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Application of learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers state, Nigeria

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Abstract
This study investigated the application of learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. Two research questions and two null hypotheses guided the study. The study adopted descriptive research design. The population comprised all the 2,905 lecturers (2,261 males and 644 females) in the three public universities in Rivers State, Nigeria. Taro Yamane's formula was used to determine a minimum sample size of 351; hence, a sample size of 581 lecturers, which represents 20% of the population was drawn using the proportionate stratified random sampling technique. Out of these 581 lecturers, 452 are males while 129 are females. An 18-item self-structured questionnaire, which was entitled: "Application of Learning Management System as Quality Assurance for Enhancing Virtual Learning Questionnaire (ALMSQAEVLQ)" was used. Face and content validities were ensured by three experts. The internal consistency reliability coefficient of 0.86 for ALMSQAEVLQ with subscales of 0.83 and 0.79 respectively, were computed using Cronbach Alpha statistical method. Mean and standard deviation were used to answer the research questions while z-test was used to test the null hypotheses at 0.05 level of significance. The findings of the study revealed, among others, that lecturers agreed that LMS is an essential software tool that can ensure qualitative education in universities in Rivers State, especially in this era where there is seismic shift to online learning. Based on the findings, the researchers recommended, among others, that the university administrators should ensure that learning management system (LMS) software is installed in their institutions, integrated into the teaching-learning process, and made accessible to both lecturers and students.

Keywords: application, learning management system, quality assurance, enhancing and virtual learning

Introduction

This 21st century world is technology-based, and it is advancing so rapidly that schools are no longer expected to embrace change and innovation, but to create them. Universities, in this computer age, face a virtual world that is more interconnected, knowledgeable, creative and innovative. The seismic shift from the traditional face-to-face teaching method to online/virtual learning has necessitated higher education institutions to engage in global networking, and also keep abreast of the global best practices and international standards of teaching with modern technologies in the classrooms. In this knowledge-based society, universities are expected to fulfil an ever-growing spectrum of roles such as: educate and train students; conduct and disseminate excellent research; boost productivity through collaborative relations with external partners; contribute to the socioeconomic wellbeing of their host communities and enhance civic value in the public realm (Barrioluengo *et al*., 2016) [7]. In other words, Nigerian universities are mandated to intensify and diversify their programmes for the development of high level manpower within the context of the needs of the nation (Federal Republic of Nigeria, 2014) [10]. Hence, globalisation has placed increased demands for using technology and e-Learning systems in teaching-learning process in our universities.

Furthermore, the outbreak of Corona Virus 2019 Disease (COVID-19) has propelled universities all over the world to depend on online learning platforms as one of the measures to curb the spread of the virus among students. Hence, it becomes exigent for universities to regulate the knowledge that is being shared and transferred to students remotely. This recent development has resulted in the emergence of a new concept in education, "Learning Management System (LMS)." LMS is one of the widely accepted software applications in universities that is currently being used to manage course activities in the digital environment, and help connect students and lecturers without the confines of the traditional classroom (Oliveira *et al*., 2016; Adzharuddin & Ling, 2013) [22, 2]. Mtebe (2015) [16] observed that LMS is currently installed in most higher education institutions in sub-Saharan Africa. Learning Management System is a software application that is used for creating, managing and distributing learning contents and resources to students via the Internet. LMS is defined as software-based application which helps universities to administer, document, track, report and evaluate the teaching-learning process, training programs, virtual classes, and e-Learning programs (Chaubey & Bhattacharya, 2015) [8]. Nair and Patil (2012) [18] defined a learning management system as a set of software tools for planning, delivering, tracking, implementing, assessing and managing online/virtual learning. There are three main users of LMS: the learners who are the first consumers of LMS, the lecturers, who use LMS to deliver instructions, guide, supervise, assist and evaluate learners, and the administrators, who are responsible for managing the proper flow of operation of services, its users, and technical issues (Oliveira *et al*., 2018). Nair and Patil noted that LMS mostly include features such as: content development tools, communication

tools, productivity tools and student involvement tools. Adzharuddin and Ling viewed LMS as an online portal that connects lecturers and students by providing an avenue for classroom materials or activities to be shared easily. Thus, an LMS provides lecturers with educational resources, where they can plan, develop course outlines/contents and deliver to students while monitoring their participations and assessing their performance.

Technological advancement has resulted in an explosion of varieties of hardware: computers, smartphones, tablets, iPads, notepads, among others, and e-learning software such as: Zoom, Google Classroom, Moodle, Canvas, Blackboards, among others, which have paved way to the development of virtual learning in higher institutions. Virtual learning is a system that allows a teacher to meet with students using computers and the Internet (Misut & Pribilova, 2015) [15]. According to Inegbediomn (2019) [13], virtual learning is the type of learning that allows students to have access to educational resources, interact, connect, learn, collaborate and share their learning experiences and materials with other students and teachers by using learning management system software like Moodle. Moore and Kearsley (2007, as cited in Oliveira *et al*., 2016) [22] defined virtual learning as a planned learning process that occurs in general, in a different place other than a regular school, and as a result, requires special techniques of course design, special forms of instruction, special methods of communication through electronic and other technologies, as well as essential organizational and administrative arrangements. Thus, integration of virtual learning in universities enables students to learn either in synchronous mode (learning at the same time, but not in the same place), or in asynchronous mode (learning occurring not only in different locations but also at different times), especially now that they can learn either on campus or off campus. Hence, LMS is one of the strategic, innovative tools that is designed to achieve effectiveness in teaching and learning.

The application of LMS in universities has had unprecedented impacts on teaching and learning. The study of Oliveira *et al*. (2016) [22] revealed that LMS allows lecturers to deliver high quality educational contents to their students from anywhere, collaborate on class topics and assignments remotely and let students access, store and send contents as at when needed. In corroboration, Findik-Coskuncay *et al*. (2018) observed that LMS has taken on a significant role in providing educational resources, managing and making them accessible to all learners. Alias and Zainuddin (2005) [3] conducted a study which revealed that LMS has the solution for planning, conveying and managing a myriad of learning programmes such as online, virtual classroom and instructor-led courses that can assess a specific learning process. Dobre (2015) [9] viewed LMS as an invaluable tool that can be used to add new compliance standards to virtual learning and ensure that users abide by the rules and regulations. The research findings of Gautreau (2011) [12] revealed that LMS enables easy, fast, and organized management of the knowledge and resources for individuals and institutions, and provides features and tools for delivering of learning contents and resources, assessing students' learning, and monitoring learners' progress. In a related study that was conducted by Adzharuddin and Ling (2013) [2], it was discovered that LMS is an essential tool for university students as it keeps them updated with their coursework, and notifies them of their daily assignments. It also makes lecturers have an easier time reaching out to their students out of class hours, and can instantly update them about issues regarding their coursework.

Learning Management System is the framework that handles all aspects of the learning process; the infrastructure that delivers and manages instructional contents; identifies and assesses individual and organizational learning or training goals; tracks the progress towards actualizing organisational goals; collects and presents data for supervising the learning process of the organization as a whole (Szabo & Flesherr, 2002, as cited in Onyeagbako *et al*., 2017). The research findings of Almarashdeh *et al*. (2010) [4] revealed that LMS supports management tasks such as delivery and tracking examination malpractice, planning virtual live classes and several statistical analyses. Kerschenbaum (2009, as cited in Onyeagbako *et al*., 2017) asserted that the functionalities of LMS include but not limited to: course content delivering, students' registration and administration, curriculum certification, competencies management, individual development plan, assessing and recording, reporting and evaluation, resource management, performance management, system interpretation, courseware auditing and virtual organization. Gautreau (2011) [12] discovered in his study that among a variety of online learning applications and tools, LMS has the potential of enhancing online learning environments and developing functional virtual classrooms. In a related study, Onyeagbako *et al*. (2017) discovered in their study that if LMS is adopted in Nigerian Federal universities, it will enhance communication and technological competence of both lecturers and students.

Quality is a term used to ascertain how a product or service satisfies customers' needs. Relating quality to education, Asiyai and Oghuvbu (2009) [5] defined quality as a measure of how good or bad the products of higher education institutions are in terms of their academic performance and meeting established standards. Thus, for universities to ensure high quality, the quality assurance minimum academic standard, carrying capacity, students' admission, lecturers' qualifications, research and development, infrastructures, teaching with modern technological devices, among others, must be effectively implemented (Nwideeduh & Adieme, 2021; Nnorom & Gauis-Oke 2013) [19]. Quality assurance is a mechanism that is adopted in organizations to ensure that the quality of inputs, transforming processes and outputs is maintained. Adepoju (2007) [1] emphasized that quality assurance in school entails the quality of teachers, learning equipment, facilities, instructional materials, school environment, students, curriculum and quality of instructional delivery. In the same vein, Asiyai (2013) [6] posited that one of the key building blocks of quality assurance in education is the development of minimum standards, which include: qualification of teachers, the quality of teaching in the institutions, expected educational achievement of students and the development of a more rigorous management process for education so that the entire sector develops effective operating policies and procedures which will always be referenced. Hence, the proliferations of open educational resources (OERs) have necessitated universities to apply LMS, which is a set of software tools for planning, managing, delivering, tracking and monitoring of virtual learning to ensure quality education.

The emergence of the knowledge society and globalization have necessitated that Nigerian education system must follow the novel concepts and trends in education before it is swept aside by the change and innovative tide. Nwideeduh and Adieme (2021) [20] posited that there is need for quality assurance to monitor the teaching-learning process in order to ensure qualitative education. Learning Management System can also be viewed as a quality assurance tool that generates, transfers, shares and manages the knowledge of higher education and makes it accessible to all lecturers and students. LMS provides all the required tools to create and manage online learning environments. Obanya (2014) [21] maintained that world class universities are distinguished not only by quality of research and publications but also by the quality of learning that their students get. Thus, quality is incontrovertible to education. Bates in Oliveira *et al*. (2018) posited that the effective implementation of LMS in higher education institutions is important to improving the quality of learning, training and access to education. According to Szabo and Flesher (2002, as cited in Onyeagbako *et al*., 2017), LMS is the framework that handles all aspects of the teaching-learning process, and the infrastructure that delivers and manages instructional contents. Almarashdeh *et al*. (2010) [4] asserted that LMS is a set of tools and a framework that allows for easy creation of online course contents, teaching and management of that course including various interactions with students taking the course. Misut and Pribilova (2015) [15] maintained that LMS is a tool for improving the quality of higher education.

Some empirical studies have revealed the adoption of LMS in higher education institutions in sub-Saharan Africa. Mtebe (2015) [16] conducted a study which revealed that there has been an increasing rate of adoption of LMS in higher education in sub-Saharan Africa. Onyeagbako *et al*. (2017) discovered in their study that a few federal universities in Nigeria have adopted LMS. These findings corroborated with Ssekakubo *et al*., (2011) [24], who found that five of the surveyed higher education institutions in sub-Saharan Africa had installed an LMS applications. The research findings of Munguatosha *et al*. (2011) revealed that 80% of surveyed higher education institutions in Tanzania were using LMS. Similarly, a study that was conducted by Unwin (2010) showed that several higher institutions in Kenya have installed various LMS Applications. These findings corroborated with another study that was conducted by Mayoka and Kyeyune (2012) in Uganda. The researchers discovered that LMS has been adopted in the higher education institutions. However, despite the adoption of LMS in higher education in sub-Saharan Africa, Mtebe observed in his study that the usage is relatively low. On the other hand, Chaubey and Bhattacharya (2015) [8] noted that the popularity of LMS among universities is so high that the current paradigm shift from traditional educational environments to online educational environments in higher education can also be seen as a challenge to create qualitative education. Hence, LMS can be used to manage courses and information exchange among lecturers and students during virtual learning. LMS can enhance qualitative education in universities if utilized adequately.

Statement of the Problem

Our society has shifted from the Industrial Age to the Information and Computer Age, and this has resulted in proliferations of information, and students depending on the Internet and open educational resources (OERs) for most of their learning tasks. With this scenario, there is every tendency that students will access open resources that may "unteach" them. It is expected that universities should ensure quality service delivery in the teaching-learning process so as to enable their products (graduates) to compete favourably with their counterparts in the global market and positively impact the society. This is why it becomes exigent for a learning management system (LMS) or students' online portal to be adopted and effectively used to manage knowledge generation and knowledge transfer in the university education system. Again, the advancements of technologies, which have resulted in different teaching devices in the education system, coupled with the outbreak of COVID-19 pandemic, have been of great concern to educational managers. More worrisome is the seismic shift to online/virtual learning which has propelled lecturers to deliver instructions to students in blended learning and remotely too. If knowledge generation and knowledge transfer are not well-managed, any material could go into the public domain, and this may not portray the image of the ivory towers – universities.

Furthermore, Nigerian public universities often seem to be criticised for unidirectional lecture methods with concepts and principles that emanate from lecturers' old notes without modifications. This has constantly raised concerns among educational stakeholders and the knowledge-based society, that pressurise universities to comply with the global best practices of teaching-learning, and respond to the needs of the competitive global economy. The researchers are equally worried about the quality of lectures students receive in this technology-driven 21st century learning. Do lecturers use and integrate their institutions' LMS before delivering instructions to the students? Hence, this unanswered question underscored the problem of this study.

Aim and Objectives of the Study

The aim of this study was to investigate the application of learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. Specifically, the study sought to:

1. Examine the benefits of applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria; and
2. Find out ways in which LMS can be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria.

Research Questions

The following research questions were posed to guide the study:

1. What are the benefits of applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria?
2. In what ways can LMS be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria?

Hypotheses

The following null hypotheses were formulated at 0.05 alpha level:

Ho_1: There is no significant difference between the mean ratings of male and female lecturers on the benefits of

applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria.

Ho_2: There is no significant difference between the mean ratings of male and female lecturers on ways LMS can be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria.

Methodology

This study adopted descriptive research design. The population comprised all the 2,905 lecturers (2,261 males and 644 females) in the three public universities in Rivers State, Nigeria. Taro Yamane's formula was used to determine a minimum sample size of 351; hence, a sample size of 581 lecturers, which represents 20% of the population was drawn using the proportionate stratified random sampling technique. Out of these 581 lecturers, 452 are males while 129 are females. An 18-item self-structured questionnaire, which was entitled: "Application of Learning Management System as Quality Assurance for Enhancing Virtual Learning Questionnaire (ALMSQAEVLQ)" was used. The questionnaire had two sections: A and B. Section A elicited information on demographic data of the respondents whereas Section B elicited information on the variables. The instrument was designed in line with modified Likert four point rating scales of Strongly Agree, Agree, Disagree and Strongly Disagree with weights of 4, 3, 2 and 1 respectively, which are attached to the response options accordingly with a criterion mean of 2.50. Face and content validities were ensured by two experts in the Department of Test and Measurement and one expert in Educational Technology Department in the Faculty of Education, University of Port Harcourt. The internal consistency reliability coefficient of 0.86 ALMSQAEVLQ was computed using Cronbach Alpha statistical method. The subscales reliability for benefits of learning management system (LMS) and application of LMS are 0.83 and 079 respectively. Mean and standard deviation were used to answer the research questions while z-test was used to test the null hypotheses at 0.05 level of significance.

Results

Research Question One: What are the benefits of applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria?

Table 1: Mean Scores and Standard Deviations of the Opinions of Male and Female Lecturers on the Benefits of Applying Learning Management System (LMS) as Quality Assurance Tool for Enhancing Virtual Learning in Public Universities in Rivers State, Nigeria

S/N	Benefits of Applying LMS in Universities:	Male Lecturers = 452		Female Lecturers = 129			
		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_1 \overline{X}_2$	Decision
1.	Learning management system (LMS) provides all the required tools for managing online learning environments.	3.09	0.33	3.07	0.61	3.08	Agreed
2.	LMS is a software tool that can be used to monitor students' academic performance.	2.84	0.34	2.90	0.63	2.89	Agreed
3.	It allows lecturers to deliver qualitative course contents to students.	2.75	0.34	2.74	0.64	2.75	Agreed
4.	It makes it easier for lecturers to reach out to students after lecture hours or remotely.	2.79	0.34	2.72	0.64	2.78	Agreed
5.	It enables students to assess their academic performance at any point in time.	2.77	0.34	2.79	0.64	2.75	Agreed
6.	It makes research less cumbersome for both lecturers and students.	2.92	0.33	2.95	0.62	2.94	Agreed
7.	It supports management tasks such as tracking examination malpractices.	2.86	0.34	2.94	0.62	2.90	Agreed
8.	It enhances e-Learning skills among lecturers.	3.01	0.33	3.03	0.62	3.02	Agreed
9.	LMS helps lecturers in planning virtual lessons by supplying them with novel open educational resources (OERs).	2.92	0.33	2.97	0.62	2.95	Agreed
	Aggregate Mean/SD	2.88	0.34	2.90	0.63		

Table 1 shows the mean responses of male and female lecturers on the benefits of applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. Both male and female lecturers agreed on all the items with mean scores greater than the criterion mean of 2.50. Their aggregate mean scores of 2.88 and 2.90 respectively, indicate that they agreed on the items as the various benefits of learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. These include: managing online learning environments; monitoring students' academic performance; delivering qualitative course contents to students; reaching out to students after lecture hours or remotely; assessing students' academic performance at any point in time, making research less cumbersome for both lecturers and students; supporting management tasks such as tracking examination malpractices; enhancing e-Learning skills among lecturers and helping lecturers in planning virtual lessons by supplying them with novel open educational resources (OERs).

Research Question Two: In what ways can LMS be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria?

Table 2: Mean Scores and Standard Deviations of the Opinions of Male and Female Lecturers on Ways Learning Management System (LMS) can be applied as Quality Assurance Tool for Enhancing Virtual Learning in Public Universities in Rivers State, Nigeria

S/N	Ways LMS can be used in Universities:	Male Lecturers = 452		Female Lecturers = 129			
		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_1 \overline{X}_2$	Decision
10.	Learning management system (LMS) can be used to design course contents which students can have access to wherever they are.	2.98	0.33	2.92	0.63	2.95	Agreed
11.	LMS can be used to carry out administrative tasks more effectively.	2.92	0.33	2.88	0.63	2.90	Agreed
12.	It can be applied to monitor students' behaviour during teaching-learning in universities.	2.75	0.34	2.79	0.64	2.77	Agreed

13.	It can be used to control information exchange or knowledge sharing among students.	2.89	0.34	2.87	0.63	2.88	Agreed
14.	It can be used to track examination malpractices among students.	3.10	0.32	3.07	0.61	3.09	Agreed
15.	It can be used to assess students' academic performance.	2.82	0.34	2.71	0.64	2.77	Agreed
16.	It can help lecturers to make knowledge transmission (teaching) more interactive with students.	2.79	0.34	2.73	0.64	2.76	Agreed
17.	LMS can be used to research for topics before delivering instructions.	2.95	0.33	2.96	0.62	2.96	Agreed
18.	Students can use their institution's LMS to access useful educational resources.	2.89	0.34	2.92	0.63	2.91	Agreed
	Aggregate Mean/SD	2.90	0.33	2.87	0.64		

Table 2 displays the mean responses of male and female lecturers on the ways LMS can be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. Both male and female lecturers agreed on all the items with mean scores greater than the criterion mean of 2.50. Their aggregate mean scores of 2.90 and 2.87 respectively, reveal that they agreed on the items as ways LMS can be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. These include: using LMS to design course contents which students can have access to wherever they are; using LMS to carry out administrative tasks more effectively; monitoring students' behaviour during teaching-learning in universities using LMS application; using LMS to control information exchange or knowledge sharing among students; using it to track examination malpractices among students; using it to assess students' academic performance; applying LMS to help lecturers make knowledge transmission (teaching) more interactive with students; using it to research for topics before delivering instructions and using LMS to access useful educational resources.

Table 3: z-test of Difference between Male and Female Lecturers on the Benefits of Applying Learning Management System (LMS) as Quality Assurance Tool for Enhancing Virtual Learning in Public Universities in Rivers State, Nigeria

Status	N	$\overline{X}$	SD	Df	z-cal	Critical Value	Remarks	Decision
Male Lecturers	452	2.88	0.34	579	-0.35	±1.96	Not significant	Failed to reject
Female Lecturers	129	2.90	0.63					

P< 0.05

Table 3 reveals the z-test analysis of the difference in the mean ratings of male and female lecturers on the benefits of applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. The result shows that z-calculated value of -0.35 is less than the critical value of ±1.96; therefore, the null hypothesis is accepted at 0.05 alpha level. Thus, there is no significant difference in the mean ratings of male and female lecturers on the benefits of applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria.

Table 4: z-test of Difference between Male and Female Lecturers on the Ways LMS can be Applied as Quality Assurance Tool for Enhancing Virtual Learning in Public Universities in Rivers State, Nigeria

Status	N	$\overline{X}$	SD	Df	z-cal	Critical Value	Remarks	Decision
Male Lecturers	452	2.90	0.33	579	1.27	± 1.96	Not significant	Failed to reject
Female Lecturers	129	2.87	0.64					

P< 0.05

Table 4 reveals the z-test analysis of the difference in the mean ratings of male and female lecturers on the ways LMS can be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria. The result shows that z-calculated value of 1.27 is less than the critical value of ±1.96; therefore, the null hypothesis is accepted at 0.05 alpha level. Thus, there is no significant difference in the mean ratings of male and female lecturers on the ways LMS can be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State, Nigeria.

Discussion of Findings

This study revealed that the benefits of applying learning management system (LMS) as quality assurance tool for enhancing virtual learning in public universities in Rivers State include: managing online learning environments; monitoring students' academic performance; delivering qualitative course contents to students; reaching out to students after lecture hours or remotely; assessing students' academic performance at any point in time, making research less cumbersome for both lecturers and students; supporting management tasks such as tracking examination malpractices; enhancing e-Learning skills among lecturers and helping lecturers in planning virtual lessons by supplying them with novel open educational resources (OERs). Hence, the implication of this study is that LMS will enable universities to ensure quality input-process-output. The finding is in agreement with Oliveira *et al*. (2016) [22]; Findik-Coskuncay *et al*. (2018), who discovered in their various studies that LMS allows lecturers to deliver high quality educational contents to their students from anywhere, collaborate on class topics and assignments remotely and let students access, store and send contents as at when needed. It is also in line with Alias and Zainuddin (2005) [3], whose study revealed that LMS has the solution for planning and managing a myriad of learning programmes such as online, virtual classroom and instructor-led courses that can assess a specific learning process. The finding of the study is also in consonance with Gautreau (2011) [12], who conducted a study on factors affecting the integration of LMS by universities and discovered that LMS enables easy, fast and organized management of the knowledge and resources for individuals and institutions, and provides features and tools for delivering of learning contents and resources, assessing

students' learning, and monitoring learners' progress. The finding is also in corroboration with Adzharuddin and Ling (2013) [2], who found out that LMS is an essential tool for university students as it keeps them updated with their coursework and makes lecturers have an easier time reaching out to their students out of class hours. The finding from the test of the null hypothesis revealed that both male and female lecturers accepted that there are significant benefits of applying LMS as quality assurance tool in universities. Thus, this is also in line with Onyeagbako *et al*. (2017), who observed that adopting LMS in Nigerian federal universities is a sure way of ensuring qualitative education. Another finding of this study showed that ways LMS can be applied as quality assurance tool for enhancing virtual learning in public universities in Rivers State include: using LMS to design course contents which students can have access to wherever they are; using LMS to carry out administrative tasks more effectively; monitoring students' behaviour during teaching-learning in universities using LMS application; using LMS to control information exchange or knowledge sharing among students; using it to track examination malpractices among students; using it to assess students' academic performance; applying LMS to help lecturers make knowledge transmission (teaching) more interactive with students; using it to research for topics before delivering instructions and using LMS to access useful educational resources. This finding agrees with Szabo & Flesherr (2002, as cited in Onyeagbako *et al*., 2017); Almarashdeh *et al*. (2010) [4], whose studies revealed that LMS can be used to support management tasks such as delivery and tracking examination malpractice, planning virtual live classes and several statistical analyses. It corroborated with Kerschenbaum (2009, as cited in Onyeagbako *et al*., 2017), who observed that the functionalities of LMS include but not limited to: course content delivering, assessing and recording of students' academic performance.

The finding is also in line with Misut and Pribilova (2015) [15], who discovered that LMS is a tool for improving the quality of higher education. The finding is also in agreement with Mtebe (2015) [16]; Onyeagbako *et al*. (2017); Ssekakubo *et al*. (2011) [24]; Munguatosha *et al*. (2011) [17]; Mayoka and Kyeyune (2012) [14]; Unwin *et al*. (2010), conducted various studies on the adoption of LMS in higher education universities, and found out that the application of LMS can ensure qualitative education, especially now that the world has gone virtual. The finding from the test of the null hypothesis revealed that both male and female lecturers accepted that the application of LMS in universities significantly impacts on quality assurance.

Thus, the application of LMS in the university education system will improve the transformational process; thereby, ensuring quality service delivery.

Conclusion

From the findings of this study, it can be concluded that the application of LMS in public universities in Rivers State will enhance and ensure qualitative education in this era where there is seismic shift to online learning. Hence, LMS is an essential software tool that can ensure that educational resources and course contents are researched and well-planned; knowledge and information managed and the teaching-learning process monitored for quality outputs.

Recommendations

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

1. Lecturers should endeavour to be adept in using modern technological devices, so as to be able to explore all the benefits of learning management system in this 21st century.
2. The university administrators should ensure that learning management system (LMS) software is installed in their institutions, integrated into the teaching-learning process, and made accessible to both lecturers and students.

References

1. Adepoju TL. Quality assurance of higher education through assessment, monitoring and accreditation process: The Nigerian experience. Paper presented at the 2nd International Conference on Quality Assurance in Higher Education in Africa Dar Es Salaam, Tanzania, 2007, 17-19. September. http://www.ripublication.com/ijepa.htm
2. Adzharuddin NC, Ling LH. Learning management system (LMS) among university students: Does it work? International Journal of e-Education, e-Business, e-Management and e-Learning,2013:3(3)248-252.
3. Alias Nam, Zainuddin AM. Innovation for better teaching and learning: Adopting the learning management system. Malaysia Online Journal of Instructional Technology,2005:2(2):27-40.
4. Almarashdeh IA, Sahari N, Zin NAM, Alsmadi M. The success of learning management system among distance learners in Malaysian universities. Journal of Theoretical and Applied Information Technology, 2010, 21(2). https:// www.jatit.org/volumes/research-papers/ pdf
5. Asiyai RI, Oghuvbu EP. An empirical analysis of the causes and possible solutions to decline in quality of tertiary education in Delta State, Nigeria. Journal of Sociology and Education in Africa,2009:8(2):1-13.
6. Asiyai RI. Challenges of quality in higher education in Nigeria in the 21st century. International Journal of Educational Planning & Administration,2013:3(2):159-172. http://www.ripublication.com/ijepa.htm
7. Barrioluengo MS, Uyarra E, Kitagawa F. The evolution of triple helix dynamics: The case of English higher education institutions. CIMR Research Working Paper Series. Birkbeck University of London, 2016. http://www.bbk.ac.uk./innovationlpublications/ docsIWP32.pdf
8. Chaubey A, Bhattacharya B. Learning management system in higher education. IJSTE - International Journal of Science Technology & Engineering,2015:2(3):158-162. https://www.researchgatenet/publication/292845230_Learning_Managementsystem_in_Higher_Education
9. Dobre J. Learning management systems for higher education – an overview of available options for higher education organizations. Procedia – Social and Behavioral Sciences,2015:180:313-320. www.sciencedirect.com
10. Federal Republic of Nigeria. National policy on education. NERDC Press, 2014.
11. Fındık-Coşkunçay D, Alkış N, Özkan-Yıldırım S. A structural model for students' adoption of learning

management systems: An empirical investigation in the higher education context. Educational Technology & Society,2018:21(2):13-27.
12. Gautreau C. Motivational factors affecting the integration of a learning management system by faculty. The Journal of Educators Online, 2011, 8(1).
13. Inegbediomn JO. Teaching with technologies: Challenges, opportunities and prospects in Nigeria. A Keynote Address presented at the 34th Annual Congress of the Nigerian Academy of Education (NAE), at the University of Port Harcourt, Rivers State, Nigeria, Monday, 4th - Thursday, 2019.
14. Mayoka K, Kyeyune R. An analysis of e-Learning information system adoption in Ugandan Universities: Case of Makerere University Business School. Information Technology Research Journal,2012:2(1):1-7.
15. Misut M, Pribilova K. Measuring of quality in the context of e-Learning. Procedia - Social and Behavioral Sciences,2015:177:312-319. www.science direct.com
16. Mtebe JS. Learning management system success: Increasing learning management system usage in higher education in sub-Saharan Africa. International Journal of Education and Development using Information and Communication Technology (IJEDICT),2015:11(2)51-64.
17. Munguatosha GM, Muyinda PB, Lubega JT. A social networked learning adoption model for higher education institutions in developing countries. On the Horizon,2011:19(4):307-320. http://www.emeraldinsight.com/10.1108/10748121111 17943
18. Nair CI, Patil R. A study on the impact of learning management systems on students of a university college in Sultanate of Oman. International Journal of Computer Science,2012:9(2):379-385.
19. Nnorum OE, Gauis-Oke H. Quality assurance in office technology and management in polytechnics in Nigeria. Journal of Business Educators of Nigeria,2013:3(1):45-52.
20. Nwideeduh SB, Adieme FG. Application of digital surveillance as a managerial tool for quality assurance in secondary schools in Rivers State, Nigeria. The International Journal of Business and Management,2021:9(3):9-15.
21. Obanya P. Educationeering. HEBN Publishers Plc, 2014.
22. Oliveira PC, Cunha CJCA, Nakayama MK. Learning management systems (LMS) and e-Learning management: An integrative review and research agenda. JISTEM - Journal of Information Systems and Technology Management, 2016, 13(2).
23. Onyeagbako SO, Adieme FG, Nwokolo EP. Adopting learning management system (LMS) for teaching in Nigerian Federal universities. Proceedings of the 12th International Conference on e-Learning, ISBN: 978-1-5108-4518-3. The University of Central Florida Orlando, USA, 2017.
24. Ssekakubo G, Suleman H, Marsden G. Issues of adoption: Have e-Learning Management Systems fulfilled their potentials in developing countries? Proceedings of the South African Institute of Computer Scientists and Information Technologists Conference on Knowledge, Innovation and Leadership in a Diverse, Multidisciplinary Environment. Cape Town, South Africa, 2011, 231-238.
25. Unwin T. Digital learning management systems in Africa: Myths and realities. The Journal of Open and Distance Learning,2010:25(1):5-23. http://www.informaworld.com/openurl?genre=article&doi=10.1080/02680510903482033