management system, Moodle

INTRODUCTION

The adoption of web-based learning management systems in higher education has resulted in a new teaching approach globally for over a decade (Piña, 2012). Teaching and learning have taken a new dimension as teachers in tertiary educational institutions across the globe have taken advantage of information technology innovations to deliver lessons and fulfil other important roles as teachers to their students. Georgouli, Skalkidis, and Guerreiro (2008) believe that, notwithstanding the effectiveness of the traditional lecture-style of an institutional method of delivery, the new innovation of using a web-based learning management system is gaining popularity in tertiary institutions.

The paradigm shift in the way education is viewed and delivered through a combination of traditional lecture-style and web-based learning approaches is attributed to a knowledge-based economy (Obisat, Airawashdeh, Altarawneh, & Altarawneh, 2013). Obisat et al. (2013) emphasize that the complexity of the rate of IT innovations in organizations has fueled the demand for web-based learning, since most of the working class would like to keep their work while schooling. An online learning management system provides for two major uses. The first is to use it for distance web-based learning and, secondly, to use it to supplement in-class lectures where lecture notes, assignments, course outline, slides, and videos are posted on the internet. According to OECD (2005) the internet then also became a platform for conducting multiple choice and true or false tests/examinations(Georgouli et al., 2008). Coates, James, and Baldwin (2005) define online management systems as enterprise-wide and internet-based systems, such as the Modular Object-Oriented Dynamic Learning Environment (MOODLE) and Google Classroom, that integrate a wide range of pedagogical and course administration tools, thereby creating a virtual learning environment where students can access teaching and learning materials, participate in class discussions, and take part in class tests/examinations. They further state that these systems now permeate universities around the world, increasing the virtual dimension of most traditional campus-based institutions.

The shift from an industrial to a knowledge-based economy is increasing the competitive level in businesses through rapid technological changes. This trend has also led to a shortening of business process life cycles, a migration towards integration and the extended enterprise as prominent contributors to the web-based learning value chain (Obisat et al., 2013). There is empirical evidence that some of the core activities that enhance effective academic work in the traditional teaching and learning environments of higher institutions of learning, like group discussion, lecture presentation, class test, assignment submission, feedback, and grading, are easily implemented in a Virtual Learning Environment (VLE). This can be achieved with tools such as Moodle, WebCT, or Blackboard (Ahmad, Edwards, & Tomkinson, 2006; Hong & Walker, 2015).

Web-based learning systems are also implemented in institutions of higher learning to gain competitive advantage resulting in increased enrolment, quicker delivery of teaching and learning materials,

faster assessment of students' performance, and many other advantages that fuel the adoption of web-based learning globally (Maina & Nzuki, 2015). However, the adoption of web-based learning management systems is confronted with various challenges, such as inadequate training of lecturers and students, high cost of technology, poor decisions, poor IT infrastructure, and the absence of business and Information Systems strategies in developing countries (Maina & Nzuki, 2015). A significant number of African Universities including the University of Professional Studies of Accra (UPSA) are blending the environments of Web-based learning management systems with the traditional methods of lecturing to provide students with both online and face-to-face learning. This enables working students to obtain their education in parallel with pursuing their personal goals as they are not always restricted to the lecture halls and can therefore utilize the available time for their own careers.

UPSA is among the few public universities in Ghana that have introduced a web-based learning management system in addition to the traditional classroom teaching approach in the last decade. The Kwame Nkrumah University of Science and Technology, the University of Education, Winneba, and the Ghana Technology University College (GTUC) are among the few universities in Ghana that have implemented and adopted e-learning systems as a strategic tool for managing the growing number of students accessing tertiary education in the country in recent years (Marfo & Okine, 2010).

UPSA commissioned a five-member e-learning project implementation team who, in collaboration with the Information Services and Technology Directorate (ISTD) of the university, selected an open-source e-learning management system called "Moodle" for the university's e-learning LMS. Lecturers and students were taken through a series of training in the second semester of the 2012/2013 academic year after the Moodle e-learning was successfully configured to suit the requirements of the university. During the first semester of the 2013/2014 academic year, management ensured that newly employed lecturers, who were successfully trained in the previous semester, demonstrated their ability to use the system before they were confirmed as full-time lecturers.

UPSA implemented the Moodle learning management system to blend with the traditional style (approach) of teaching and learning. A study done by Adjin-Tettey (2014) concludes that students of the university are generally aware of the system and have accepted it. However, it appears that the usage of the system declined for the last two years due to a number of factors. This study intends to investigate the factors that are impeding the adoption of the system. In addition to the Moodle, the university has the Skillsoft Books24x7 digital library to cater for all programmes run by the university. No medium is blocked in the university nor in the country as a whole.

The following sections in this paper will discuss the objectives, research questions and hypotheses of the study. Next, the theoretical model guiding the study and a review of the literature is followed by the methodology of the research. A section on the analyses and discussions of the findings is followed by a summary of the findings and finally a concluding section ends the paper.

OBJECTIVES OF THE RESEARCH

The main objective of this study is to investigate the factors affecting post implementation success of a web-based learning management system at UPSA. In order to achieve the general objective for this study, the following specific objectives will guide the study:

- To analyse the relationship of university students' intention to use e-learning constructs such as attitude, perceived usefulness, perceived ease of use, personal computer (PC) and internet proficiency, subjective norm, and experience
- To examine students' interactions on LMS
- To identify post implementation factors that hinder successful adoption of LMS

The first objective was used to develop a general linear model of web-based learning acceptance and usage of university students. The remaining two objectives were used to determine some descriptive characteristics of web-based learning use and to help in setting patterns for the selected constructs.

RESEARCH QUESTIONS

Research questions in a study form the bases of the hypotheses and the study objectives. These research questions were generated after a review of the literature to enable achievement of the objectives and hypotheses of the research. The research questions underlying this study are:

1. What is the level of acceptance of an online learning system by students in higher education?
2. What are the factors that impact post-implementation usage of a web-based learning system in higher education?
3. What are the post implementation factors that may be hindering the successful adoption of web-based learning in higher education institutions in Ghana?

RESEARCH HYPOTHESES

Four main hypotheses were constructed and tested to make statistical inferences about the population parameters based on the sample data collected. These hypotheses were developed using the research questions stated above. Furthermore, they in turn guided and informed the research objectives that the research sought to achieve as well as informed the type of research design for the study.

H1: University students' behavioural intention to use e-learning is affected by their Attitude ($H1_1$), Perceived Usefulness ($H1_2$), Perceived Ease of Use ($H1_3$), PC & Internet Proficiency ($H1_4$), Subjective Norm ($H1_5$), and Experience ($H1_6$).

H2: University students' e-learning attitude is affected by their Perceived Usefulness ($H2_1$), Perceived Ease of Use ($H2_2$), PC & Internet Proficiency ($H2_3$), Subjective Norm ($H2_4$), and Experience ($H2_5$).

H3: University students' perceived usefulness of e-learning is affected by their Perceived Ease of Use ($H3_1$), PC & Internet Proficiency ($H3_2$), Subjective Norm ($H3_3$), and Experience ($H3_4$).

H4: University students' Perceived Ease of Use of e-learning is affected by their PC & Internet Proficiency ($H4_1$), Subjective Norm ($H4_2$), and Experience ($H4_3$).

LITERATURE REVIEW AND THEORETICAL MODEL (TAM)

Institutions of higher learning are becoming innovative to increase enrolment through cost effective approaches by preparing students for virtual learning to replace conventional education at both the undergraduate and graduate levels. This is to meet the growing need for higher education globally. There is widespread assumption that when students and faculty are exposed to online learning systems early in their academic life, they will be more successful online learners and instructors respectively (Aldosari & Mekheimer, 2013; Volery & Lord, 2000). Information systems researchers and practitioners continue to call for caution in the hurried adoption of information technology, even though there exist several benefits of the web-based learning systems. It is argued that a hurried adoption of technology can create a hurdle for faculty and students who lack the necessary skills, experiences, and expertise to function successfully (O'Neill, Singh, & O'Donoghue, 2004).

According to Paulsen (2002), the concept of a learning management system is broad and covers a wide range of systems used to organize and provide access to online learning services for students,

teachers, and administrators. LMS enables access control, provision of learning content, communication tools, and organizations of user groups.

According to Phillipo and Krongard (2012, p. 1), "A learning management system is the 'great enabler' of many current and future education initiatives, such as personalized learning, learner-centered decision making, staff productivity, and curriculum development in support of Common Core State Standards".

LMSs not only enable online and face-to-face education but also provide opportunities for extensive research on users of the system in terms of their behavior (Firat, 2016). Since the early 1990s when LMSs were first introduced onto the market, demand from both learners and instructors for platforms that will connect and increase contact hours resulted in a high explosion of electronic learning management systems developed to meet that demand. The systems that were developed received various labels such as Course Management Systems (CMS), Learning Management Systems (LMS), Virtual Learning Environment (VLE), and more recently, Personal Learning Environments (PLE) (Zaharias & Pappas, 2016).

Although LMSs are not a completely new concept in the world, they received quick acceptance and have gone through rapid evolution. This evolution started with the introduction of the computer and the internet in the late 20th Century (Oxagile, 2016). Oxagile (2016) traces the history of LMSs as follows. The 1970s saw LMSs being used for classroom registration and administration. The 1980s introduced Computer-Based CD Training. The first real LMS was by SoftArc called FirstClass, started in the 1990s when LMSs were used as Web-Learning & On-demand Learning systems. FirstClass is still used by the United Kingdom's Open University to deliver online learning across Europe. CourseInfo developed the first LMS with a relational MySQL database called the Interactive Learning Network in 1997. This was followed by the first open-source LMS in 2002, MOODLE, which is still the most popular open-source LMS available online. In 2004, Shareable Content Object Reference Model (SCORM) came to establish the standards for many current LMSs. In 2005, multimedia was included in LMSs with online video becoming very important in LMSs. In the same year, NACON Consulting enabled users to learn with only a web browser with the introduction of VirtualOnDemand. Eucalyptus was introduced in 2008 as the first Cloud-Based Open-Source LMS. In the 2010s, LMSs enabled learning anytime, anywhere. In 2012, Modern SaaS LMS was developed to take advantage of cloud-based technology, as well as applications that supported delivery to mobile devices using WiFi. SCORM's next generation was released under the name Experience API (or Tin Can API) in 2013 as version 1.0.0.

An LMS is different from other computer-based education systems due to its systemic nature. An LMS has different components which are well-integrated to provide the structure that handles all aspects of the learning process (Watson & Watson, 2007). Hence Szabo and Flesher (2002) describe LMS as the set-up that enables the delivery and management of instructional content, identifying and assessing individual and organizational learning or training goals to track progress towards the meeting of such goals, and also collecting and presenting data for supervising the learning process of an organization as a whole. An LMS provides for content management, course authoring, and also handles the registration for courses, course administration, skills gap analysis, tracking, reporting, and emphasizes communication and collaboration features (Gilhooly, 2001; Gottipati & Shankararaman, 2016).

Gottipati and Shankararaman (2016) assert that most LMSs are rather faculty or management focused with limited focus on the student and so may provide limited features for the management of competency tracking in relation to student progression. They further noted that even though assessments provide a means to track students' progress, they are laborious; hence, students' self-assessment of competence can be a more practical approach to track progression.

Selection Criteria for LMS Systems

According to Claar, Dias, and Shields (2014) and Ellis (2009) well organized higher academic institutions that intend to select an LMS, must carefully choose one that will be able to perform six main activities. They lists these six main features of LMSs as the following: Centralized and automated administration; Use self-service and self-guided services; Assemble and deliver learning content rapidly; Consolidate training initiatives on a scalable web-based platform; Support portability and standards; and Personalize content and enable knowledge reuse.

Salmeron (2009, p. 277), used a Fuzzy Cognitive Map (FCM) to model Critical Success Factors (CSFs) for LMS selection. He argues that the ten critical success factors for LMS selection are "asynchronous and synchronous communication tools, usability, content structure, standards compliance, cost, easy maintenance, students' attitude, assignments, and multimedia."

Chaubey and Bhattacharya (2015) discuss a number of features that an LMS should possess to be useful in a fast-paced technological society. They identified interactivity, the provision to connect learning objectives with content, instruction, and assessment, tracking of progress, and incorporating with legacy systems as important features that an LMS should have. The researchers believe that the security of an LMS should not be taken for granted since any security breach will expose the entire system to attack and, therefore, would recommend a robust security feature as the seventh feature.

Dahlstrom, Brooks, and Bichsel (2014) combining findings from three sources of about 800 educational institutions, 17,000 faculty and 75,000 students from their 2013 and 2014 EDUCAUSE survey to provide a multidimensional perspective on the status and future of LMS in higher education came out with interesting findings. According to them, whilst both faculty and students value the LMS as an enhancement to their teaching and learning experiences, only few use the advance features and even fewer use these systems to their fullest capacity. They also noted that user satisfaction is highest for the basic LMS features and lowest for features designed to foster collaboration and engagement (p. 4). Furthermore, both faculty and students believe they could be more effective users if they were more skilled at using the LMS. Again, they assert that the general digital literacy skills and experiences level may be high, they are not necessarily transferred to institutional-specific technology systems such as LMS.

For higher academic institutions that intend deploying an LMS system, Ash (2013) proposes an online learning management systems implementation guide that require the institutions to:

- determine the overall teaching and learning structure of the organisation, and identify what is needed from an LMS to meet these goals. There should also be the need to identify the institutional strategy for the academic programmes and the assurance that the LMS strategy is linked to course content and to devices that students will be using to access the materials with;
- include a mix of various college or university stakeholders in decision process. Pearlson and Saunders (2009) suggested that the decision making processes for the implementation of an LMS should not be left in the hands of only IT experts but should include lecturers, academic affairs officers, quality control officers, procurement officers, and many others who understand the business of quality teaching and learning. The institution must also decide on whether to acquire a license for a commercial off-the-shelf LMS or for open source software;
- participate in LMS demonstrations by organizations and be interactive in these demonstrations. They should ensure that online demonstrations are executed to enable potential users to ask relevant questions that will help to improve the system;
- if possible, pilot the LMS first. This can provide a helpful feedback which may assist fine-tune the system;
- talk to other schools using the system;

- evaluate total cost of ownership, including initial price, licensing fee, professional development, support, repair, maintenance, hosting fees, and any network upgrades or hardware.

Technology Acceptance Model (TAM)

According to Al-alak and Alnawas (2011), the technology acceptance model (TAM) was proposed by Davis (1989) which is seen as an influential extension of the theory of reasoned action (TRA) to understand behavior and predict outcomes. Fishbein and Ajzen originally proposed the TRA in 1975. Davis' Technology Acceptance Model is grounded on the fact that people's behavioral intention to accept and really utilize a specific IT innovation is influenced by two constructs, namely, perceived usefulness and perceived ease of use (Al-alak & Alnawas, 2011; S. Y. Park, 2009). In addition, user's attitude and belief as proposed by TAM is observed to be a vital determinant that affects the utilization of new information technology. Individuals who have positive attitudes toward technological innovations have a high tendency to accept web-based learning management systems, contrarily to individuals who have negative attitudes toward that innovation (Claar et al., 2014). According to these researchers, TAM suggests that external variables affect users' intention and actual use, which are also affected by perceived usefulness and perceived ease of use.

According to S. Y. Park (2009), TAM as a model has been examined by several researchers to explain how people adopt and use web-based learning, but it was Selim (2003) who proposed investigating TAM with web-based learning. He also proposed the course website acceptance model (CWAM) and tested the relationship amongst perceived usefulness, perceived ease of use, and intention to use with university students using the structural equation modeling techniques of the Linear Structural Relations (LISREL) program. According to Selim (2003), it is presumed that the model fits the gathered information and that the usefulness and ease of use ended up being great determinants of the acceptance and utilization of a course website as a viable and effective learning technology.

Ignatius and Ramayah (2005) perceived that usefulness can be defined as the degree to which a university student thinks utilizing web-based learning will support his or her learning. They argued further that, although TAM was powerful in predicting and explaining technology acceptance, it lacks users' precise positions on a particular technology. According to Venkatesh and Davis (2000), TAM has evolved over a period of time and as a result extensions have been made to explain perceived usefulness and usage intentions, which includes social influence (subjective norm, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience. TAM2 therefore is an extension of the original model meant to explain perceived usefulness and usage intentions with social influence (subjective norm, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience. S. Y. Park (2009) conducted research using TAM with undergraduate students (N=628) using web-based learning courses and found that the modified, three-factor model was a good fit for the data. Researchers discovered that the outcome of the new model showed a higher proportion of 60 percent of user adoption using the updated version of TAM. The researchers therefore adopted both the new model and original models of TAM to conduct confirmatory analyses on earlier research activities.

J. Y. Park and Mills (2014) published a paper that examined student perceptions of an interdisciplinary course on information technology and visual design that utilized a learning management system. The study found that learners prefer a self-directed and collaborative instructional online environment with teacher presence and interventions. It also noted that student participation is significantly influenced by how they perceive ICT-based interdisciplinary learning design. The study found that even though it was expected that a communication framework will aid students to actively engage their colleagues and teachers on the various platforms, almost 31% of the students reported ineffective communication with teachers, while about 38% of them gave neutral responses. It was therefore concluded that lack of teacher encouragement and presence in an online learning environment leads to a decrease in participation in the LMS site. The study also found that availability of different par-

ticipatory activities promotes active participation and engagement of students in LMS-based learning and facilitates cordial interactions and generates interest in the LMS.

METHODOLOGY

This paper utilized the pragmatic paradigm as the underpinning philosophy of this study. According to Goldkuhl (2008, p. 1), pragmatism is now recognized as "an independent and viable alternative" to the current main philosophies like positivism and interpretivism in information systems (IS) research. In IS, researchers are faced with application problems and therefore need to focus on solutions to those problems and not on only on methods and theories. The pragmatic worldview which "arises out of actions, situations and consequences, rather than antecedent conditions" (Creswell, 2014, p. 39), makes this possible. The pragmatic paradigm is an important philosophical foundation for mixed methods studies as it provides a means for using pluralistic approaches to the study of a problem for the acquisition of knowledge (Tashakkori & Teddlie, 2010).

This study used the explanatory sequential mixed method approach to enable the researchers first to conduct a quantitative research. This was followed by a qualitative research approach to build on the results for a more in depth analysis. This method allowed the researchers to give detailed explanations after the initial results of the quantitative research (Creswell, 2014). The integration of both quantitative and qualitative data in a single study has the advantage of enriching the results than can be achieved if only one form of data is used (Hanson, Creswell, Clark, Petska, & Creswell, 2005). Notwithstanding these advantages, the mixed methods sequential explanatory design is not easy to implement due to the question of priority of weight to be given to quantitative and qualitative data and time issues (Ivankova, Creswell, & Stick, 2006).

The General Linear Model (GLM) was used by this study to achieve its research objectives. Since the explanatory sequential mixed method had to use the quantitative research followed by a qualitative research, the model allowed the researchers to determine if the means of the various factors differs. The GLM uses linear regression approach to describe the statistical relationships of the variables of the quantitative and qualitative researches. The choice of this technique is pivotal on its ability to make a stronger conclusion than other parametric and non-parametric test statistics especially when using small sample size (Neideen & Brasel, 2007). The GLM embodies common statistical test procedures such as t-test, analyses of variance (ANOVA), multiple regressions, descriptive discriminate analyses (DDA), multiple analyses of variance (MANOVA), structural equation modeling, and canonical correlation analyses and as such very useful in data analyses (Graham, 2008). GLM test procedures share common characteristics like least squares weights which minimize error in model variance or optimize the explained variance and variance-accounted-for effect sizes analogous to r-squares.

The GLM is a useful and flexible statistical tool. The GLM provides an important conceptual framework that is applicable to all parametric procedures that suggests structural coefficients and effect sizes. It pervades all statistical procedures in common use in the fields of psychology and education (Graham, 2008).

GLM is mathematically stated as $Y = \beta_i X_i + \varepsilon$… (1). The GLM is used for predicting one or more variables from one or more independent variables. Thus, the GLM is used for univariate and multivariate test analyses. The Y in equation 1 represents the response or dependent variable, where the X's represents the independent or explanatory variables. The ε is the error term associated with the model. The GLM as a linear model fits only straight lines. This implies that all explanatory variables and response variables are to have single exponents. Generically, it uses k predictors or independent variables to explain the variations in the response variable noted as Y. This are specified as: $Y = \sum_{i=0}^{k} \beta_i X_i + \varepsilon$ … (2a), also expressed as $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \varepsilon$ …(2b).

The estimated GLM is differentiated from equation 2 by having a cap on the respondent variable i.e. $\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k \ldots (3)$ and the difference between equation 2 and 3 gives the prediction error of the GLM. The GLM uses the least square criterion in estimating its parameters which minimize the sum of the squared difference between observed and predicted values (Graham, 2008). The estimated β_i indicates the weighted contribution of the explanatory variable to the variability of the response variable. The GLM uses the R-square and the adjusted R to determine the fitness of the model that is how well the independent variables predict the variability in the response variable (ibid). In most GLM studies the Adjusted R-square is preferred to the R-square due to its ability to correct biasness associated the R-square. According to Graham (2008), GLM just like any other model has some underlining assumptions which it satisfy this include linearity, normality of the residuals; equality of residual variances and fixed independent variables.

From the research hypotheses, the GLM for hypotheses one becomes:

- $Y(intention\ to\ use\ e-learning) = \beta_0 + \beta_1(attitude) + \beta_2(usefullness) + \beta_3(easiness) + \beta_4(availability\ of\ PC\&Internet) + \beta_5(Duration\ of\ usage) + \beta_6(academic\ level\ of\ student) + \varepsilon \ldots (4)$

The hypotheses two also becomes:

- $Y(attitude\ towards\ e-learning) = \beta_0 + \beta_1(usefulness) + \beta_2(easiness\ of\ use) + \beta_3(availability\ of\ PC) + \beta_4(Internet) + \beta_5(Duration\ of\ usage) + \beta_6(academic\ level\ of\ student) + \varepsilon \ldots (5)$

GLM for hypotheses three is stated as:

- $Y(usefulness\ of\ e-learning) = \beta_0 + \beta_1(availability\ of\ PC) + \beta_2(Internet) + \beta_3(Duration\ of\ usage) + \beta_4(Academic\ level\ of\ student) + \beta_5(easiness) + \varepsilon \ldots (6)$

The GLM for hypotheses four is stated as:

- $Y(easiness\ of\ e-learning) = \beta_0 + \beta_1(availability\ of\ PC) + \beta_2(Internet) + \beta_3(Duration\ of\ usage) + \beta_4(Academic\ level\ of\ student) + \beta_5(usefulness) + \beta_6(attitude) + \varepsilon \ldots (7)$

Using the SPSS software, the above GLM models were estimated to achieve the study objectives that sought to understand the adoption of web-based learning management system in higher education in Ghana.

Sample Size and Procedure

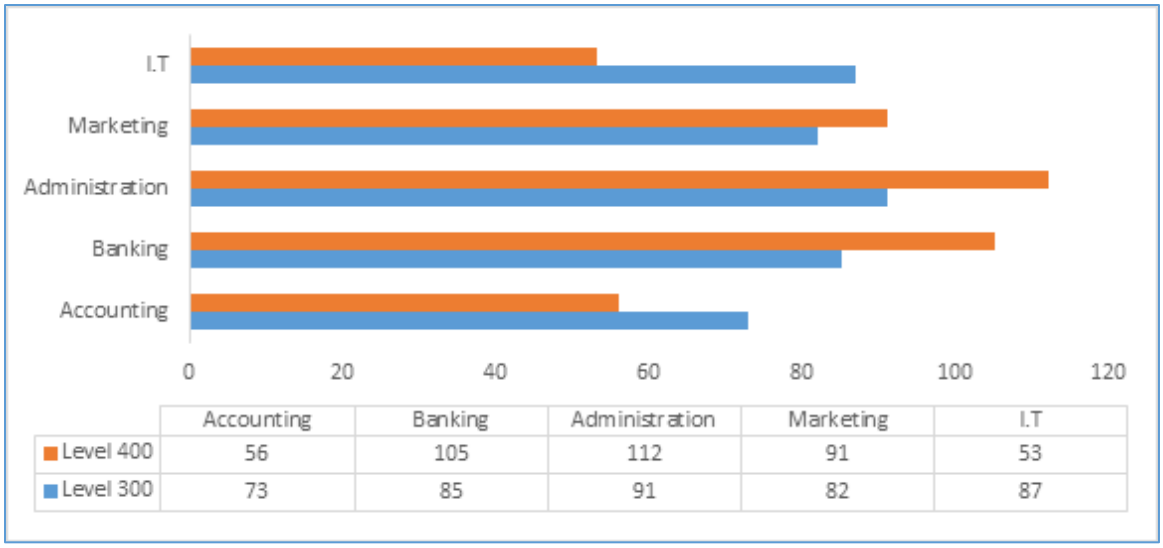
The population for the study consisted of both final and third-year undergraduate students admitted in the 2013/2014 academic year to UPSA who were at the time of the study in the first semester of the 2015/2016 academic year. In all, there were one thousand, seven hundred (1700) and two thousand eight hundred (2800) final and third-year undergraduate students respectively, making a total population of 4500 students. Marsh, Balla, and MacDonald (1988) suggested that it was normal and appropriate to select at least a minimum sample size of 200 subjects, if one wanted to carry out a meaningful case study. Hence, a sample size of 870 satisfies the minimum requirement needed for a case study. Using a stratified random sampling technique, respondents were selected and administered the questionnaire. Two strata composing of third-year students and final year students with 435 students were selected at random.

ANALYSES & DISCUSSIONS

DEMOGRAPHIC CHARACTERISTICS

Out of the 870 questionnaire administered, 845 were properly filled and hence could be used for the analyses. This signifies a response rate of 97.13 percent. The high response rate is attributed to the mode of selection of respondents. Respondents were met in lecture halls before or immediately after lectures using their programmes as the first strata. Sub-strata including Information and Technology, Marketing, Business Administration, Banking and Accounting were created in each stratum. Data was collected over a period of ten working days. Students were given the questionnaire for completion before the commencement of a lecture or immediately after a lecture. It was observed that 35 questionnaires were not used for the analyses as a result of improper filling of the questions and non-responses. Again, the high rate of response implied that students were interested in using an online learning management system; hence, the study may give them a voice so that whoever is responsible should make it work as desired. Presented in Figure 1 is the number of respondents per programme in each stratum used in the study. Students from the Business Administration, Marketing, and Banking dominated the study owning to the skewness of students in such subjects to other programmes, leading to the higher proportion of respondents from such disciplines.

On gender bases, the males generally dominated and accounted for 58.3 percent of valid questionnaires used for the analyses whist females constituted the remaining 41.7 percent of the respondents. This, again, is not surprising in this part of the world since males seem to take up technology much more easily than females. The female will generally turn to the male for help in terms of technology much more readily than they will turn to a female.



	Accounting	Banking	Administration	Marketing	I.T
Level 400	56	105	112	91	53
Level 300	73	85	91	82	87

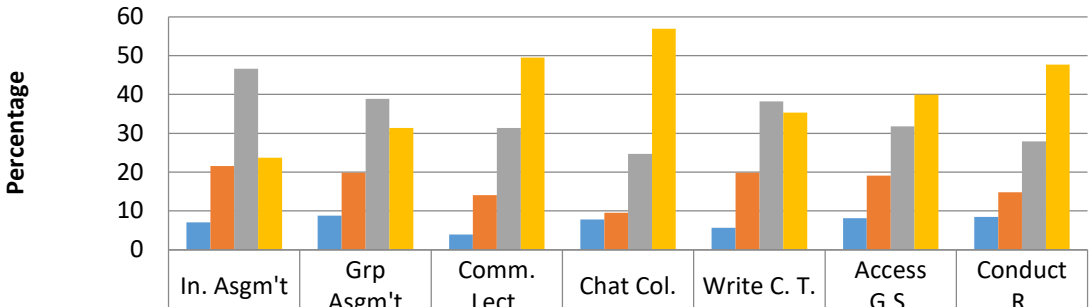
Figure 1: Demographic Data of Students
Source: Authors Survey, 2016

THE LEVEL OF ACCEPTANCE OF ONLINE LMS BY STUDENTS IN HIGHER INSTITUTIONS

To establish the level of acceptance of the online LMS by students, the study first ascertained the various usages of LMS by students. From available literature, online LMS were identified to be used for class assignments, group assignments, communication with lecturers, communication with others students, undertaking class test, multi-media content, online quizzes and examinations, discussions and forums, accessing examination scores, and conducting of research (Berggren et al., 2005; Chaubey & Bhattacharya, 2015; Lui, Lo, & Yiu, 2013; Ozkan, Koseler, & Baykal, 2009). Figure 2

summarises the responses to the question, "how often do you use UPSA's OLMS to conduct the following activities: 1. Submit individual assignment; 2. Submit group assignment; 3. Communicate with your lecturer; 4. Chat with your colleagues; 5. Write a class test; 6. Access grade scored in a test; and 7. Conduct research. The level of acceptance of LMS seems very low. This comes from the fact that students' responses to various usages of LMS were dominated by the responses of "rarely" and "never". About two thirds of the respondents had never or had rarely used the LMS for such activities. Communication with colleagues and lecturers had the highest of such views, about 81.6 percent and 80.9 percent of students respectively indicated they had never or had rarely used LMS for such functions. About 75.6 percent, 73.5 percent and 71.7 percent of students had similar responses for the use of LMS for conducting research, writing class assignments and access scores on the LMS. The use of LMS for both class and group assignments accounted for about 70.3 percent of students, representing less than 30 percent of students who used LMS for these functions. However, it should be noted that this seemingly lack of usage of the features of the learning system emanates mainly from the inability to access the facility due to a variety of causes that may include the lack of infrastructure, technical support, low internet connectivity, and others.

Despite the general low patronage of the LMS by students, it was used for undertaking individual and group assignments. This was the highest participation among the various usages of LMS. About 28.8 percent of students often or sometimes used the LMS for individual assignments. On group assignments, about 28.6 percent of students reported using the LMS (Figure 2). Also, the study observed that students who either often or sometimes used the LMS for grade assessment, writing tests, and conducting research represented 27.2 percent, 25.5 percent and 23.3 percent respectively (Figure 2). The use of LMS for communication by lecturers and other colleagues was limited as it had less patronage by students. The excuse from students was that they did not get messages sent by the lecturers via the LMS due to poor internet connectivity. Only 18 percent and 17.3 percent of the students either frequently or sometimes respectively used the LMS. This may be so due to the inability of either students or lecturers to access the system when they needed to access it. Consequently, when they later meet in a face-to-face interaction the need to use the system would no longer be necessary.



	In. Asgm't	Grp Asgm't	Comm. Lect.	Chat Col.	Write C. T.	Access G.S.	Conduct R.
Often	7.1	8.8	3.9	7.8	5.7	8.1	8.5
Sometimes	21.6	19.8	14.1	9.5	19.8	19.1	14.8
Rarely	46.6	38.9	31.4	24.7	38.2	31.8	27.9
Never	23.7	31.4	49.5	56.9	35.3	39.9	47.7

Figure 2: Students' Level of Acceptance of LMS
Source: Authors Survey, 2016

THE INTENTION OF STUDENTS TO USE AN LMS

In the determination of students' intention to use LMS, the question, "If you have access to a learning system, to what use would you put it?" was asked in the questionnaire. Findings from the GLM

accept the hypotheses that one's intention to use LMS is influenced by one's attitudes, perceived usefulness, perceived ease of use, one's PC and Internet Proficiency ($H1_4$), and duration of use. The R-square value of 0.771 further indicates that a higher proportion of the variability of students' intention to use LMS can be explained by the independent variables of the model.

From the estimates, availability of computers came out strongly to determine one's intention of using an LMS. Computers either owned by students or institutions play a critical role in influencing students' intention of using LMS for academic activities (Kenney & Newcombe, 2011; Kiget, Wanyembi, & Peters, 2014). In the current study, institutional computers had a predictive power of 13.8 percent on intention to use LMS. This is significant at 5 percent and hence a generalization about the fact that intention to use LMS by students can be determined by exposure of students to institutional computer facilities. Ownership of personal computers was also noted to have a similar positive predictive influence on one's intention to use the LMS. About 13.9 percent of the variability in one's intention to use LMS was affected by a student owning a computer device. Comparatively, the study observed that although both cases had a significant positive power on intention to use LMS, predictive power by personal computers came out slightly stronger than institution computers. Hence, there is the need to encourage personal possession of computers by students. This is evident by the differences in the estimates of their effect sizes (Table 1).

Table 1 also demonstrates that computers (either possessed by the individual or institution) had a higher influential role in determining one's intention to use LMS. Perceived usefulness of the LMS also showed significant inferences on one's intention to use an LMS.

Usefulness had a predictive power of 13.7 percent on students' intention to use LMS. Also evident in Table 1 is the fact that variables such as internet connectivity, attitude, academic level of students and how long a student is exposed to LMS failed to have a significant impact on one's intention to use the LMS despite their positive predictive estimates of 2.6%, 2.0%, 0.9% and 1.3% respectively. Despite their insignificance impact on students' intention of using LMS, it does not rule out their impact due to their direct relationship established by their effect size estimates. Even though intention to use should not have been a factor, since LMS usage is mandated, the researchers wanted to confirm the study by Adjin-Tettey (2014). Hence, students are keen to use the LMS but for the challenges posed by infrastructure such as internet connectivity and system downtime among others.

Table 1: Dependent Variable: Intention to use e-learning system among students

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect Size
Corrected Model	52.028[a]	25	2.081	1.793	.014*	.771
Intercept	35.442	1	35.442	30.536	.000*	.307
Sch. Computers	11.728	4	2.932	2.526	.041*	.138
Pers. Computers	11.829	4	2.957	2.548	.040*	.139
Internet Connectivity	8.024	4	2.006	1.728	.144	.026
Attitude	.611	4	.153	.132	.971	.002
Usefulness	11.312	4	2.828	2.436	.048*	.137
Academic level of Students	2.737	2	1.368	1.179	.309	.009
Duration of Last Usage	3.812	3	1.271	1.095	.352	.013
Error	294.815	254	1.161			
Total	1624.000	280				
Corrected Total	346.843	279				

a. R Squared = .771 (Adjusted R Squared = .758)
Source: Authors Survey, 2016

Students' Attitudes toward LMS Usage

Attitude towards LMS usage by students was elicited by responses to the likert-type question, "Given that I have access to the learning system, I plan to use it". Table 2 presents the GLM estimates of equation 5 which addresses the second hypotheses of the study. The rationale of the hypotheses was that students' attitude towards LMS can be influenced by variables such as perceived usefulness, perceived ease of use, PC and Internet Proficiency, and duration of exposure to LMS. The p value of 0.00 which is less than 5 percent, illustrates the fact that indeed such variables can really influence students' attitude towards LMS as it fails to reject the hypotheses. The model explains a higher proportion of the variability of one's attitude towards LMS this is evidence in the R-square and adjusted R estimates of 0.636 and 0.614 respectively.

Unlike the case of students' intention to use LMS, availability of computers showed insignificant influence on perceived attitude towards LMS despite its positive predictive impacts. Personal computers and institutional computers contributed to 1.40% and 2.1% respectively to the variability of students Attitude towards LMS. Internet proficiency, however, in this case had a positive impact on attitude towards LMS. A positive predictive impact of 9.1% was observed on Attitude towards LMS.

How a student perceives the LMS as an easy and useful tool plays a critical role in shaping one's attitude towards it. From the estimates of the GLM model as presented in Table 2, a significant positive impact of 38.3% and 10.3% respectively was observed on students' attitude towards LMS. Despite the fact that the two variables had significant positive impacts, influences on students' attitude was much higher and associated with easiness to use the LMS than perceived usefulness. The result (Table 2) also demonstrates that how long a student is exposed to the LMS conditions his attitude towards the use of LMS. A significant positive predictive power of 8.1 percent was observed to come from one's experience with LMS on attitude towards LMS. Also, what the research further observed was the independence of academic levels with perceived attitude towards LMS usage among students. Hence, to situate the mind-set of students to use more of LMS for academic activities there is the need to have exposed students long enough to the use of LMS. Features need to be user-friendly in order to be easy to use and further influence their perceived usefulness.

Table 2: Dependent Variable: Interactions with OLMS is clear and understandable

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect Size
Corrected Model	206.039[a]	25	8.242	7.842	.000*	.636
Intercept	65.520	1	65.520	62.339	.000*	.197
Personal Computer	3.781	4	.945	.899	.465	.014
Internet Connectivity	11.467	4	2.867	2.728	.030*	.091
School Computer	5.605	4	1.401	1.333	.258	.021
Usefulness	14.983	4	3.746	3.564	.008*	.103
Easiness	133.025	4	33.256	31.642	.000*	.383
Academic level of Student	5.884	2	2.942	2.799	.063**	.022
Duration of Last Usage	8.431	3	2.810	2.674	.048*	.081
Error	266.958	254	1.051			
Total	3437.000	280				
Corrected Total	472.996	279				

a. R Squared = .636 (Adjusted R Squared = .614)
Source: Authors Survey, 2016

Perceived Usefulness of the LMS

In capturing the usefulness of the LMS, the questionnaire unearthed students' opinions about the question, "whether the LMS enhances effective learning". The model illustrates how students perceived the LMS to be useful and this is explained by the variability of independent variables in model. An alpha value of 0.000 reinstates this fact; hence, the lack of evidence to reject the null hypotheses of hypotheses three and hence the acceptance (Table 3). Like the observations on Attitude towards LMS usage by students, impacts from computers on one's perceived usefulness was insignificant despite their predictive powers of 2.0% and 3.2% (Personal Computers and Institution Computers respectively) (Table 3). Internet proficiency, which was vital in the determination of students' perceived attitudes towards LMS usage, was insignificant in this scenario. Thus, the students' proficiency on internet did not sufficiently determine their perceived usefulness of LMS despite its positive predictive power of 1.6%.

Easiness of use of LMS played a critical role in determining students' perception of the usefulness of the LMS. Hence how easy one thought the LMS was, directly influenced how he/she perceived it to be useful. From Table 3, a positive significant predictive power of 43.9 percent was observed from easiness on usefulness of LMS. Also, evident from Table 3 are the positive insignificant impacts from the academic level of the student and duration of last usage.

Table 3: Dependent Variable: Find OLMS quick assignment feedback

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect Size
Corrected Model	221.796[a]	21	10.562	12.866	.000*	.512
Intercept	70.343	1	70.343	85.692	.000*	.249
Pers. Computer	.411	4	.103	.125	.973	.002
Internet Connectivity	3.443	4	.861	1.048	.383	.016
School Computer	6.915	4	1.729	2.106	.081**	.032
Academic level of Student	4.014	2	2.007	2.445	.089**	.019
Duration of Last Usage	.549	3	.183	.223	.880	.003
Easiness	165.831	4	41.458	50.503	.000*	.439
Error	211.790	258	.821			
Total	3684.000	280				
Corrected Total	433.586	279				

a. R Squared = .512 (Adjusted R Squared = .501)
Source: Authors Survey, 2016

Perceived Easiness of the LMS

In Table 4, the GLM estimate for model 7 is presented where perceived easiness was captured by the question "To what extent do you find OLMS easy to use? There is a claim of acceptance of the null component of hypotheses 4, that is, easiness of use of LMS was influenced by variables in the model. This is demonstrated by the p-value which is less than 5 percent. More than half of the variability of the dependent variable "Easiness to use LMS" can be explained by the variability of independent variables. The model (Table 4) estimates an r-square value of 55.8 percent. All variables (computers, internet proficiency, academic level of student, attitude, usefulness, exposure to LMS) had direct relationship with perceived easiness of the LMS. This implies that such variables are needed to influence students' thoughts about how easily the LMS can be used. Despite their positive prediction on perceived easiness of the LMS, most variables failed to show significant impacts. Computers (Personal and Institution), experience with LMS and perceived usefulness which had predictive powers of (2.4% and 1.9% respectively), 2.4% and 1.3% respectively showed no significances.

There is evidence also that variables such as internet proficiency, Attitude and Academic level of students had significant direct relationship with students' perceived easiness of the LMS. This suggests that such variables are necessary and sufficient in shaping students' thoughts of whether the LMS is easy to use or not. From their predictive powers, attitude has significant influence in determining students' thoughts about whether the LMS was easy to use with a predictive power of 39.9 percent. Internet proficiency came second with a 7.6 percent effects on perceived easiness of the LMS, while the academic level of the students only had a predictive power of 3.0 percent. Owing to the direct relationship and significance of the predictive power of the academic level of students, it implies that students at higher levels consider the LMS more beneficial.

Table 4: Dependent Variable: find OLMS easy to use

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect Size
Corrected Model	182.084[a]	25	7.283	8.584	.000*	.558
Intercept	55.093	1	55.093	64.936	.000*	.204
Personal Computer	5.261	4	1.315	1.550	.188	.024
Internet Connectivity	10.338	4	2.584	3.046	.018*	.076
School Computer	4.135	4	1.034	1.219	.303	.019
Academic Level of Student	6.583	2	3.292	3.880	.022*	.030
Duration of Last Usage	5.356	3	1.785	2.104	.100	.024
Attitude	105.803	4	26.451	31.176	.000*	.399
Usefulness	2.843	4	.711	.838	.502	.013
Error	215.502	254	.848			
Total	3252.000	280				
Corrected Total	397.586	279				

a. R Squared = .558 (Adjusted R Squared = .555)
Source: Authors' Survey, 2016

Factors that Impact Post-Implementation Usage

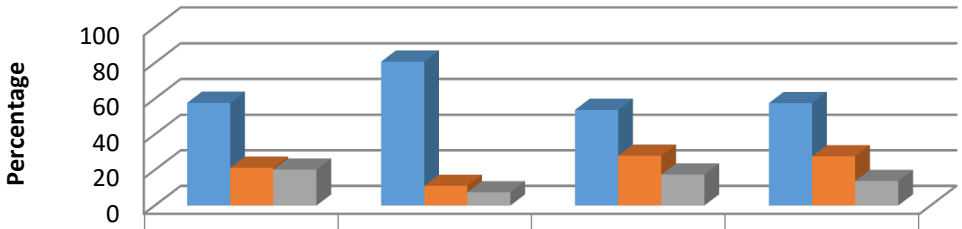
The study also sought to unearth the causes of the low patronage among students to achieve the second objective of the study of identifying the post-implementation factors affecting acceptance. Questions to elicit information to assess the post-implementation factors included the following: "To what extent do you agree with the following statements on the UPSA's OLMS":

1. I do not know how to use it.
2. I did not get enough training on how to use it.
3. There are no enough computers on campus to enhance its use.
4. I do not own a computer/device that I can use to access.
5. I do not have internet connectivity.
6. The learning management site is too slow.
7. The learning management system is too complex.
8. There are not enough teaching/learning activities on the system.
9. I find the online learning management system not user-friendly.
10. The learning management system enhances effective teaching/learning.
11. I find it easy to get the OLMS to do what I want.
12. My interactions with the OLMS is clear and understandable.
13. I find the OLMS easy to use.

The responses are summarised in Figure 3.

Coming strongly from the research were issues of inadequate training on the LMS, slowness of the LMS, LMS complexity, and unfriendly nature of the LMS. These issues accounted for by at least over 50 percent of the students surveyed.

Slowness of the LMS negatively affected its acceptance more than any of the post-implementation factors. About 80.6 percent of students were of the view that the current LMS existing in their institutions was very slow, which affected their interest in using the LMS for academic activities. Issues of inadequate training also came out as a hindrance to the use of LMS by students. About 57.6 percent of the students believed the existing time allocation for the use of LMS was not encouraging and, hence, hinders their total interest in the LMS. Emanating from the survey is the fact that the LMS used within the institution is not user friendly and is very complex; hence, making their usage very challenging. Such perceptions most likely negatively interfered with interest for the system. For, as evidenced in Figure 3, about 57.5 percent of the students claimed that LMS was user unfriendly. About 53.7 percent of the students also indicated that the system was too cumbersome and complex and this reduced their interest in the use of the system.



	Not enough Training	e-LS slow	e-LS complex	e-LS not user friendly
Agree	57.6	80.6	53.7	57.5
Neutral	21.2	11	27.9	27.6
Disagree	20.1	7.4	17.3	13.7

Figure 3: Factors that impact post-implementation usage
Source: Authors' Survey, 2016

SYNTHESIS OF FINDINGS

This paper sought to investigate factors that affect post-implementation success of the web-based learning management system at UPSA using the explanatory sequential mixed method with GLM.

Overall, the level of acceptance of online LMS by students of UPSA as per the data suggests a rather low acceptance level. As pointed out by Berggren et al. (2005), the LMS environment enables and facilitates class assignments, group assignments, communication, tests and quizzes, and discussion fora. The data however, showed that usage of these activities is very low by students. On communication and interactions, particularly with lecturers, about 81.6% indicated they had never or rarely used the communication and discussion fora. This situation is attributed to mainly the lack of infrastructure, technical support, low internet connectivity, and poor teacher proficiency and ICT capacity. (J. Y. Park & Mills, 2014). According to J. Y. Park and Mills (2014), student interaction and participation in ICT-based LMS activities will be positively enhanced if lecturer presence on the LMS in the form of moderator and facilitator is significant. Hence, factors that will generally improve on student acceptance and usage of an LMS will include the availability of infrastructure, technical support, teacher ICT proficiency, and teacher frequency on online engagement and prompt responds to technical concerns of students. Furthermore, as indicated by O'Neill et al. (2004), adoption of technology for teaching and learning should be well planned so it does not create hurdles for faculty and

students. Adequate consideration made for physical infrastructure, technical expertise, and experience foster successful implementation and adoption of technology in education.

Students of UPSA showed significant level of intention to use the LMS as per the analysis of the data. Students' intention to use an LMS was found to be determined by their exposure to computer facilities, especially personal computers. It was also found that their intention to use an LMS is not related so much to internet connectivity, attitude, academic level of students, and the length of time students are exposed to LMS despite the fact that they had a positive estimate. This is in tandem with Kiget et al. (2014) and Maina and Nzuki (2015) who agreed that computer facilities are related to usability and intention to use LMS. This implies that there is generally low perception in ICT infrastructure among users of LMS in higher institution of learning.

The data analysis revealed that the post-implementation factors affecting acceptance and causes of low patronage of the LMS among students of UPSA are varied but the most prominent ones are that speed of the LMS affects its acceptance. This factor constitutes about 81% of students' perception of the current LMS. The study found that inadequate training for both faculty and students, teaching and learning time allocated to the use of LMS, user-friendliness, and cumbersomeness of the system combine to negatively affect acceptance of the LMS. These factors discourage both faculty and students from using the LMS. They lose interest and eventually stop using the system altogether. For these reasons Claar et al. (2014) suggests that institutions intending to use LMS must ensure they are automated and centrally controlled, offer self-guided services, consolidate training for all users, and others to aid successful post-implementation. Specifically on the training of faculty and students to be skillful in the usage of LMS, Dahlstrom et al. (2014) found in their study that users believe they will be more effective if they were more skilled at using the LMS. The inference implies that various types of factors need to be considered and planned in the early stages of the LMS in collaboration with all stakeholders and design of the module to facilitate success.

CONCLUSION

Although the LMS has been integrated into the teaching and learning structures of the University of Professional Studies for some time now, its total embracement is low. Only few students employed the various usages of the LMS while the majority of the students either had never used the LMS before or were hardly found using the system. Accounting for this low acceptance and usage are factors such as inadequate training and technical support, lack of personal and institutional computers, low internet connectivity, high downtime of the LMS, and other infrastructural issues. These issues played a major role in reducing the passion of students in the use of the learning management systems.

To achieve the objectives for the introduction of the LMS into the educational curriculum of an institution, it is imperative that post-implementation factors hindering the successes of the LMS are tackled.

First, the provision of a reliable and fast internet connectivity system to power the LMS is essential. This will address the slowness issue associated with the LMS. From the findings, predictive powers of internet proficiency on perceived attitude and easiness of LMS were noted to be positive and significant; hence, the provision of a much reliable internet system will simultaneously boost students' internet proficiency and improve the performance of the LMS so as to make the learning system much useful and easy to use by students.

Additionally, features such as complexity and unfriendliness of the LMS should be addressed by reengineering to make it much easier and convenient to use. This has the advantage of stimulating students' interest and usefulness of the system.

Moreover, there is the need to increase the time allocated for practical sections on usages of the LMS. This need is supported by the fact that duration of exposure to LMS was noted to have a sig-

nificant predictive power on students' attitude towards LMS. Hence, having longer practical section for learners will be instrumental in encouraging students' acceptance for an LMS.

REFERENCES

Adjin-Tettey, T. D. (2014). Adoption nd utilisation of learning /course management systems: The study of University Of Professional Studies, Accra. *International Journal of ICT and Management, II*(1), 48-64.

Ahmad, R., Edwards, R., & Tomkinson, B. (2006). The use of WebCT in distance learning course in University of Manchester. *Turkish Online Journal of Distance Education, 7*(2), 101-108.

Al-alak, B. A., & Alnawas, I. A. (2011). Measuring the acceptance and adoption of e-learning by academic staff. *Knowledge Management & E-Learning: An International Journal, 3*(2), 201-221.

Aldosari, H. S., & Mekheimer, M. A. A. (2013). The bandwagon effect in the adoption of e-learning systems in language learning-An appraisal. *GSTF Journal on Computing (JoC), 2*(4), 61-81.

Ash, K. (2013). How to choose the right learning management system. *Education Week, 6*(03), 25-27. Retrieved from Education Week: Digital Direction website: http://www.edweek.org/dd/articles/2013/06/12/03lms-evaluation.h06.html

Berggren, A., Burgos, D., Fontana, J., Hinkelman, D., Hung, V., Hursh, A., & Tielemans, G. (2005). Practical and pedagogical issues for teacher adoption of IMS learning design standards in Moodle LMS. *Journal of Interactive Media in Education, 2005*(1), 1-24.

Chaubey, A., & Bhattacharya, B. (2015). Learning management systems in higher education. *International Journal of Science Technology & Engineering, 2*(3), 158-162. Retrieved from http://www.ijste.org/articles/IJSTEV2I3050.pdf

Claar, C., Dias, L. P., & Shields, R. (2014). Student acceptance of learning management systems: A study on demographics. *Issues in Information Systems, 15*(1), 409-417.

Coates, H., James, R., & Baldwin, G. (2005). A critical examination of the effects of learning management systems on university teaching and learning. *Tertiary Education and Management, 11*, 19-36.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Los Angeles, CA: Sage Publication.

Dahlstrom, E., Brooks, C. D., & Bichsel, J. (2014). The current ecosystem of learning management systems in higher education: Student, faculty, and IT perspectives. Research Report. *EDUCAUSE*. Retrieved from http://www.educause.edu/ecar

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 318–339.

Ellis, R. K. (2009). *Field guide to learning management systems* (pp. 1-8). American Society for Training & Development (ASTD).

Firat, M. (2016). Determining the effects of LMS learning behaviors on academic achievement in a Learning Analytic Perspective. *Journal of Information Technology Education, 15*, 75-87. Retrieved from https://www.informingscience.org/Publications/3405

Georgouli, K., Skalkidis, I., & Guerreiro, P. (2008). A framework for adopting LMS to introduce e-learning in a traditional course. *Educational Technology & Society, 11*(2), 227-240.

Gilhooly, K. (2001). Making e-learning effective. *Computerworld, 35*(29), 52-53.

Goldkuhl, G. (2008). *What kind of pragmatism in information systems research*. Paper presented at the AIS SIG Prag Inaugural meeting, Paris, France.

Gottipati, S., & Shankararaman, V. (2016). *MyCompetencies: Competency tracking mobile application for IS students*. Paper presented at the EDUCON 2016: Proceedings of the IEEE Global Engineering Education Conference 2016, Abu Dhabi, UAE.

Graham, J. M. (2008). The general linear model as structural equation modeling. *Journal of Educational and Behavioral Statistics, 33*(4), 485-506.

Hanson, W. E., Creswell, J. W., Clark, V. L. P., Petska, K. S., & Creswell, D. J. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology, 52*(2), 224-235.

Hong, C., & Walker, D. A. (2015). A confirmatory factor analysis of the Technology Acceptance Model. *General Linear Model Journal, 41*(2), 22-29.

Ignatius, J., & Ramayah, T. (2005). An empirical investigation of the course website acceptance model (CWAM). *International Journal of Business and Society, 6*(2), 69-78.

Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods, 18*(1), 3-20. doi: 10.1177/1525822X05282260

Kenney, J., & Newcombe, E. (2011). Adopting a blended learning approach: Challenges encounted and lessons learned in an action research study. *Journal of Asynchronous Learning Networks, 15*(1), 47-60.

Kiget, N. K., Wanyembi, G., & Peters, A. I. (2014). Evaluating usability of e-learning systems in universities. *International Journal of Advanced Computer Science and Applications, 5*(8), 97-102.

Lui, R. W., Lo, K. K., & Yiu, S. (2013). Evaluating and adopting e-learning platforms. *International Journal of e-Education, e-Business, e-Management and e-Learning, 3*(3), 229-233.

Maina, M. K., & Nzuki, D. M. (2015). Adoption determinants of e-learning management system in institutions of higher learning in Kenya: A case of selected universities in Nairobi Metropolitan. *International Journal of Business and Social Science, 6*(2), 233-248.

Marfo, J. S., & Okine, R. K. (2010). *Implementation of e-Learning in Ghanaian Tertiary Institutions (A Case Study of KNUST).* Paper presented at the The Fifth Conference of MIT's Learning International Networks Consortium.

Marsh, H. W., Balla, J. R., & MacDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin, 88*, 245-258.

Neideen, T., & Brasel, K. (2007). Understanding statistical tests. *Journal of Surgical Education, 64*(2), 93-96.

O'Neill, K., Singh, G., & O'Donoghue, J. (2004). Implementing e-learning programmes for higher education: A review of the literature. *Journal of Information Technology Education, 3*(1), 313-323. Retrieved from https://www.informingscience.org/Publications/304

Obisat, F. M., Airawashdeh, H. S., Altarawneh, H., & Altarawneh, M. (2013). Factors affecting the adoption of e-learning: Jordanian universities case study. *Computer Engineering and Intelligent Systems, 4*(3), 32-40.

OECD. (2005). E-learning in tertiary education. *Policy Brief*, 1-8. Retrieved from http://www.oecd.org/dataoecd/27/35/35991871.pdf

Oxagile. (2016). *History and trends of learning management system.* Retrieved from contact@oxagile.com

Ozkan, S., Koseler, R., & Baykal, N. (2009). Evaluating learning management systems. *Transforming Government: People, Process and Policy, 3*(2), 111-130.

Park, J. Y., & Mills, K. A. (2014). Enhancing interdisciplinary learning with a learning management system. *MERLOT Journal of Online Learning and Teaching, 10*(2), 299-313.

Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society, 12*(3), 150-162.

Paulsen, M. F. (2002). Online education systems: Discussion and definition of terms. *NKI Distance Education.* Retrieved from www.nettskolen.com/in_english/web_edu.html

Pearlson, K. E., & Saunders, C. S. (2009). *Managing and using information systems: A strategic approach* (4th ed.). New York: John Wiley & Sons.

Phillipo, J., & Krongard, S. (2012). Learning management system (LMS): The missing link and great enabler. Retrieved from http://www.celtcorp.com/resources/1/celt_lms_article.pdf

Piña, A. A. (2012). An overview of learning management systems. In *Virtual Learning Environments: Concepts, Methodologies, Tools and Applications* (pp. 33-51). USA: IGI Global.

Salmeron, J. L. (2009). Augmented fuzzy cognitive maps for modelling LMS critical success factors. *Knowledge-based Systems, 22*(4), 275-278.

Selim, H. M. (2003). An empirical investigation of student acceptance of course web sites. . *Computers & Education, 40*(4), 343-360.

Szabo, M., & Flesher, K. (2002). *CMI theory and practice: Historical roots of learning management systems*. Paper presented at the E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education, Montreal, Canada.

Tashakkori, A., & Teddlie, C. (2010). *SAGE handbook of mixed methods in social & behavioral research* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

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

Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management, 14*(5), 216-223.

Watson, W. R., & Watson, S. L. (2007). What are learning management systems, what are they not, and what should they become. *TechTrends, 51*(2), 1-17.

Zaharias, P., & Pappas, C. (2016). Quality management of learning management systems: A user experience perspective. *Current Issues in Emerging eLearning, 3*(1), 60-83. Retrieved from http://scholarworks.umb.edu/ciee/vol3/iss1/5

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