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# Performance of Learning Management System Moodle design in a Nigerian Higher Education Institution

Alhaji Modu Mustapha, Madya Noraffandy B Yahaya and Megat Aman Zahiri B Megat Zakaria



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[1] **Alhaji Modu Mustapha** mmalhaji@graduate.utm.my
[2] **Prof. Madya Dr. Noraffandy B. Yahaya** p-affandy@utm.my
[3] **Dr. Megat Aman Zahiri B Megat Zakaria** megataman@utm.my

## Abstract

This paper presents three different model to evaluate the concept of learning management system (LMS), more specifically Moodle web learning and course management across Higher Education Institutions throughout Sub-Saharan nations by adopting two different models: 1) DeLone and McLean information system success model; and unified theory of acceptance and use of technology (UTAUT) model in various schools throughout the African country of Nigeria. This secondary research explains the scope, potential, impact and challenges of adopting Moodle in Nigeria using the aforementioned models to find out ways of increasing the meaningful adoption of LMS in higher education. In addition, these studies underscore the myriad challenges that impede adoption of LMS n Nigeria's higher education, such as high tariffs of internet, poor power supply, lack of technological infrastructure and skills, and the reluctancy in adopting to new changes.

**Keywords:** Learning management system, Moodle, Nigeria's higher education, tertiary institutes, UTAUT model, elearning

## 1 Introduction

Learning management system is considered to be a vital part of elearning, with the advancement of digital technology. According to the European Union (EU) elearning can be explained as a web-based learning tool which makes use of online communication, information sharing, training and overall collaboration to benefit individuals as well as various entities (eEurope, 2005). More specifically, it entails the provision of teaching materials through electronic media platforms such as satellite broadcasting, extranets, intranets, CD-ROM, interactive TV, etc. in order to provide a broad range of knowledge/performance enhancing solutions (Carvalo, 2003). Several practitioners have acknowledged the value of etraining that has been adopted along with conventional classroom training (Tiago and Alee, 2014).

For this reason, organizations are increasingly examining the utility of information and communication technologies (ICT) to improve the quality of teaching in higher education across Nigeria. More specifically, with the emergence of web technologies, higher educations across Africa and all over the world are looking to leverage e-learning approaches as well as technologies

to meet their requirements pertaining to distance teaching. Of the numerous mechanisms and techniques of e-learning, LMS is a recognized medium of delivery as far has higher institutions are concerned. According to Smith and Rupp (2004) online education is increasingly common in higher two purposes:

1) To improve the flexibility of courses involving face to face interactions in classrooms that offers unrestricted access to materials, syllabi, and discussions
2) To become the only means of eliminating or reducing the challenges associated with conventional classes

LMS is advantageous in that it provides students with effective opportunities to learn effectively, irrespective of their location and availability. It also enables students to take part in interactive and self-faced learning which is otherwise impossible. Notably, this learning-focused approach positions elearning as a robust tool to transform their learning behaviors and enhance the way they process information in their own contexts (Rosenburg, 2006). Such changes in the training contexts have underscored the need to understand and incorporate students' elearning-based acceptance to facilitate the processes of learning.

The underlying rationale for implementing LMS particularly in African settings has been suggested by Hoosen and Butcher (2012) as follows: 1) to increase efficiency in learning and teaching for students and teachers, respectively; 2) to enhance convenience for the students; 3) to improve the reputation of the school or the higher education institute; and 4) Achieve cost savings for the school.

Moreover, since educators rarely possess the skills needed to customize classes, many educational institutions are adopting different types of LMS systems, such as Blackboard, WebCT and Moodle applications (Vrasidas, 2004). The current study examines extant studies concerning the implementation of Moodle in Nigeria's higher education using three models.
It would also define constructs elucidating the adoption of LMS in Nigeria and then assess their reliability while also looking at some key challenges.

## 2 Moodle and Nigeria's Higher Education

In the recent past, many higher educations in Nigeria have been looking to use digital technology so as to allow students to make significant improvements in their learning abilities within as well outside classroom environments and ensure their long-term wellbeing/development (Marchewka, Liu, and Kostiwa, 2007). The ongoing transformation within the ICT sector in Nigeria has created significant changes in the implementation and acceptance of LMS in higher education. To that end, elearning programmes at Nigerian universities have supported technological syncretism by blending conventional education structures with new technologies.

In that context, Moodle is an Open Source Software (FOSS) used to create internet-based courses (Raman, Don, Khalid, and Rizuan, 2014). The system's features lend support to a philosophy of teaching/learning style of constructionism, constructivism, and social constructivism. Moodle must be installed on the web server of an organization or at an internet hosting company. Its features can be understood as a culmination of six important factors

mentioned below (Momani, 2010): a) Pedagogy, b) Learning environment, c) Instructor-specific Tools, d) Administrator Tools, e) Course and Curriculum Design) and f) Technical specifications.

Moodle has been able to gain acceptance in a broader range of higher education institutes in conducting academic activities like exams, assignments, and courses. It is use to provide complete online and offline support to learners as well as students. Despite the presence of several challenges, Moodle has been able to elicit the attention of myriad categories of learning communities in wake of the following characteristics: modularity, flexibility, security and availability.

Moodle package underscores the universal instructional design features that helps educators implement the creation of efficacious learning communities on the internet. In that context, Batchuluun (2008) conducted a study wherein the majority of respondents assert their support for Moodle as the optimal learning management system specific to their objectives. The result from other studies are also indicative of higher ratings of Moodle experience (Momani, 2010). One of the biggest advantages of the innately user-friendly Moodle is its flexibility. In addition, it is also possible to widely use Moodle for supporting different approaches, such as pedagogical and andragogical.

Moodle packages are devised using five important principals (Knight & Bush, 2009): 1) These systems need to be used by experienced experts; 2) Moodle necessitates spending time on computers; 3) It involves asking intelligent questions and proactive involvement of teachers; 4) It entails a lot of hard work and not merely fun-filled task; and 5) users can revert or opt other systems anytime and in any manner (Moodle, 2010). Through secondary research, this examines the relevancy, scope, challenges, and other aspects of Moodle LMS in Nigeria's higher education using the backdrop of DeLone and McLean (D&M) and unified theory of acceptance and use of technology (UTAUT) models.

## 3 LITERATURE REVIEW

### 3.1 D&M Model

With learning organizations continuing to adopt LMS to improve the quality of learning and teaching across the world, including Nigeria, several models have been prepared for the purpose of exploring its efficaciousness across educational settings. To that end, (D&M) model have been used to examine many LMSs globally, and include six constructs: 1) system quality, 2) information quality, 3) satisfaction of users, 4) usage of system, 5) impact on organizations, and 6) impact on individuals. While system quality gauges Moodle's overall quality and performance, information quality helps better assess the usefulness and efficacy of information generated via the system.

DeLone and McLean (2003) contended that researchers can increase or reduce the number of constructs to maintain relevance in their area of studies. To that end, recent advancements with regard to the domain of Moodle have underscored the importance of expounding on the D&M model so that an accurate estimate can be made about how successful it is in different academic frameworks. Ozkan and Koseler (2009) and Hassanzadeh et al. (2012) have validated the

efficaciousness of Moodle in higher education, although they pointed out that the uptake of Moodle needs to increase significantly

Holsapple et al. (2006) segregated the D&M model into three phases: 1) the phase of design; 2) the phase of delivery; and 3) the phase of outcomes. According to their observations, the paucity of technological infrastructure, barriers in procuring equipment and reluctance of students is impeding the progress of Moodle in Nigeria's educational institutes

Similarly, Wang and Wang (2009) sought to get the D&M model extended. More specifically, they put it into a couple of constructs, namely, social, and technical, which collectively led the formation of Hexagonal eLearning Assessment Model. As part of their study, two aspects of this model were kept as is – quality of system, and quality of service. At the same time, four constructs – quality of content, perspective of learners, attitude of instructors and accompanying issues. After being tested on 84 students, Moodle was found to be useful in improving the quality of learning, but it was also observed that the acceptance of this system needs to improve radically.

Meanwhile, Hassanzadeh et al. (2012) divided net benefits into three constructs:
goals achievement, educational system quality, and loyalty to system – validating the model via a sample study that entailed the participation of 470 alumni and 270 instructors across five Nigerian universities. All ten constructs of Moodle were found helpful in gauging the success of Moodle.

### 3.2 UTAUT Model

The UTAUT model is based on eight theories of technological acceptance (Momani, 2010) and draws on the following:

1) Technology Acceptance Model (TAM)
2) Theory of Planned behavior (TPB)
3) Motivational Model
4) Personal Computer Utilization Model
5) Social Cognitive Theory
6) Innovation Diffusion Theory.

Apart from behavioral use an intention, the UTAUT model comprising of four factors: sex, education, gender and voluntary usage. Meanwhile the four constructs include the following: Performance expectancy, Effort expectancy, Behavioral intention, Social influence, and Facilitating conditions, as well as Behavioral use. UTAUT has been used to examine the association between constructs and behavior of information technology. In the past, many studies have contributed to undertaking discussions for interpreting Moodle's scholarly utilization in Nigeria.

Additionally, a recent study in students' acceptance to Moodle revealed that UTAUT's predictability may vary in various cultural settings (Gruzd, Staves, and Wilk, 2012). Meanwhile (Maldonado, Khan, Moon, and Rho, 2011) conducted a study on educational portal acceptance and elearning motivation of Moodle in Nigeria's higher education in order to empirically validate a UTAUT model by adding the construct of "elearning motivation." According to the findings, social influence and elearning motivation positively impacted behavioral intention, while behavior had a positive impact on elearning motivation. (Olabode and Rao, 2010) assessed the use of UTAUT for examining the willingness of high education universities on adopting Moodle in Nigeria and validated the findings.

Olatubosun, Olusoga, and Samuel (2015) utilized the UTAUT model so as to elucidate elearning adoption in Nigeria's higher education settings and examine the concomitant impact on behavioral use as well as intent for adopting elearning. Data was procured through a survey consisting of a couple of Nigerian universities whereby the models were estimated in a structural modelling framework All constructs of this model were confirmed using confirmatory tests.

As per the findings, three constructs were found to positively impact behavioral intention and consequently, usage behavior. It was found that students with more positive perceptions about the usefulness of the elearning technologies for learning, and those with more positive views of the facilitating conditions have more positive behavioral intention, tends to have a positive attitude towards the use of elearning technologies and to the contrary, the social influence does not predict attitude towards the use of the technologies.

Finally, it was also observed that that performance expectancy, effort expectancy and behavioral intention are positively related to use behavior but are moderated by technological access and foreseen willingness not to use elearning technology. However, social influence and facilitating conditions are negatively associated with use behavior. Tertiary institutions did try to improve
technological infrastructures in their school for student to adopt Moodle, but it was found that many students were unwilling to utilize the technology.

## 4 Discussion

In Nigeria, recent awareness of the government on ICT has created new opportunities to adopt elearning systems (Suleiman, 2011). The ways of ensuring management of materials, evaluating the achievements of students and examining their preferences/styles of learning are some features that have been looked into by researchers in the past (Suleiman and Ghalib, 2007). In this context, LMS is helpful on account of its integrative and interactive approach of teaching. Moreover, students can leverage chat forums as well as other means of interactions through which students can look forward to augmenting their skills and knowledge via practical experiences instead of having to rely to classes or textbooks (Ellis, 2010).

To that end, Moodle helps instructors plan engaging activities for their students while also creating surveys that actively examine how they respond. Additionally, Moodle instructors allow students to get their assignments uploaded on a daily basis without any hassles. Among other features, the system makes it possible to randomize questions as well as their responses. In

addition, it is also possible for students to benefit from self-assessments and because they would be required to complete the assignment or test within a time-limit.

Despite these advantages and proven benefits, the uptake of Moodle is less than ideal in Nigeria, as demonstrated in the secondary research conducted involving the two models. In particular, the UTAUT model looked at effort and performance expectancy, facilitating conditions as well as social influence as the main propellants of LMS, including the Moodle system.

The inclusion of facilitating condition caused the four constructs to have a negative impact on behavioral intention, thus impelling the students to believe that existing technical infrastructure that can support this system contributes negatively to its adoption. Thus, Nigeria's tertiary educational bodies need to become more familiar with technology and recognize the importance of their role as guiding forces. They must be willing to inspire students and allow them to ensure their future success (Georgouli, Skalkidis, and Guerreiro, 2008).

Chigozie-Okwum, and Oddi (2018) conducted a study to assess the level of LML adoption by Nigerian higher institutions while identifying the problems that impede the technology's adoption. This study sampled 100 respondents in a tertiary institution and data was gathered using questionnaire after which its analysis was done via descriptive statistics. As per the findings, LMS adoption remains null in the nation's tertiary entities.

## 5 Conclusion and Recommendations

The level of adoption of LMS, including Moodle, in Nigeria's higher education institutions is very low (Chigozie-Okwum, and Oddi, 2018). According to research studies in the country, not many higher learning institutions in the country have been able to leverage LMS efficaciously. It is also notable that privately owned entities such as The American University of Nigeria have utilized it, but their public-owned counterparts have not.

The challenges confronting the adoption of LMS are inclusive of the following: administrative/technical challenges, security challenges, lack of support infrastructures such as poor power supply and computer systems. In wake of the aforementioned research, it is evident that quality of infrastructure, expense considerations, depth and willingness on part of students assumes great significance in helping students making optimal use of Moodle to maximize their learning potential. Therefore, instructors should also ensure that the course content prepared by them are accurate and up-to-date.

As different methods of LMS continue to evolve, it is important to examine them to determine whether or not they are able to make improvements from prevailing learning approaches. It However, it is more important to ascertain whether or not their benefits surpass those offered by existing practices. This is attributed to the fact that making needless alterations in LMS support can disturb the process of course development, thus causing ambiguity for both students and teachers (Batchuluun, 2008).

A few predicaments stemming from Moodle system executions are unlikely to be impervious to the challenges facing financing. Therefore, it is necessary to address funding-related attitudes in order to ensure that these systems run smoothly. The expenses involved would be specific to enabling repeated use of certain packages. At the same time, resources and materials (such as internet, computers, etc.) must be put into place to ensure the LSM Moodle system is being implemented adequately.

Other challenges associated with the procedure of implementation may include local politics between academicians and administrators. Therefore, it is imperative to design suitable policies to ensure appropriate implementation till the point of completion. Moreover, it is important to maintain acceptable trust levels amongst administrators, staff members as well as students in order to avoid the pitfalls associated with this system. There should also be a good level of commitment to ensure that LSM is successfully implemented across institutions.

On the other hand, reliable power is another prerequisite for successful execution of LMS. Power supply must remain uninterrupted in laboratories or the server unit for avoiding unnecessary documentary loss. Students should be allowed to access educational content anywhere and anytime. However, fluctuating power may affect Moodle's financial viability, which is why maintenance is paramount. Future researches would do well to consider how solid pedagogical approaches and assistive technologies can eradicate barriers to diversity in education in the Nigerian context.

Finally, subsidization of internet access tariffs on campus must be looked at closely, so that it becomes accessible to faculty members as well as students. In addition to making significant investments in Moodle-related investments in the country, the focus must also be on capacity building for students and faculty members on using LMS in Nigeria, especially the Moodle system. There must also be a radical change in terms of receptiveness and attitude to novel technologies.

## 6 Competing interests

The authors declare no competing interests.

## 7 Consent for publication

Not applicable.

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