THE EFFECTS OF LEARNING MANAGEMENT SYSTEM ON THE TEACHING OF BIOLOGY: A CASE STUDY OF UNIVERSITY OF ILORIN, NIGERIA

BY

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Abstract
This study employed the descriptive survey design to investigate the effect of learning management systems on the students in biology related courses in the University of Ilorin. 300 students from the department of Biology education were used as sample for this study. The study employed the use of an online questionnaire to measure the effects of the use of online learning management system on students of Biology. Results showed that 95.7% of all respondents have used a learning management system. The most popularly employed learning management system being MOODLE. Majority of the respondents opined that learning management systems helped them to clearly understand the important course topics in Biology. 85.6% of the respondents affirmed that learning management systems let them identify areas of agreement and disagreement on course, 83.7% of the respondents opined that learning management systems helps to guide them in the class towards understanding course topic in a way that helped clarify their thought pattern. 86.7% of the respondents opined that online and web – based communications are excellent media for social interactions. Majority of the respondents opined that learning management systems enable students to describe ways to test and apply the knowledge created in Biology courses. It is therefore recommended that the use of learning management systems should be encouraged in more biology departments in various institutions in Nigeria has it has clear benefits for students and can aid them to learn more efficiently.
Keywords: Learning Management system, Biology, Tertiary education, Technology

Introduction
In order to use e-learning well, it is better to control how the learners interact with the materials and the educators through the computer. The application of technology is having significant impact on the delivery of education while also providing unique learning opportunities (Akey and Gumusoglu, 2020). Prominent among the technology revolutionizing the education sphere is Learning Management Systems (LMS). This is made possible by using special type of information systems called E-learning Management Systems (ELMS) (Sife, Lwoga, & Sanga, 2007). Learning Management System refers to a software application or Web based technology used to plan, implement and access specific learning process (Bhalalusesa, Lukwaro and Clemence, 2013). It also provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance. Altogether, it is a software system designed to facilitate learning, administrative tasks as well as student participation in e-learning.

Coates *et al.* (2005) identified the key functionalities of a learning management system to include the following:
i. Communication: the learning management system should allow for two-way communication between users of the system in the form of announcements, sending of emails and discussion forums.
ii. Development and delivery of contents: it should allow creation of teaching resources and addition of links o necessary internet resources.
iii. Assessment of students learning outcome and

iv. Class management through the registration of class members, dissemination of class timetables, controlling students' activities etc.

There exist many types of Learning Management system. One example of learning management systems is the modular object-oriented distributed learning environment (Moodle). It is an open source learning management system widely used in many learning institutions. Moodle is noted for its usability and intuitive interface, and it supports various automated personalized services that are easy for faculty and students to access, create, deliver and present (Whelan & Bhartu, 2008).Borboa *et al*. (2005) wrote that one of the crucial functionalities the learning management system provides is the blackboard functionality which allows students to keep a record of every interaction in class. This significance of this functionality is paramount in classes with large class size as obtains in most tertiary institutions in Nigeria, where there is not enough time to answer all questions in class thereby providing students personalized assess to instructors. The blackboard also provides easy access to resources and research results to students.

Learning management systems are widely deployed but there are challenges to the implementation of learning management system especially in developing countries. Emmamoge *et al*. (2020) listed this to include:

i.   Poor internet connectivity: learning management systems rely on the usage of internet connections and since internet connectivity in Nigeria and other developing countries of the world, they present a challenge to the fully utilisation of learning management systems in Africa.

ii.   Inadequate training and support facilities: support facilities can be wanting in this part of the world. This could constitute an impediment to the deployment and widespread utilization of learning management systems in Nigeria.

iii. Computer illiteracy: there is still a prevalence of lack of computer skills among the younger generations. This can create a challenge as students who are computer illiterate cannot benefit from the deployment of the learning management system.

The Learning Management system provide a good platform for the lecturers to make sure that the students continue with their learning wherever they are. They have to upload and control the flow of the learning contents so that the learners can be able to progress in distance learning.

Although it has piqued the interest of academics the world over as a reliable means to support learning among learners, it is been questioned whether learning management systems have any significant contribution to the learning of students. Bates (2005) posited that although adoption of learning management systems are being heralded as the next phase of educational development, current deployments are challenged by problems of poor learner performance, high rate of incompletion of courses, learner resistance among others. This study therefore aims to establish the impact of electronic learning management systems on the students of Biology in University of Ilorin.

Towards achieving the set objective, the following research questions were raised.
1.   What is the effect of learning management systems on students?
2.   Does Learning management systems aid critical thinking and improve students' learning skill?
3.   Does Learning management systems foster relationships and social interactions between students?

Methodology
This study employed the descriptive design method to investigate the Usage of Learning Management System (LMS) among the students of Biology Education department in University of Ilorin. The population of the study department comprised of 650 students across the levels. The faculty and students at this university have been using LMS since 2019/2020 academic session. Departmental records show that approximately 89% of the faculty and 99% of the students have used the LMS for at least one class. An online questionnaire was designed and administered for students of this department with 300 randomly selected respondents. The questionnaire was subjected to content validity. The Test re-test

method was used to determine the reliability of the instrument. The coefficient of reliability was found to be 0.86. Descriptive Statistics such as frequency, simple percentage, mean and standard deviation were used to analyze the data collected.

Results
Demography of respondents
Table 1: Age of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15 - 19 years	52	17.3	17.3	17.3
	20 - 24 years	211	70.3	70.3	87.7
	25 - 29 years	32	10.7	10.7	98.3
	30 -34 years	5	1.7	1.7	100.0
	Total	300	100.0	100.0	

Table 1 above shows the age of the respondents that partook in this research. From the table, it can be seen that 52 of the respondents which represents 17.3% of the population are between 15 – 19 years. 32 of the respondents are between 25 – 29 years, 5 of the respondents aged between 30 – 34 years while exactly 70.3% of the population are between 20 – 24 years old.

Gender of the Respondents
Table 2: Gender of the Respondents

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Female	180	60.0	60.2	60.2
	Male	119	39.7	39.8	100.0
	Total	299	99.7	100.0	
Missing	System	1	.3		
Total		300	100.0		

The information in table 2 above represents the gender of the respondents. From the table, it can be seen that 180 of the respondents were females while 119 of them were males. One of the respondents did not specify their gender.
Respondents' Awareness of Learning Management Systems
Table 3:Learning Management System Awareness

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Yes	287	95.7	95.7	95.7
	No	13	4.3	4.3	100.0
	Total	300	100.0	100.0	

Table 3 above represents the awareness of the respondents about learning management systems. From the table, it can be seen that 287 which represents 95.7% of the respondents affirmed that they are aware of

learning management systems while 13 of the respondents are unaware of the learning management systems.

Respondents' Usage of Learning Management System Packages
Table 4: Respondents' usage of learning management systems packages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Moodle	250	83.3	88.3	88.3
	Open EDx	5	1.7	1.8	90.1
	Its Learning	11	3.7	3.9	94.0
	Litmos	1	.3	.4	94.3
	Schoology	10	3.3	3.5	97.9
	Camilo	5	1.7	1.8	99.6
	EthosCe	1	.3	.4	100.0
	Total	283	94.3	100.0	
Missing	System	17	5.7		
Total		300	100.0		

The table 4 above shows the respondents' usage of learning management systems. From the table it can be seen that 88.3% of the respondents that are aware of learning management systems use the Moodle learning package, 3.9% and 3.5% of them use the 'Its Learning' and Schoology packages respectively. The remaining 4.4% of the respondents use Open EDx, Litmos, Camilo and EthosCe packages. It can also be seen from the table that 17 of the respondents did not specify their choice of any of the learning management system packages.

Research Question One: What is the effect of learning management systems on students?
Table 5: Effect of learning management systems on students

S/N	ITEMS	SA	%SA	A	%A	D	%D	SD	%SD
1.	LMS enabled me to clearly understand important course topics	16	5.3	244	81.3	11	3.7	29	9.7
2.	LMS has enabled me to receive clear instructions on how to participate in course learning activities	25	8.3	242	80.7	26	8.7	7	2.3
3.	LMS enabled me to clearly understand important outstanding dates/time frames for learning activities	28	9.3	227	75.7	34	11.3	11	3.7
4.	LMS enabled me to clearly understand important course goals	16	5.3	240	80.0	27	9.0	17	5.7

The table 5 above presents the items of the questionnaire that addresses the research question one stated above. From the table, it can be observed that majority of the respondents opined that learning management systems help them to clearly understand the important course topics in Biology. Also, majority of the respondents indicated that learning management systems had helped them to receive clear instructions on how to participate and understand outstanding date/time frames for learning activities. The respondents' affirmed that learning management systems had helped them to clearly understand important course goals.

Research Question two: Does learning management systems aid critical thinking and improve students' learning skill?

Table 6: Learning management system, critical thinking and students learning skills

S/N	ITEMS	SA	%SA	A	%A	D	%D	SD	%SD
1.	LMS enabled me to identify areas of agreement and disagreement on course	28	9.3	229	76.3	33	11.0	10	3.3
2.	LMS enabled students to guide the class towards understanding course topic in a way that helped clarify their thought pattern	36	12.0	215	71.7	39	13.0	10	3.3
3.	LMS keeps the students engaged and participating in productive dialogue	39	13.0	219	73.0	33	11.0	9	3.0
4.	LMS keeps the students on task in a way that helped the students to learn	41	13.7	230	76.7	21	7.0	8	2.7
5.	LMS encourages students to explore new concepts in different courses	44	14.7	220	73.3	30	10.0	6	2.0
6.	LMS improved students' learning by helping to focus discussion on relevant issues	37	12.3	228	76.0	24	8.0	11	3.7
7.	LMS helps to provide feedback that helped students understand their strengths and weakness relative to the course's goals and objectives	37	12.3	221	73.7	30	10.0	12	4.0

The information on the Table 6 represents the items of the questionnaire that addresses whether learning management systems aid critical thinking and improves students' overall learning abilities. 85.6% of the respondents affirmed that learning management systems let them identify areas of agreement and disagreement on course, 83.7% of the respondents opined that learning management systems helps to guide them in the class towards understanding course topic in a way that helped clarify their thought pattern. Also, 86.0% of the respondents suggested that learning management systems keep them engaged and participate in productive dialogue. From the table, it can be seen that 90.4% of the total population of respondents suggested that learning management systems keeps them on tasks in a way that helped them to learn, while 88.0% of them opined that learning management systems encourage them to explore new concepts in different courses. 88.3% of the respondents submitted that learning management systems helped them to focus discussion on relevant issues.

Research question three: Does Learning management systems foster relationships and social interactions between students?

Table 7: Effects of learning management system on relationship and social interaction between students

S/N	ITEMS	SA	%SA	A	%A	D	%D	SD	%SD
1.	LMS aided lecturer to students' relationships	33	11.0	211	70.3	47	15.7	9	3.0
2.	Online and web – based communications is an excellent medium for social interaction	39	13.0	221	73.7	31	10.3	9	3.0
3.	LMS aided students to feel comfortable communicating through online medium	33	11.0	228	76.0	31	10.3	8	2.7
4.	LMS aided student to student relationship thereby creating a comfortable interacting environment for each other	29	9.7	219	73.0	39	13.0	13	4.3

5.	LMS aided online discussions that helped students to have a sense of association	31	10.3	222	74.0	34	11.3	13	4.3
6.	LMS aided problems to be posed that increased students interest in course issues	30	10.0	228	76.0	25	8.3	17	5.7
7.	LMS enabled students to describe ways to test and apply the knowledge created in this course	28	9.3	231	77.0	34	11.3	7	2.3

Table 7 above presents the items of the questionnaire that addresses whether learning management foster relationships and social interactions between students. Exactly 81.3% of the respondents suggested that learning management systems helped to improve student – lecturer relationship. Also, from the table, 86.7% of the respondents opined that online and web – based communications are excellent media for social interactions. Majority of the respondents opined that learning management systems enable students to describe ways to test and apply the knowledge created in Biology courses.

Discussion of Findings
From the results it can be seen that the use of learning management systems is of significant importance in achieving the educational objectives of the department studied. Results have shown that an overwhelming majority of the students use and accrue benefits such as improving their understanding of important concepts and topics. This supports the result of Akey and Gumusoglu (2020) who found in a study of the effect of learning management systems on students' achievement found that the use of learning management systems significantly influence the performance of their students in the formative and summative assessments.

Results also show that the use of a learning management system aid the social interacts between lecturers and students. This is as the learning management system creates a close knitted virtual society among students as well as fosters relationships between the instructor and learners which might otherwise being difficult without the use of the learning management system. This aligns with the views of Borboa (2005) who claimed that the use of learning management systems will foster communication in classes with large class size where there is not enough time to answer all questions in class thereby providing students personalized assess to instructors

Conclusion
This study examined the effect of learning managementon the students of biology in the University of Ilorin. Results showed that 95.7% of the respondents that is aware of learning management systems and 86.6% are of the view that learning management systems are vital to their understanding of important topics in Biology. Based on this, it can be concluded that learning management system can become an integral tool for the learning of Biology in tertiary institutions in Nigeria. Furthermore, the use of learning management systems can increase efficiency in course delivery as they facilitate flexible course delivery, communication, and assessment of students' performance.

Recommendations
Based on the findings of this study, the use of learning management systems should be encouraged in tertiary institutions in Nigeria as it makes monitoring of learners' activities easier.

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