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Perception of Learning Management System (LMS) on the Academic Performance of Undergraduate Students during the COVID-19 Pandemic

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ABSTRACT

The study investigated the perception of undergraduate students on the use of a Learning Management System (LMS) in the teaching-learning process. The study employed a descriptive survey design. The data for the study were collected using online questionnaires. The study sample comprised 551 undergraduate students from five colleges in Osun State University. The study found a significant difference in undergraduate students' perception of the use of LMS in instructional delivery based on gender, class levels and area of speciliasation. The results showed that the LMS is helpful in reflecting on students' knowledge gaps when preparing for classes. It also revealed that the cost for accessing the LMS, power failures and poor Internet services are major challenges in using the LMS platform. Hence, the study recommends students and lecturers should be encouraged to improve on their computer literacy skills to enhance their usage of the LMS and the use of the LMS should be improved upon and made functional by universities to facilitate blended learning.

Keywords: *LMS, Perceptions, Teaching-Learning, Undergraduates*

INTRODUCTION

The world is ever-changing due to the developments in the realm of science and technology. The issue of the COVID-19 pandemic is a significant force that has made governments and all stakeholders in the educational sector all over the world, adopt online teaching as a strategy in the teaching-learning process through the adoption of various technological tools. The COVID-19 pandemic affected all facets of human activities among which are education, politics, sports, transportation, religion, social gatherings, social interactions, entertainment, economy, businesses, and research. The pandemic has led to a paradigm shift in the teaching-learning process premised on the need to avoid close personal contact, thereby making the usual face-to-face contact between the teacher and learners unsafe in terms of health implications.

Many countries shut down their schools in a bid to avoid the spread of the disease. In Nigeria, the federal government ordered a total shutdown of all schools while the National Universities Commission (NUC), a regulatory body for all universities in Nigeria, also gave a follow-up directive to all universities in line with the decision of the federal government. Other countries such as South Africa, Ghana, Côte d'Ivoire, Gambia, Togo, Germany, Spain, Italy, America, France, United Kingdom, and Russia also shut down their schools to curtail the spread of coronavirus disease.

To avoid or minimize the devastating effect of shutting down schools - not only on the education sector, but on both the present and future of society, as education remains pivotal for the overwhelming development of the society - efforts were made by various countries to ensure the continuity of teaching and learning without physical contact between teachers and learners, thereby leading to the adoption of e-learning strategies. E-learning involves a wide range of technology-

based learning through learning management systems, websites, learning portals, video conferencing, YouTube, mobile apps, and many other free available websites for blended learning. The LMS is one of the most recent tools in technology that is commonly used to enhance knowledge and skills acquisition by students, academic staff, and other professionals, aside from those in the educational sector, via the Internet (Adams, Sumintono*,* Mohamed *&.* Noor, 2018; Chopra, Madan, Jaisingh & Bhaskar, 2019).

A Learning Management System (LMS) according to Brush (2019), is a software application or web-based technology used to plan, implement and assess a specific learning process. It is an e-learning-based platform built on two major elements - a server that performs the base functionality and a user interface that is operated by an instructor, students and administrators. The LMS, according to the author, enables an instructor to create and deliver content, monitor students' participation and assess students' performance. According to Brown (2020), the LMS provides an avenue for the delivery and tracking of e-learning initiatives in one place. E-learning Basics (2021) asserts LMS as a platform for digital learning with the key features captured as follows;

1. Learning - It allows for the creation of a single source of online courses and training materials.
2. Management – It allows for the management of both courses and learners.
3. System – It makes use of a computer system.

The LMS is an online-learning tool that connects teachers with students beyond the traditional classroom for effective learning activities. Teachers use the LMS to achieve their stated instructional goals through several activities that happen in the classroom. According to Ben, Najar & Belghith (2018), online-learning is an essential medium and constitutes a critical factor in virtual learning. The main purpose behind its adoption is to replace face-to-face teaching and learning.

Scholars, while advancing the need to adopt the LMS as an instructional strategy, have identified some of its significance. Alecu, Marcuta , Marcuta, & Angelescu (2011) revealed the ability of the LMS to: make learning easier and faster when compared with traditional classroom learning, promote interactive and collaborative learning experiences, encourage one to learn at his/her own pace, enhance flexible learning systems and give opportunities to learners to access the latest materials. O'Leary & Ramsden (2002) reported the acknowledgment of the advantages of the LMS by academics/instructor premised on its usefulness in improving the learning experiences of students. Binti, Dulkaman and Ali (2016) found that the LMS is capable of motivating students towards learning thereby impacting positively on academic performance. Mödritscher, Andergassen and Neumann (2013) found a positive correlation between students' commitment to use of the LMS in learning and their academic performance. Oguguo, Nannim, Agah, Ugwuanyi, Ene and Nzeadibe (2021) revealed significant effects of the LMS on students' academic performance when compared with Computer-Assisted Instruction. Mohammed (2021) showed significant effect of LMS on students' academic performance in financial accounting.

However, scholars have identified some challenges that could limit the efficacy of the LMS in instructional delivery. Sahu (2020) identified low quality of instruction when it involves use on an LMS platform. Selim (2007) revealed challenges such as: poor Internet facilities, styles of teaching online, poor technical competency of the lecturers and the students, problems of motivating students, barriers to accessing the site, and infrastructure reliability problems when the LMS is used. Drent & Meelissen (2008) identified students' lack of knowledge of ICT and the failure of the lecturers to provide the needed technical support. Becker (2000) identified barriers such as the commitment of some lecturers to face-to-face teaching methods and their unwillingness to adopt ICT-based learning strategy, limited or lack of training on the use of the technology and poor commitment to a modern pedagogical approach that could inculcate the needed skills for online learning. Orfanou , Tselios & Katsanos (2015) argued that online learning compromises the integrity

and value of delivered instruction and should be utilized minimally or not at all, especially for some degree programmes. According to Lim (2021), the LMS strategy is faced with the problems of ineffective training for teachers, the problem of adapting to individual's needs in relation to staff and students, and that of course management.

The challenges surrounding use of the LMS cannot override the inherent benefits since the challenges are not insurmountable. According to Al-Hunaiyyah, Al-Sharhan and AlHajri (2020), provision of user friendly interfaces, training of users on how to effectively use an LMS platform, coupled with appropriate guidance, would effectively address challenges inherent in the use of an LMS in instructional delivery. Lim (2021) advocated for the following: proper support for the use of an LMS by the school leadership, understanding of the existing school culture, imbedding the pre-existing software in the school into the LMS, proper training of the users, adequate knowledge of the limits of the school's LMS, and creating support links for users, as ways through which some of the challenges could be overcome.

Adoption of the LMS can also be influenced by variables that are associated with technology integration in instructional delivery. Asiri, Mahmud, Abu Bakar, Mohd Ayub (2012) identified gender, experience in computer usage, training, and workshop attendance as some of the determinants of effective utilization of the LMS. Some of these factors that are of concern in this study are gender, area of specialisation and the class level of the student. Borboa, et.al (2014) identified significant gender differences on the influence of LMS use on learning with female students on. Yousef (2018) revealed significant influence of gender on students' engagement in the LMS, while Binyamin, Rutter, and Smith (2020) revealed a significant difference in how LMS tools influence learning based on gender. The study revealed that female students are less affected by the quality and quantity of content but are more concerned with the ease of navigation while the opposite held for the male students. Lim et al (2020) found that both male and female students use LMS in accessing class-related information such as the syllabus, instructors' notices and attendance status without any bias but noted that male students differed significantly in their use of the LMS for learning. Alshehri, Rutter and Smith (2020) revealed no effect for gender on use of the LMS by students. Peria, Candolita, Mahinay, Campos and Buladaco (2021) found no gender difference in students' learning satisfaction based on use of the LMS. The above postulations imply that gender could be a determinant of the willingness to adopt use of an LMS, as well as the learning outcomes when used.

On the issue of the influence of area of specialisation of students in terms of natural science, arts and social science on use of an LMS, Olakunle and Bolaji (2017) found positive disposition of undergraduate students towards use, but this was significantly influenced by area of specialisation. This finding has been corroborated by Ajijola, Ogunlade, Aladesusi and Olumorin (2021) whose study revealed the effectiveness of the LMS in promoting academic performance, while the perceived ease of use and perceived usefulness were significantly influenced by the areas of specialisation of the students. Premised on the above findings, students' area of specialization could influence their perception of use of the LMS for instructional delivery.

Students' level in the school could play a fundamental role in determining their disposition towards any instructional strategy, as older students, that is, those have been in the school longer, are more familiar with the operation of the school system than the new students. Abbad, Morris and Jaber (2011) revealed that older students that have been in the system longer are better disposed to the use of an LMS than new students. The scholars equally found significant differences in the perceived usefulness and intention to use the LMS based on age. The influence of year of study on student' perception of use of the LMS has also been attested to by Olakunle and Bolaji (2015). However, Peria et.al (2021) showed no significant effect for year of study on students' learning satisfaction while using an LMS. The inconsistency in the findings by scholars on the influence of

year of study and students' disposition towards LMS use requires further investigation of the construct thereby making it relevant in this study.

STATEMENT OF THE PROBLEM

The outbreak of the COVID-19 pandemic necessitated the adoption of learning strategies that could minimize or eradicate face-to-face interaction between teachers and learners to prevent the spread of the disease. Amongst the popular online learning strategies is the use of a Learning Management System (LMS) for the delivery of instruction. Scholars have revealed that an LMS can facilitate learning and proper interaction between the teachers and the learners while others are doubtful of the quality of instruction through the platform, coupled with a lack of proper training for both the teachers and learners on how to make use of the platform and benefit maximally, aside from the issues of infrastructural deficit and Internet connectivity. Studies have also revealed that gender, years of study and area of specialization could play a prominent role in the acceptance and use among students. Since the adoption of an LMS was of necessity, premised on the outbreak of COVID-19 in less developed countries including Nigeria, there is a need to investigate the perception of students in relation to use. This is necessary to have insight on the level of acceptance, and identify the barriers to usage, to enhance appropriate policy formulation and implementation of LMS usage in instructional delivery.

RESEARCH QUESTIONS

The research questions that guided this study are:

1. How frequently do students use the LMS?
2. How does LMS use influence students' academic performance?
3. What are the problems faced by students in using the LMS?

NULL HYPOTHESES

1. There is no statistically significant difference between the perceptions of male and female students on the influence of LMS use on academic performance.
2. There is no statistically significant difference in the perception of LMS use on academic performance of students based on student level.
3. There is no statistically significant difference in the perception of LMS use on the academic performance of students based on area of specialisation.

METHODOLOGY

The study utilized a descriptive survey design. An online questionnaire titled "Perceived Impact of Learning Management System on Students' Academic Performance Questionnaire (PILMSSAPQ)" was used to collect quantitative data for the study. It consists of four sections A, B, C, and D. Section A contains the demographic data while Section B consists of two sections on how frequently participants use the LMS and their preferred location for use of the LMS. Five items were drawn to find out how frequently the participants use the LMS. Their responses were measured on a 6 point rating scale of *never*, *rarely*, *once a month*, *once in two weeks*, *once in a week*, and *daily*. Items to elicit the impact of LMS use, common activities, and difficulties faced by students when using the LMS comprised the content of Sections C and D. Items on Section D were placed on a four-point rating scale of *strongly agree (SA)*, *agree (A)*, *disagree (D)* and *strongly disagree (SD).* The instrument was validated by experts in the fields of educational technology and test construction. The reliability coefficient of the instrument was found to be 0.77 using the test-retest reliability method.

PARTICIPANTS

Participants in this study were 551 undergraduate students from five colleges in Osun State University Osogbo in Nigeria. Undergraduate students were selected for the study based on LMS use by many of the higher education institutions during the COVID 19 pandemic lockdown and its continued use.

Table 1: *Gender Distribution of the Participants*

Gender	Frequency(F)	Percentage (%)
Male	147	27.0
Female	404	73.0
Total	**551**	**100.0**

The data shown in Table 1 indicates a significantly higher proportion of female respondents than male respondents in the study.

Table 2: *Distribution of Participants by College*

Colleges	Frequency(F)	Percentage (%)
Agriculture	101	18.3
Education	130	23.6
Humanities	119	21.6
Science and Engineering	78	14.2
Management Sciences	123	22.3
Total	**551**	**100.0**

The data in Table 2 shows that most of the respondents were from the College of Education (23.6%) with the College of Science and Engineering having the least of the respondents, accounting for 14.2%.

RESULTS

Research Question 1: How frequently do students use the LMS?

The results shown in Table 3 below indicate that a high proportion of the students (37.2%) frequently use the LMS to access and download lecture notes daily, while 24.3% used it once a week, 18.7% rarely used it, and 18.2 % used it once a month. A low proportion (5.8%) reported that they never use the LMS to access and download lecture notes. Further, just under half of the respondents (45.6%) use the LMS to attend live lectures/classes daily, while 25.4% rarely used the LMS and, (13.2%) of the students indicated that they never use the LMS to attend live lectures/classes. 1.5% of the respondents used it once in a month while 1.3% used the LMS to attend live lectures/classes once in two weeks. It was also observed 32.5 % of the students used the LMS to submit assignments once a week, 26.3% did so daily, while 22.7% rarely used the LMS to submit assignments. 10.7% never used it for this purpose, 4% used it once in every two weeks, while only 3.8% of the students used the LMS once a month to submit assignments. Regarding taking evaluation tests, 36.5% agreed that they rarely used the LMS, 29% used it once in a week, while 16.9% agreed that they used it daily. 9.1% used it once in two weeks, and 4.7% of the

students used the LMS only once in a month. Regarding interaction with other students in the LMS, 52.1% of the respondents reported daily interaction with other students using LMS, while 17.2 % reported that they rarely interacted and 15.1% agreed that they never used the LMS for interaction with other students. It could be inferred from the table that the level of engagement of students in using LMS for learning is below average. None of the items dealing specifically with pure academic purpose scored up to 50% for daily use. The highest proportion of use (52%) was obtained on the item dealing with using the LMS for interaction among the participants and such interactions are not limited to academic purposes.

Table 3: *Analysis of the Frequency of Students' LMS Use*

S/N	ITEMS	RESPONSE											
		Never		Rarely		Once a month		Once in two weeks		Once a week		Daily	
		F	%	F	%	F	%	F	%	F	%	F	%
1	Access and download lecture notes	32	5.8	103	18.7	45	8.2	32	5.8	134	24.3	205	37.2
2	Attend live lectures/ classes	73	13.2	140	25.4	8	1.5	7	1.3	70	12.7	251	45.6
3	Submit assignments	59	10.7	125	22.7	21	3.8	22	4.0	179	32.5	145	26.3
4	Take evaluations/ tests	Nil		201	36.5	47	8.5	50	9.1	160	29.0	93	16.9
5	Interact with other students	83	15.1	95	17.2	11	2.0	23	4.2	48	8.7	287	52.1

*F= Frequency

Research Question 2: How does LMS use influence students' academic performance?

The results shown in Table 4 below indicate a high proportion of the students (52.6%) expressing agreement that the LMS was helpful in reflecting on their knowledge gaps when preparing for class, while 30.3% disagreed and 17.1% were neutral in their response. Further, 49.7% of the students reported that the LMS helped them to prepare for examinations and tests, while 33% of the students disagreed and 17.6% were neutral. Interestingly, 56.4% of the students indicated that their lecturers were able to use the LMS efficiently for teaching, in contrast to 31.2% of the students who disagreed and 12.3% were neutral in their view. Regarding the student views on whether they learned better via the LMS than through face-to-face lectures, only 10.3% agreed, while 76.0% disagreed completely. In response to the statement - *I think I would have had better scores if LMS was not used for lecture delivery;* 40.4% of the students agreed, while 25% were neutral in their view. 30.1% of the students agreed that using the LMS increased their chances of getting better grades while 20.5% of the students were neutral and 49.2% did not agree that use of the LMS increased their chances of getting better grades. When asked for their view of the LMS as a useful tool for learning, 62.6% of the students agreed that they found the LMS useful, 16.3% were neutral while (21%) of the students disagreed. 41% of the students disagreed that the LMS enabled them to learn faster and better, while 37.4% agreed that using the LMS increased their productivity, however 26.7% of the students were neutral in their view on increased productivity resulting from

use of the LMS. The table also reveals that the perception of the participants on the effectiveness of LMS on academic performance is below average. Although most of the respondents agreed to the effectiveness of LMS in reflecting on knowledge gap, preparation for examination and the usefulness in learning, their perception in terms of the contribution to academic performance is below average.

Table 4: *Analysis of how LMS Use Influences Students' Academic Performance*

S/N	ITEMS	RESPONSE									
		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		F	%	F	%	F	%	F	%	F	%
1	LMS was helpful to reflect on my knowledge gaps when preparing for class?	42	7.6	248	45.0	94	17.1	108	19.6	59	10.7
2	LMS helped me to prepare for examinations and tests	48	8.7	226	41.0	97	17.6	103	18.7	77	14.0
3	My lecturers were able to use the LMS efficiently for teaching?	36	6.5	275	49.9	68	12.3	114	20.7	58	10.5
4	I think I learned better via LMS than through face-to-face lectures	11	2.0	46	8.3	75	13.6	231	41.9	188	34.1
5	I think I would have had better scores if LMS was not used for lecture delivery	79	14.3	144	26.1	138	25.0	134	24.3	56	10.2
6	Using LMS has increased my chances of getting better grades (CGPA)	27	4.9	139	25.2	113	20.5	163	29.6	108	19.6
7	I find Learning Management System useful for learning	55	10.0	290	52.6	90	16.3	63	11.4	53	9.6
8	Using Learning Management System enables me to learn faster and better.	31	5.6	165	29.9	129	23.4	147	26.7	79	14.3
9	Using LMS has increased my productivity	32	5.8	174	31.6	147	26.7	146	26.5	52	9.4

*F= Frequency

Research Question 3: What are the problems faced by students in using the LMS?

The results in Table 5 show that 56.1% of the students disagreed that LMS contained irrelevant information, which could distract users while 32.2% of the students agreed. There was agreement among the students (62.4%) that the cost of accessing the LMS is very high, while 44.3% agreed that the institution held training (workshop) for students and lecturers on eLearning, but 88% of the students agreed that LMS is mostly affected by poor Internet speed services, Further, 85.3% of the

respondents agreed that power failure contributed to poor access to the LMS. The data in the table reveals that the cost of accessing the LMS platform, poor Internet services and power failure are major challenges impacting LMS use by the students.

Table 5: *Analysis of the Problems Faced by Students in Using LMS*

S/N	ITEMS	RESPONSE									
		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		F	%	F	%	F	%	F	%	F	%
1	Learning Management systems do contain irrelevant information, which could distract users	40	7.3	137	24.9	65	11.8	239	43.4	70	12.7
2	The cost of accessing the Learning Management System is very high	103	18.7	241	43.7	85	15.4	91	16.5	31	5.6
3	My institution holds training (workshop) for students and lecturers on eLearning	38	6.9	206	37.4	106	19.2	133	24.1	68	12.3
4	LMS is mostly affected by poor internet speed services	194	35.2	291	52.8	22	4.0	26	4.7	18	3.3
5	Power failure contributes to poor access to LMS	167	30.3	303	55.0	43	7.8	26	4.7	9	1.6

*F= Frequency

Hypothesis 1: There is no statistically significant difference between the perceptions of male and female students on the influence of LMS use on academic performance.

The data in Table 6 below shows the difference between the perception of male and female students on the influence of LMS on academic performance.

The results indicate a significant difference between the perceptions of male and female students on the influence of LMS on academic performance ($t = 2.83$, $df = 549$, $p < 0.05$). This implies that the perception of the influence of LMS use on the academic performance differs based on gender with a higher mean value for the male participants.

Table 6: *Summary of t-test Analysis of Difference between Male and Female Students on the Influence of LMS on Academic Performance*

	N	Mean	SD	T	Df	Sig. (2-tailed)	Remark
Female	404	18.10	6.50	2.83	549	0.003	Significant
Male	147	21.96	7.57				

Hypothesis 2: There is no statistically significant difference in the perception of LMS use on academic performance of students based on student level

A one-way ANOVA was conducted to examine if there is a difference in the perception of LMS use on the academic performance of students based on their level. The results shown in Table 7 below revealed that there is a significant difference in the students' perception (F (4, 546) = 7.737, p = 0.000). Since the p-value is less than 0.05, it implies that the null hypothesis is rejected.

Table 7: *Summary of ANOVA on the Difference in Students' Perception of the Influence of LMS on Academic Performance based on Student Level*

	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
Between Groups	1384.623	4	346.156	7.737	.000
Within Groups	24429.126	546	44.742		
Total	25813.750	550			

Hypothesis 3: There is no statistically significant difference in the perception of LMS use on the academic performance of students based on the department

A one-way ANOVA was conducted to examine if there is a difference in the perception of LMS use on the academic performance of students based on their area of specialisation. The results shown in Table 8 below revealed that there is a significant difference in the perception of the influence of LMS use on academic performance of students based on area of specialisation, (F (4, 546) = 3.387, p = 0.009). Since the p-value is less than 0.05, it implies that the null hypothesis is rejected.

Table 8: *Summary of ANOVA on the Difference in Students' Perception of the Influence of LMS on Academic Performance based on Area of Specialisation*

	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
Between Groups	625.053	4	156.263	3.387	.009
Within Groups	25188.697	546	46.133		
Total	25813.750	550			

DISCUSSION OF RESULTS

The study reveals a low level of LMS use for academic purposes. A fair number of participants agreed that the LMS is used to access and download lecture notes daily, interact with other students almost daily and submit assignments once a week. The findings contradict that of Olakunle and Bolaji (2017) which asserts positive disposition of undergraduate students towards LMS use. The low level of commitment could be attributed to their familiarity with the traditional mode of instructional delivery, poor ICT competency and the fact that LMS use came without proper planning and training, in a bid to prevent the collapse of the educational system during the pandemic.

The results show that many participants disagreed that LMS use could enhance their academic performance. This is contrary to the findings of Alecu et.al (2011), O'Leary and Ramsden (2002), Binti et al (2016), Oguguo et al (2021), and Mohammed (2021) on the capability of LMS use in promoting academic performance. The participants posited cost of accessing the LMS, poor Internet connectivity, and the irregular supply of power as impediments to LMS use. The results are supported by the findings of Selim (2007) and Sahu (2020). However, the results could also be attributed to the general epileptic power supply prevailing in the country.

The study found a significant difference in the perception of the participants in relation to the influence of LMS use on academic performance more so among males. This finding aligns in part with Borboa et.al (2014) who found significant difference on the influence of LMS on academic performance more so among females. There is also alignment with the findings of Lim et.al (2020) but runs contrary to Peria et.al (2021). However, these results of significance among males could also be attributed to a higher disposition among males to the use of technology.

The study further reveals significant difference in the perception based on students' level. This supports Abbad et.al (2011), Olakunle and Bolaji (2015), but runs contrary to Peria et.al (2021). The study also shows significant differences in the perception of the participants based on their area of specialisation. This is in keeping with the findings of Olakunle and Bolaji (2017) and Ajijola et.al (2021). The result could be attributed to the fact that science oriented students are more used to using technology than those in humanities.

CONCLUSION AND RECOMMENDATIONS

The study concluded that the perception most students had on LMS use for academic purposes was below average. The highest score was obtained on the items dealing with using the LMS for interaction among the participants and such interactions are not limited to academic purposes. There is a significant difference in the perceptions of students on the influence of LMS use on academic performance based on gender, school levels and area of speciliasation. The cost of accessing the LMS, power failure and poor Internet services are major challenges encountered by students in the process of using the LMS.

The overall view of these results is subject to certain limitations. The scope of this study was limited in terms of using a quantitative research methodological approach. A descriptive survey was used to collect data from the target population, as the survey method is a common approach used in technology acceptance research. There are two suggested directions for future extension of this study: first an increase in the scope to cover data from a larger and more varied population – such as other types and locations of institutions in Nigeria, with different demographic characteristics; a second direction might be to examine how to expose and motivate students on the use of e-learning systems with support from the university. Also, research on significant factors needed to influence students toward LMS use could produce valuable insights.

On this basis, the following recommendations are made:

1. Students and lecturers should be encouraged to improve their computer literacy skills to enhance LMS use.
2. LMS use should be improved upon and made functional by universities to facilitate blended learning.
3. Nigerian universities should continuously incorporate LMS use in their teaching and learning strategy.
4. Governments and curriculum developers should incorporate LMS use in tertiary institution curriculum as one of the modes of instruction delivery.

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