



Exploring the Use of Learning Management System for Instructional Delivery During the COVID-19 Pandemic: A Case of University of Nigeria, Nsukka

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Abstract

This study explored the use of the Learning Management System (LMS) among lecturers at the University of Nigeria, Nsukka during the COVID-19 pandemic. The study adopted the exploratory sequential mixed method design. A sample of six participants were interviewed as part of the qualitative component of the study, while 355 respondents participated in the quantitative component by responding to an online questionnaire. The trustworthiness and validity of the instruments were checked by three experts. The qualitative data were transcribed and categorized based on Rogers's Diffusion of Innovation (DoI) Theory, while the quantitative data were analyzed using frequency count and percentages, and results were represented in a bar chart. Results from the study showed that although some lecturers were categorized as innovators due to their venturesomeness and creativity in using LMS, some have never seen nor used LMS. It was recommended that the university through the ICT directorate should organize at least a quarterly training programme for lecturers to create awareness and equip them with the necessary skills to use LMS for instructional delivery during a pandemic in the university.

Keywords: COVID-19; Adoption; Learning Management System; Lecturers; University of Nigeria

Introduction

Advances in Information and Communication Technology (ICT) have revolutionized the education industry. These advances have led to the emergence of e-learning, blended learning, and cloud-based Learning among others. This technology gives hope to education amid global disruptions like the Corona Virus (COVID-19) pandemic. The COVID-19 global pandemic resulted in disruption of education around the world, and only countries that were prepared for distance learning approaches continued to provide education while complying with social distancing policies put in place by the various governments around the world (González-Zamar et al., 2020; Azevedo et al., 2020; Owusu-Fordjour, 2020). Therefore, the Learning Management System (LMS) has become an indispensable tool in teaching and learning through which distance education is provided and served as a go-to medium during the COVID-19 pandemic, especially in Higher Education Institutions (HEI) (Mtebe, 2015).

Recently, teachers and other professionals such as engineers, doctors and lawyers depend on low-technology tools basically for reading, writing, speeches, manipulative visual aids, role play, games, and so on. With the proliferation of technology in classrooms, its importance in teaching and learning cannot be overemphasized. Studies have shown that classroom technologies are critical to engaging learners in a meaningful and effective way (Han et al., 2019; Kubravi et al., 2018). Now, HEIs utilized online educational social networks to connect teachers and students to collaborate, communicate or

report attendance, academic progress, school events, and other educational activities (Bagarukayo & Kalema, 2015; Dube & Scott, 2014).

The common way to categorize how students interact with technology has been penned down by Jonassen and Reeves (1996) as learning about technology or technology as a subject; learning from technology where technology is used as a delivery tool; and learning with technology (technology as a cognitive partner. Teachers are encouraged to go beyond the typical uses of computers to engage students in what is termed technology-enabled learning (TEL). According to Jonassen and Reeves (1996), technology is best used when students, not teachers, use it as a cognitive partner or tool to access and analyse information, interpret and transform that information into their knowledge, and then represent that knowledge to others. Based on this, numerous learning technologies have evolved. Some of these learning technologies are today known as Learning Management Systems (LMS).

The LMS are enterprise-wide and internet-based systems that integrate a wide range of pedagogical and course administration tools such as Moodle; Google Classroom; WebCT; Blackboard etc. (Coates et al., 2005). The LMS enables the creation of a virtual learning environment for students and is being used to develop online virtual universities. The literature has identified LMS with different names such as Course Management Systems (CMS), Virtual Learning Environments (VLE), and e-learning courseware (Gibbons, 2009). These online LMS have

potentially affected teaching and learning in unanticipated ways (Cerezo et al., 2016; Jordan & Duckett, 2018). With LMS, the students are not necessarily required to be in the same location as their lecturers.

Hannan and Silver (2000) opined that successful implementation of LMS in a university to involved careful planning, implementation of need-based skills development for lecturers and students to ensure meaningful adoption of the technology, strategies at a university-wide or faculty or departmental or Service level. Although the adoption or utilization of ICT in teaching is no longer a major concern in developed and some developing countries (Smith et al., 2018; Albion & Tondeur, 2018), it is still a concern in most developing countries (Al-dheleai, Baki, Tasir & Al-rahmi, 2019; Alharbi & Alotebi, 2019) because they are still struggling with issues of availability and adoption of this new technology in teaching. The COVID-19 pandemic has further exposed this gap. Literature has also shown that teaching and learning facilities such as interactive whiteboards (IWB) or smart boards, Learning Management Systems, and computers are available in Nigerian Tertiary Institutions (Nannim & Yushau, 2019; Odelewe & Okwor, 2017; Obahiagbon & Osahon, 2014). However, there is a paucity of literature that shows that LMS are being effectively utilized in teaching (Malekani, 2018). The ineffective utilization of these LMS could be a plausible reason for shutting down schools in Nigeria without any form of teaching in most of our universities, while other nations of the world continue with schooling at home via the distance learning platforms such as LMS (Dhawan, 2020; Huang et al., 2020). The underutilization of these facilities has been linked to inadequate facilities, lack of in-service training on ICT in teaching and learning, poor internet connectivity (low speed) due to low bandwidth, power supply issues, absence of policies and training schedules (Al-dheleai et al., 2019; Malekani, 2018; Muslem et al., 2018). Literature has also shown that the utilization of these facilities varied among countries, and even within the same country, and could also vary among the universities (Yushau & Nannim, 2018). Specifically, there is a scarcity of studies that are aimed at investigating how these available LMSs are being utilized for teaching purposes in Nigerian universities, especially during the COVID-19 pandemic.

Despite the benefit of LMS in HEI, research into various aspects of LMS such as effective utilization and pedagogical issues (Zieber, 2019; Abdullateef et al., 2016) is still problematic (Coates et al., 2005). Although the LMS is primarily a tool for teaching,

Coates et al. (2005) opined that attention has rather been focused mostly on technical, financial, and administrative issues. For instance, at the University of Nigeria, Nsukka (UNN) under review, there is no visible adoption and integration of LMS in teaching and learning even during the COVID-19 pandemic. This is despite efforts being put in place by the university through the provision of these learning platforms and ensuring that lecturers are trained on how to use these facilities in teaching and learning. This challenge hinders the advancement of an initiative that will embed LMS in the university.

Research findings from developing countries show that once users are trained, they do not utilize the system. Dube and Scott (2014) found that out of the 10 000 users that were trained to use the LMS at the National University of Science and Technology of Zimbabwe, only 20% utilized the system. Similarly, increased adoption of the LMS but low usage was reported in South Africa (Bagarukayo, & Kalema, 2015), as well as in other countries such as Ghana (Darko-Adjei, 2018), Kenya (Tarus & Gichoya, 2015; Maina & Nzuki, 2015); Uganda (Mayoka & Kyeyune 2012); and Sudan (Elmahadi & Osman, 2013). The low adoption and utilization were linked to the difficulty of use of LMS; lack of feasibility study to link the implementation to the need of users; lack of support services such as training and appropriate technical support. The above findings made Mtebe (2015) suggest that institutions should establish functional ICT units equipped with qualified staff who have both technical and pedagogical skills to provide appropriate support. Therefore, this study explored the use of LMS in Universities including the University of Nigeria, Nsukka as a case study, using a more detailed and in-depth approach to impact knowledge, policies, and practice.

The University of Nigeria, Nsukka (UNN) has access to LMS such as CANVAS, Moodle and Google Suites for Education, yet the utilization of these LMSs is not visible. This study, therefore, sought to explore lecturers' use of LMS for instructional delivery at the University of Nigeria, Nsukka amid the COVID-19 pandemic.

Theoretical Framework

This study is theoretically framed on Diffusion of Innovation (DoI) Theory (Rogers, 2003). This theory is concerned with how social members adopt a new innovative idea and how they make a decision concerning the adoption of the technology. This theory plays an important role in the adoption of a new invention when it comes into existence and further explains the mechanism through which the innovation is adopted by different people who belong

to different adopters' categories. It also predicts whether or not innovation will be successful or not based on the relative importance and the ease with which it can be adopted (Rogers, 2003).

Adopting an innovation at times comes with a lot of resistance from certain quarters of the society in which the innovation is to be diffused. This is because changing the way things were being done to a new way is often very difficult. For example, it is an old practice in the university that a teacher stands before the students in the class and lectures. The lecturer in this context is seen as the all-knowing and knowledge repository. According to Koller (2012), the most commonly used approach to teaching in higher institutions is the expository approach which involved the talk-chalk method, which is the old method. Lecturers now find it very difficult to adopt the new approach which involves the use of LMS. LMS here is seen as the "new order of things" (Rogers, 2003). Although the university system could be observed as very hard to change, there is an increasing proliferation of ICT facilities (Selwyn, 2007), which is pushing for a change in the way lecturers are carrying out their teaching responsibilities.

According to Rogers, this diffusion of innovation is carried out in five sequential stages, which are described as the process of decision-making in response to innovation: Knowledge, Persuasion, Decision, Implementation and Confirmation. At the *knowledge* stage, the individual or organization is exposed to the innovation for the first time but does not have concrete information about it and is therefore inspired to find out more about the innovation. At the *persuasion* stage, the would-be users develop a keen interest in the innovation and the individual actively seeks detailed information about it. At the *decision* stage, the decision on whether or not to adopt the innovation is reached based on the supposed merits, comparative advantage and demerits of using it. The *implementation* stage encourages the individual to put the innovation into practice and assesses its usefulness depending on the situation and might be spurred into seeking more information about it. At the *confirmation* stage, the individual makes up his/her mind on whether to continue using the innovation or not. The decision to use the innovation optimally, sparingly or reject it is made at this very level.

To understand how lecturers respond to the introduction of the Learning Management System (LMS) in the university, Rogers adopters' categories became appropriate. Roger classified people into five adopters' categories based on their level of innovativeness. These categories of adopters are innovators, early adopters, early majority, late

majority, and laggards (Rogers, 2003). These categories follow a standard deviation curve. Very few innovators adopt the innovation in the beginning (2.5%), early adopters making up 13.5% a short time later, the early majority 34%, the late majority 34% and after some time finally the laggards make up 16%.

Innovators: They are described as venturesome, individuals who are infatuated with innovation and are willing to take big risks, making them the first individuals to adopt an innovation. They are mostly younger in age.

Early adopters: This group comes second to innovators in terms of how quickly they adopt innovation. They have the highest degree of opinion leadership compared to the other adopters' categories. They are younger, have higher social mobility, and advanced education compared to others. Although they exhibit more discretion in adoption choices than innovators, that is, they "tread carefully." People look up to them for advice on such new ideas and this earns them respect in society.

Early Majority: This group accepts innovation after a relatively longer time than the innovators and early majority. They show a slow-paced adoption process, contact with early adopters and usually not opinion leaders.

Late Majority: This category only adopts innovation after a majority of the society have done so because they approach innovation with a high level of scepticism. They typically have below-average social status and are in contact with others in the late majority and early majority, but have very little opinion leadership.

Laggards: They are the last category to adopt innovation. They are near isolated and only have close contact with members of their families or friends. They are most advanced in age compared to the aforementioned categories. They approach new innovation with lots of caution and must be convinced of the relative advantage of the innovation before attempting it. This group possess little or no opinion leadership.

Furthermore, to understand which factors promote or hinder the adoption of new innovation, Roger (2003) explains six characteristics:

Relative advantage – this involves comparing new innovation with what it replaces. It is measured not only in economic terms but also in the social prestige it brings to the user, the convenience of its use and the amount of satisfaction the user derives from it.

Compatibility – is concerned with how consistent is the new innovation with existing values, past experiences and needs of potential adopters. However, adopting an innovation that flouts societal

norms and values more often than not necessitates changing the value system of the society in question so that there is compatibility with the new innovation. Even though, it takes a very long time for any society to form a value system and even more so to change one. *Complexity* – is concerned with whether it is easy to use the new innovation. Obviously, some innovations do not necessitate the acquisition of new skills and knowledge in order to be understood by potential users. However, others are not easily comprehensible and call for would-be users to acquire new knowledge and skills on how to use them. *Trialability* – is the level at which the new innovation can be trial tested. Innovation would be adopted incrementally. According to Roger, people would rather have a piecemeal add-on process of adoption than adopt it wholesale. So, the more trialable an innovation is, the better it is chance of adoption. *Observability* – this simply means the visibility of its results to others. If the results of innovation can easily be observed by peers, then it is a lot easier to spread it to the general population because it becomes a topic of discussion consequently spurring interests among members of a social group and hence giving it a better chance of adoption.

This theory is very important in the current study because it helps the researchers in identifying the current stage of adoption of LMS at the University of Nigeria, Nsukka (UNN). To achieve this, the qualitative data were coded and categorized based on these stages of the adoption of new innovation. The data were further categorized in the Rogers adopters' categories to understand how lecturers respond to the introduction of LMS in the university. This helps the researcher in interpreting and discussing the findings of the study.

Research Questions

The following research questions guided the study:

1. What category of LMS adopters do lecturers at the University of Nigeria Nsukka belong to?
2. What is the familiarity of UNN lecturers with the use of LMS for instructional delivery?

Methods

Table 1. Categorization Criteria for Adopter Types

Description	Innovators	Early Adopter	Early Majority	Late Majority	Laggards
Creative, venturesome	✓	—	—	—	—
Has the implementation of LMS occurred?	✓	✓ (pre)	✓	✓	—
Likelihood to implement LMS	✓	✓	✓	Undecided/unlikely	—

The exploratory sequential mixed method design was adopted for this study. This design involves collecting data in two phases; first gathering qualitative data through interviews to explore the phenomenon and secondly, collecting quantitative data (using the questionnaire as the instrument) to explain relationships found in the qualitative data (Creswell, 2012). The design is shown in Figure 1.

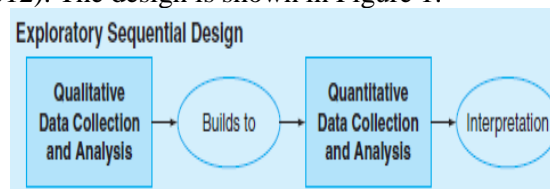


Figure 1. The Exploratory Sequential Design. Source: (Creswell, 2012, p.541).

The Population of the study is made up of all the 9645 Academic Staff of the University of Nigeria, Nsukka. Six (6) participants were purposively selected for the qualitative interview. The purposive sampling technique enabled the researchers to select participants who are information-rich to learn about the central phenomenon. Simple random sampling technique was used to select a total sample of 355 respondents who responded to items on the familiarity of lecturers with LMS. An interview protocol was used to collect the qualitative data through the use of semi-structured interview questions. The quantitative data was collected through a self-constructed closed-ended online questionnaire, developed through a review of consulted literature.

The trustworthiness and validity of the instruments were checked by three experts, two from the Computer and Robotics Education Department and one from the Measurement and Evaluation Unit of the Department of Science Education, University of Nigeria, Nsukka.

The data collected was transcribed. The researchers leveraged the different types of adopter categories of Roger's theory to develop a coding rubric that allowed the categorization of participants into the adopter categories as shown in Table 1. Table 1 is adopted from Xue (2017).

Leadership	✓	✓	—	—	—
Previous pedagogical training	✓	✓	✓	—	—
Traditional Teaching in all level of peer evaluation	—	—	—	✓	✓

The quantitative data were analyzed using a bar chart (percentages). Ethical considerations such as seeking participants' consent and their confidentiality were strictly adhered to.

Findings

Research question one was “What category of LMS adopters do lecturers at the University of Nigeria Nsukka belong to?” To answer this question, a qualitative investigation was carried out to study the phenomenon. The analysis of the qualitative data

shows that the participants could be categorized into four major adopter categories. The Innovators and the Early Adopters were merged into the Innovator category. There are the Early Majority, the Late Majority and the Laggards.

Findings show that, of the six (6) participants in a one-on-one semi-structured interview, two (2) participants fall within the Innovator category, two (2) in the Early Majority, none in the Late Majority, and two (2) in the Laggard category (see Table 2).

Table 2. Types of Adopters with Features

Types of adopters	Description	Features in Transcript
Innovator (Innovators + Early adopters)	Creative, venturesome Activists, Leaders, Experienced	“I developed my own LMS which I am using. I am no longer using the school (University) Moodle” [Lecturer C] “... I have different network. If one is bad, I switched to the other one” [Lecturer E].
Early Majority	Fall-in-line	“Even though there was a time we were trained on how to use blackboard, but as it is now, it is not existing anywhere” [Lecturer B] “...I tried using it but I am still having a little challenge about it” [Lecturer D].
Late Majority	Having some Concerns;	
Laggards (Non-adopters)	Never try out or never had the chance to try	“I have heard about LMS, but I have never seen it in use.... I have never used it” [Lecturer A] “...was mentioned during our departmental meeting that the university encourages lecturers to upload lectures online [via LMS] for students to use” [Lecturer F].

The findings of this study as summarized in Table 2 show that although some of the lecturers are innovative users of the LMS in the university, some still claim that they have never seen how LMS look like talk more of using it. This finding is disturbing considering the popularity gained by LMS during the COVID-19 pandemic as a result of governments of various nations, and educational institutions' policies that facilitate a swift shift from their traditional

teaching methods to online-based approaches to curb social distancing policy.

Research question two investigates “What is the familiarity of UNN lecturers with LMS for instructional delivery?” The quantitative approach was employed to expand and enable generalization on research question 1(a) and the population of the study. Bar chart and frequency counts were used to analyse the research question. The result is presented in Figure 2.

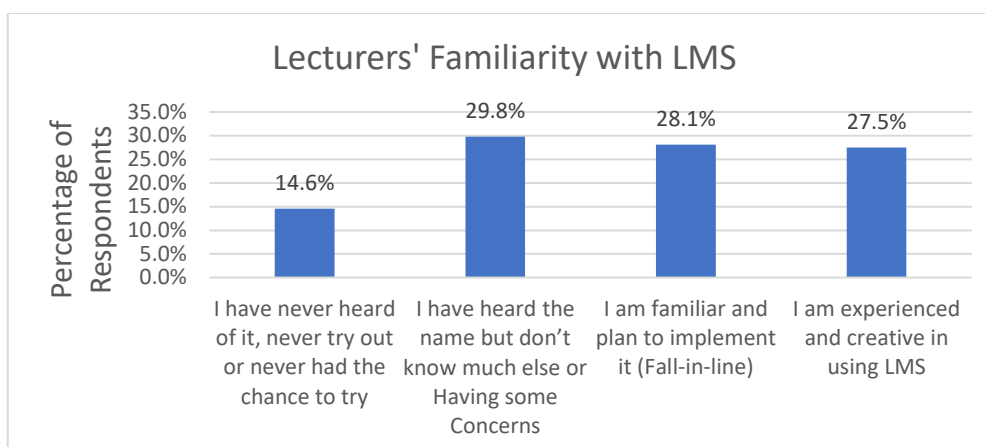


Figure 2. Lecturers' Familiarity with LMS

Results in Figure 1 show that out of 355 participants who responded to items on research question 1b, 51 (14.6%) responded that they have never heard of or never had the chance to try using LMS; 106 (29.8%) have heard the name but don't know much else or having some concerns, 100 (28.1%) indicated that they are familiar with LMS and plan to implement (Fall-in-line), and 98 (27.5%) responded that they are experienced and creative in using LMS in instructional delivery.

Discussion

The study investigated the adoption of LMS by lecturers at the University of Nigeria, Nsukka. The discussion of the result is done based on the research questions guiding the study. Results of research question 1 show that although some of the lecturers are innovative users of LMS within the university, others still claim not to know what LMS look like and do not know how to use it. The excerpt from the interview with some lecturers as presented below captures the assertion: *"I developed my own LMS which I am using. I am no longer using the school's (University's) Moodle"* [Lecturer C]. The transcript from Lecturer C clearly showed that he is an innovator because he is creative, venturesome and experienced with LMS, which is a new technology (Rogers, 2003). An interview with Lecturer A reports the complete opposite! *"I have never seen it in use... I have never used it"* [Lecturer A]. Lecturer A is therefore categorized as Laggard since he has never tried out or had the chance to try using the LMS (Rogers, 2003). It was found that, of the six (6) participants in a one-on-one semi-structured interview, two (2) participants fall within the Innovator category, two (2) in the Early Majority, none in the Late Majority, and two (2) in the Laggard category (see Table 2). This finding is disturbing considering the popularity gained by LMS during the COVID-19 pandemic as a result of governments, and educational institutions' policies that facilitate a swift

shift from traditional teaching methods to online-based approaches using LMS to curb with social distancing. None of the lecturers should be found within the Laggard category considering the above reasons which necessitated the global paradigm shift to ubiquitous learning platforms. However, lecturers who showed a level of confidence in their technological skills were more likely to adopt the technology for their teaching (Alzahrani, 2023).

The quantitative data collected through the online questionnaire to help in extending the findings, getting a better understanding, and generalization using a larger sample supports the qualitative findings. The result of research question two in Figure 2 shows that out of 355 participants who responded to items on research question two, 51 (14.6%) responded that they have never heard of or never had the chance to try using LMS; 106 (29.8%) have heard the name but don't know much else or having some concerns, 100 (28.1%) indicated that they are familiar with LMS and plan to implement (Fall-in-line), and 98 (27.5%) responded that they are experienced and creative in using LMS. This result agrees with Rogers (2003) which shows a normal distribution curve for adopters' categories in the adoption of new innovations.

Triangulating the qualitative findings and quantitative results shows that within the university, there are experienced and creative users of LMS which Rogers (2003) refers to as Innovators. Also, some lecturers have never tried out or never had the chance to try using LMS, a category Rogers (2003) refers to as laggards. This result is quite concerning considering the large proportion of lecturers that have never tried or had the chance to try using LMS. The plausible explanation could be that there is a poor institutional framework for integrating LMS in teaching and learning within the university. It could also be lecturers' individual factors, large workloads that leave them with little or no time to prepare for and use LMS (Nannim & Yushau, 2020), or the perceived

difficulty in using LMS by lecturers. The findings of this study agree with Shelton (2017) and Mpungose (2020) which show that in educational institutions, not everyone accepts new technology no matter the perceived benefits of such a technology.

Conclusion

This study has explored the use of LMS at the University of Nigeria, Nsukka. The study identified various adopters' categories and lecturers' familiarity with LMS. It was surprising that though, some lecturers were categorized as innovators due to their venturesomeness and creativity in using LMS, quite a number of the lecturers claimed to have never seen nor used LMS. This result is a source of worry because, despite the campaign and publicity for the use of LMS within the country and university, several lecturers have not even known what the LMS looks like.

Recommendations

This study has great implications for the use of LMS in the university because LMS stimulates an environment where lecturers could reach their students anytime and anywhere, breaking the time and place barrier to learning. Most importantly in this era of global disruptions, its uses cannot be better as it's the best option to continue teaching/learning even amid lockdown to contain the spread of the COVID-19 virus and other emergencies.

Based on the findings of this study, the following recommendations were made:

1. The university through the ICT directorate should organize at least a quarterly training programme for lecturers in the use of LMS.
2. Training on the pedagogy of using LMS should be conducted at least twice a year to equip lecturers with the Technological Pedagogical Content Knowledge (TPCK) of using LMS.
3. The Government and the Ministry of Education should promulgate policies that will mandate the use of LMS in Universities considering the benefits thereof.

Limitations of the Study

This study is carried out at the University of Nigeria, Nsukka, only lecturers from the university constitute the population of the study. Therefore, the results of this study might not apply to other universities.

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