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Factors predisposing the use of LMS in the University of Ibadan Distance Learning Centre (DLC): A path analytical Investigation

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Abstract
The adoption of Learning Management Systems (LMS) in higher education institutions has become increasingly crucial in the wake of digital transformation and the global shift toward online and blended learning. This case study investigates the factors influencing LMS adoption among students and lecturers at the University of Ibadan Distance Learning Centre (UI DLC) in Nigeria. Through a comprehensive survey and path analytical modelling, this research explores the relationships between key variables and LMS adoption, aiming to contribute to a deeper understanding of technology adoption in higher education in the Nigerian context.
The findings reveal several significant factors that influence LMS adoption among students and lecturers in Nigerian universities. For students, policy regulation, teacher training, and access to technology emerged as significant predictors of LMS adoption. These findings align with existing literature, emphasizing the importance of institutional support, educator preparation, and technology access. Surprisingly, internet availability did not directly impact students' LMS adoption, suggesting a relatively widespread internet access among university students in Nigeria. Among lecturers, policy regulation and teacher training were identified as significant factors influencing LMS adoption. This underscores the critical role of clear policies and ongoing professional development in promoting technology adoption among educators. Interestingly, internet availability did not have a significant direct effect on lecturers' LMS adoption, possibly due to their assumed tech-savviness. Furthermore, this study explores the indirect factors contributing to LMS adoption among students and lecturers. Access to technology, policy regulation, and teacher training indirectly influence adoption through perceived ease of use and perceived usefulness. These findings highlight the complexity of LMS adoption, where multiple factors interact to shape users' perceptions and behaviours.
Additionally, a model comparison was conducted to determine which path analytical model best explained LMS adoption patterns. Both models, one for students and one for lecturers, explained a high percentage of variance in LMS adoption, with the lecturer model slightly outperforming the student model. This suggests that students and lecturers are influenced by similar factors but may have different expectations and roles in LMS adoption.

I. Introduction

Learning Management Systems (LMS) have emerged as indispensable tools for facilitating online learning, providing educational institutions, businesses, and organizations with versatile software platforms to support teaching and learning in a digital environment (Al-Azawei, et al. 2017). The adoption of LMS has been widespread in many countries, especially during the COVID-19 pandemic, as they offer valuable features such as content management, communication tools, assessment tools, grading tools, feedback mechanisms, and analytics tools (Al-Azawei et al., 2017). According to Research.com (2020), the global LMS market was valued at $9.4 billion in 2018 and is expected to reach $28.1 billion by 2025, with a compound annual growth rate (CAGR) of 16.2%. The report identifies several factors that drive the growth of the LMS market, such as

government initiatives, digital learning trends, bring-your-own-device policies, and artificial intelligence and machine learning applications. However, in Africa, the LMS market is also growing rapidly, although it faces some challenges such as lack of infrastructure, digital skills, and awareness. A study by Statista (2020) estimates that the adoption rate of digital skills in selected African countries was between 10% and 40% in 2019, and is projected to increase to between 25% and 55% by 2030. Digital skills are essential for using LMS effectively and efficiently. In the context of Nigerian universities, the integration of LMS holds immense potential for enhancing the quality and accessibility of education (Yakubu, et al. 2020).

The use of LMS in Nigerian universities can provide instructors with a convenient and efficient means to share course materials, including textual content, multimedia resources, and interactive activities, fostering increased engagement and leading to improved learning outcomes (Fakinlede et al., 2014). With 170 universities registered under the National University Commission (NUC) (Statistica, 2023), LMS holds the potential to facilitates effective communication and collaboration among students and instructors through features like discussion forums, messaging systems, and virtual classrooms, promoting a sense of community and active learning (Baran, 2014). These collaborative tools encourage knowledge sharing, peer support, and the exchange of diverse perspectives, enriching the overall learning experience for students. Apart from content delivery and communication, LMS empower instructors to monitor and assess student performance more efficiently (Al-Azawei et al., 2017). Through tools for administering quizzes, assignments, and assessments, LMS offer automated grading capabilities that save time for instructors and provide timely and constructive feedback to students, aiding their comprehension and progress tracking (Hew & Cheung, 2014).

However, despite the significant potential of LMS to enhance the educational experience, the adoption and use of these systems in Nigerian universities remain low and uneven (Yakubu et al., 2020). Only a handful of Nigerian universities have fully deployed LMS, and there is limited research on the factors that influence students' acceptance and utilization of these systems (Yakubu et al., 2020). A key finding is that private university students are more likely to use LMS than their counterparts in public universities, primarily due to differences in facilitating conditions, such as internet availability, access to computers and other technology, educational policies, teacher training, and expertise (Walson & Okanu-Igwela, 2019). Furthermore, numerous challenges and barriers contribute to the limited adoption of LMS in Nigerian higher education institutions, including non-existent operational policies, financial constraints, poor internet connectivity, resistance, lack of capacity-building, and insufficient investment in human and infrastructural facilities (Musa et al., 2021; Alabi & Mutula, 2017; Walson & Okanu-Igwela, 2019). Understanding the factors that influence the adoption and use of LMS in Nigerian universities is essential for devising comprehensive strategies that address these challenges.

Hence, to comprehensively investigate the factors influencing LMS adoption in Nigerian universities, this research seeks to apply a theoretical framework that incorporates constructs from renowned technology acceptance models, such as perceived usefulness, perceived ease of use, social influence, and behavioral intention to use (Al-Azawei et al., 2017). Internet availability is a crucial factor affecting LMS use in Nigerian universities, as it determines the accessibility and reliability of online courses and resources (Yakubu et al., 2020). A report from Research.com (2020) indicated that as of January 2021, Nigeria's internet penetration rate stood at 50%, implying that only half of the population had internet access. Projections from the same report estimated a growth to 65.2% by 2025, reflecting a compound annual growth rate of 16.2%. This underscores a strong demand for internet services in Nigeria. However, internet accessibility is unevenly distributed, with notable disparities between urban and rural areas as well as various regions and states. Statista (2020) revealed that digital skills adoption rates in selected African countries ranged from 10% to 40% in 2019, and this is expected to rise to between 25% and 55% by 2030. Conversely, challenges such as inadequate infrastructure, high bandwidth costs, expensive devices, and low awareness and literacy rates pose obstacles to internet connectivity in Nigeria. These hindrances, in turn, impede the effective use of learning management systems (LMS) in the country.

Access to computers and other technology is another significant factor that influences LMS use, determining the availability and affordability of the devices and software required for accessing the LMS platform (Forson & Vuopala, 2019). Additionally, educational policies and regulations play a vital role in influencing LMS use, as they provide the legal and ethical framework for LMS implementation and evaluation (Janus et al., 2021).

Teacher training and expertise also have a substantial impact on LMS use, as they influence instructors' competence and confidence in utilizing LMS tools for teaching purposes (Yakubu, 2019). Furthermore, perceived usefulness and perceived ease of use are critical factors that shape students' and lecturers' motivation and satisfaction in using LMS platforms (Yakubu & Dasuki, 2018). Lastly, behavioral intention to use is a significant determinant of LMS adoption, as it reflects the strength of individuals' intentions to use the LMS platform (Forson & Vuopala, 2019).

Given the importance of these factors in LMS adoption and utilization, it is vital to conduct empirical research to understand their specific impact in the Nigerian higher education context (Janus et al., 2021; Fakinlede et al., 2014). This study aims to address this knowledge gap by identifying the factors that predispose

the use of LMS in Nigerian universities and developing evidence-based strategies to promote successful LMS implementation in the country's higher education institutions.

Purpose of The Study

The main aim of this research is to identify the factors that predispose the use of Learning Management Systems (LMS) in the University of Ibadan Distance Learning Centre (DLC). Specifically, the study;

1. Explored the relationships among various factors, including internet availability, access to computers and other technology, educational policies and regulations, teacher training and expertise, perceived usefulness, perceived ease of use, and behavior intention to use, within the University of Ibadan DLC context.
2. Pinpointed the key factors that directly impact the use of LMS within the University of Ibadan DLC.
3. Uncovered the indirect factors that play a role in LMS adoption within the University of Ibadan DLC.
4. Analyzed the relationships among the identified factors comprehensively within the University of Ibadan DLC.

Research Questions

The research will address the following questions within the context of the University of Ibadan DLC:

What factors predispose the use of Learning Management Systems in teaching and learning at the University of Ibadan DLC?

Sub-Research Questions:

a. What is the nature of the relationship between the identified factors and the use of LMS among students and lecturers at the University of Ibadan DLC?

b. Which factors directly influence the adoption and utilization of LMS among students and lecturers at the University of Ibadan DLC?

c. How do indirect factors contribute to the adoption and utilization of LMS at the University of Ibadan DLC?

d. Which path analytical model (theorized or adjusted) best explains the patterns of LMS adoption among lecturers at the University of Ibadan DLC based on the identified factors?

II. Methodology

Participants

Participants in this study include both students and lecturers affiliated with the University of Ibadan Distance Learning Center in Nigeria. The student participants have an average age of 20 years (± 2.1), with 44% of them identifying as female. Lecturers participating in the study have an average age of 34 years (± 5.1), with 50% identifying as female. The target population includes individuals actively engaged in teaching or learning activities within the distance learning framework offered by the university. Participants are selected based on their voluntary consent to participate in the research.

Materials

The primary data collection instrument used in this study is an online survey hosted on the JISC platform. The survey is designed to gather information on factors influencing the adoption and utilization of Learning Management Systems (LMS) among students and lecturers. It includes structured questions covering various aspects such as internet availability, access to technology, educational policies, teacher training, perceived usefulness, perceived ease of use, and behavioral intention to use LMS.

Procedure

Participants are recruited through various channels, including email invitations sent to students and lecturers registered with the University of Ibadan Distance Learning Center. Additionally, announcements are made through official university communication channels and relevant social media platforms to maximize participation. Participants complete the online survey at their convenience, accessing the survey link provided in the recruitment materials. They are instructed to respond to all survey questions honestly and to the best of their ability. Upon completion of data collection, the survey responses are exported to statistical analysis software for data processing and analysis. Descriptive statistics, correlation analysis, and structural equation modeling (SEM) are employed to examine relationships between variables and derive insights into factors influencing LMS adoption, using SPSS version 27 and JASP version 0.18.

III. Result

Research Question 1: What is the relationship that exists between the factors and use of LMS among students in Nigerian Universities?

Table 1: Multiple Correlation showing the relationship between the factors and use of LMS among students in Nigerian Universities?

Variable	*LMS adoption*	
1. LMS adoption	—	
2. internet availability	*0.869*	***
3. Access Technology	*0.855*	***
4. Policy regulation	*0.950*	***
5. Teacher Training	*0.867*	***
6. Perceived Usefulness	*0.926*	***
7. Perceived Ease of Use	*0.920*	***
8. Behaviour intention	*0.840*	***

* p < .05, ** p < .01, *** p < .001; Source: Field Survey.2023

Table 1 above reveals the relationship that exists between the independent variables (internet availability, access to computers, educational policies, teacher training, perceived usefulness, perceived ease of use, behaviour intention) and the dependent variable (use of Learning Management System) among students in Nigerian Universities. The result shows that the use of learning management system positively correlates with all the independent variables under investigation in the following order; policy registration (r = 0.950, P<01); perceived usefulness (r = 0.926, P<01); perceived ease of use r =0.920); internet availability (r = 0.869, P<01); teacher training expertise (r = 0.867, P<01); access to technology (r = 0.855, P<01) and behaviour intention (r = 0.840, P<01) respectively. This implies that all the independent variables have a resultant positive effect on the use of learning management system among students in Nigerian Universities. It also indicates that increase in each of the independent variables would bring about a positive increase in the use of learning management system among students in Nigerian Universities.

Research Question 2: What is the relationship that exists between the factors and use of LMS among lecturers in University of Ibadan DLC ?

Table 2: Multiple Correlation Showing the relationship between the factors and use of LMS among lecturers in University of Ibadan DLC ?

Variable	*LMS adoption*	
1. LMS adoption	—	
2. internet availability	*0.820*	***
3. Access Technology	*0.896*	***
4. Policy regulation	*0.953*	***
5. Teacher Training	*0.949*	***
6. Perceived Usefulness	*0.955*	***
7. Perceived Ease of Use	*0.824*	***
8. Behaviour intention	*0.715*	***

* p < .05, ** p < .01, *** p < .001 Source: Field Survey.2023

Table 2 above reveals the relationship that exists between the independent variables (internet availability, access to computers, educational policies, teacher training, perceived usefulness, perceived ease of use, behaviour intention) and the dependent variable (use of Learning Management System) among lecturers in Nigerian Universities. The result shows that the use of learning management system positively correlates with all the independent variables under investigation as presented in order of magnitude; perceived usefulness (r = 0.955, P<01); educational policies (r = 0.953, P<01); teacher training (r = 0.949, P<01); access to technologies (r = 0.896, P<01); perceived ease of use (r = 0.824, P<01); internet availability (r = 0.0.820, P<01) and behaviour intention (r=0.715, P<01) respectively. This implies that all the independent variables are positive correlate of the use of learning management system among lecturers in Nigerian Universities. By default, increase in each of the independent variables would yield a positive increase in the use of learning management system among lecturers in Nigerian Universities.

Research Question 2: Which factors directly influence the adoption and utilization of LMS among students and lecturers at the University of Ibadan DLC?
The research question two was answered through a maximum estimate path analytical model explaining the direct effect of factors on adoption of LMS among students and lecturers.

Table 3: Path analytical model showing direct effect factors predisposing adoption and utilization of LMS among students at the University of Ibadan DLC

Exogenous variables		***Endogenous Variable***	***Estimate (β)***	***Std. Error***	***z-value***	***p***
Internet availability	→	*LMS adoption*	*0.012*	*0.014*	*0.839*	*0.401*
Access Tech	→	*LMS adoption*	*-0.054*	*0.015*	*-3.508*	*< .001*
Policy regulation	→	*LMS adoption*	*0.079*	*0.015*	*5.128*	*< .001*
Teacher Training	→	*LMS adoption*	*0.069*	*0.014*	*4.889*	*< .001*

Table 3 reveals that policy regulation (β= 0.079, z = 5.128, p< 0.01), teacher training (β= 0.069, z = 4.889, p< 0.01), and access to technology (β= -0.054, z = -3.508, p< 0.01) had direct effect on LMS adoption among students. By implication a unit change in the standard deviation of policy regulation and teacher training will increase the adoption of LMS among the student by 7.9% and 6.9% respectively. The table further reveals that an increase in students' access to technology will reduce their adoption of LMS by 5.4%. While internet availability has no significant direct effect on LMS adoption.

Table 4: Path analytical model showing direct effect factors predisposing adoption and utilization of LMS among Lecturers at the University of Ibadan DLC

Exogenous variable		***Endogenous variable***	***Estimate (β)***	***Std. Error***	***z-value***	***p***
Internet availability	→	*LMS adoption*	*-0.005*	*0.009*	*-0.604*	*0.546*
Access Tech	→	*LMS adoption*	*0.016*	*0.011*	*1.477*	*0.140*
Policy regulation	→	*LMS adoption*	*0.056*	*0.011*	*4.960*	*< .001*
Teacher Training	→	*LMS adoption*	*0.056*	*0.022*	*2.556*	*0.011*

Note. Delta method standard errors, normal theory confidence intervals, ML estimator
Table 4 reveals that policy regulation (β= 0.056, z = 4.960, p< 0.01) and teacher training (β= 0.056, z = 2.556, p< 0.01) had direct effect on lecturers LMS adoption. This implies that policy regulation and teacher training explained 5.6% and 5.6% variance in lecturers LMS adoption. However, internet availability and access to technology does not have significant direct effect on lecturers LMS adoption.
Research Question 3: How do indirect factors contribute to the adoption and utilization of LMS at the University of Ibadan DLC?

Table 5: Path analytical model showing indirect effect factors predisposing adoption and utilization of LMS among students at the University of Ibadan DLC

Exogenous variables		***Mediating Endogenous variables***		***Final endogenous variable***	***Estimate (β)***	***Std. Error***	***z-value***	***p***
Internet availability	→	*Perceived Usefulness*	→	*LMS adoption*	*0.014*	*0.007*	*1.859*	*0.063*
Internet availability	→	*Perceived Ease of Use*	→	*LMS adoption*	*0.008*	*0.009*	*0.908*	*0.364*
Internet availability	→	*Behaviour intention*	→	*LMS adoption*	*0.012*	*0.007*	*1.617*	*0.106*
Access to technology	→	*Perceived Usefulness*	→	*LMS adoption*	*0.014*	*0.007*	*1.866*	*0.062*

Access to technology	→	*Perceived Ease of Use*	→	*LMS adoption*	*0.048*	*0.013*	*3.792*	*< .001*
Access to technology	→	*Behaviour intention*	→	*LMS adoption*	*0.002*	*0.003*	*0.754*	*0.451*
Policy regulation	→	*Perceived Usefulness*	→	*LMS adoption*	*0.033*	*0.011*	*3.073*	*0.002*
Policy regulation	→	*Perceived Ease of Use*	→	*LMS adoption*	*0.015*	*0.009*	*1.595*	*0.111*
Policy regulation	→	*Behaviour intention*	→	*LMS adoption*	*0.006*	*0.005*	*1.303*	*0.193*
Teacher Training	→	*Perceived Usefulness*	→	*LMS adoption*	2.866×10^{-4}	*0.008*	*0.038*	*0.970*
Teacher Training	→	*Perceived Ease of Use*	→	*LMS adoption*	*0.022*	*0.011*	*2.075*	*0.038*
Teacher Training	→	*Behaviour intention*	→	*LMS adoption*	-9.567×10^{-4}	*0.003*	*-0.279*	*0.780*

Note. Delta method standard errors, normal theory confidence intervals, ML estimator.

Table 5 reveals that out of twelve theorized indirect effect only three of them were found significant. Access to technology had significant indirect effect on students LMS adoption through perceive ease of use (β = 0.048, z = 3.792, p< 0.01), policy regulation also had significant indirect effect on student LMS adoption through perceived usefulness (β = 0.033, z = 3.073, p< 0.05), while teacher training also had significant indirect effect on students LMS adoption through perceive ease of use (β = 0.022, z = 2.075, p< 0.05). This indicates that access to technology will increase students adoption of LMS through perceive ease of use by 4.8%, policy regulation will also increase students adoption of LMS through perceived usefulness by 3.3%, while teacher training will increase students use of LMS through perceived ease of use by 3.8%.

Table 6: Path analytical model showing indirect effect factors predisposing adoption and utilization of LMS among lecturers at the University of Ibadan DLC

Exogenous variables		***Mediating Endogenous variables***		***Final endogenous variable***	***Estimate*** *(β)*	***Std. Error***	***z-value***	***p***
Internet availability	→	*Perceived Usefulness*	→	*LMS adoption*	*0.015*	*0.006*	*2.603*	*0.009*
Internet availability	→	*Perceived Ease of Use*	→	*LMS adoption*	7.977×10^{-4}	*0.001*	*0.586*	*0.558*
Internet availability	→	*Behaviour intention*	→	*LMS adoption*	*-0.002*	*0.002*	*-0.925*	*0.355*
Access to technology	→	*Perceived Usefulness*	→	*LMS adoption*	4.557×10^{-4}	*0.006*	*0.077*	*0.938*
Access to technology	→	*Perceived Ease of Use*	→	*LMS adoption*	*-0.003*	*0.003*	*-0.820*	*0.412*
Access to technology	→	*Behaviour intention*	→	*LMS adoption*	*-0.003*	*0.003*	*-1.002*	*0.317*
Policy regulation	→	*Perceived Usefulness*	→	*LMS adoption*	*0.032*	*0.009*	*3.489*	*< .001*
Policy regulation	→	*Perceived Ease of Use*	→	*LMS adoption*	*-0.001*	*0.002*	*-0.642*	*0.521*
Policy regulation	→	*Behaviour intention*	→	*LMS adoption*	8.158×10^{-4}	*0.002*	*0.383*	*0.701*
Teacher Training	→	*Perceived Usefulness*	→	*LMS adoption*	*0.011*	*0.008*	*1.312*	*0.189*
Teacher Training	→	*Perceived Ease of Use*	→	*LMS adoption*	*0.012*	*0.013*	*0.903*	*0.367*

Teacher Training	→	*Behaviour intention*	→	*LMS adoption*	*0.013*	*0.009*	*1.528*	*0.127*

Note. Delta method standard errors, normal theory confidence intervals, ML estimator

Table 6 reveals that out of twelve theorized indirect effect only two of them were found significant among lecturers. Internet availability had significant indirect effect on lecturers LMS adoption through perceived usefulness ($\beta = 0.015$, $z = 2.603$, $p < 0.01$), while policy regulation had indirect effect on lecturers LMS adoption through perceived usefulness ($\beta = 0.032$, $z = 3.489$, $p < 0.01$). By implication, internet availability for lecturers will increase their adoption of LMS through perceived usefulness by 1.5%, more so, policy regulations can enhance lecturers' adoption of LMS through perceived usefulness by 3.2%.

It can be further inferred that both lecturers and students could actually embrace LMS in various universities. However, students' adoption of LMS is majorly dependent on access to technology, policy regulation and teacher training but not without the mediating role of perceived ease of use and perceived usefulness. On the other hand, lecturers adoption of LMS is mainly depending on internet availability and policy regulation but not without the mediating role of perceived usefulness. This could imply that lecturers' perception about the usefulness of LMS as a tool for teaching and learning has a huge role to play in the adoption of the tool, while on the part of the students, perceived ease of use goes a long way in determining their adoption of LMS. If students don't find the LMS platform user friendly it might be difficult for them to keep using it.

Research question 4: Which path analytical model (theorized or adjusted) best explains the patterns of LMS adoption among students and lecturers at the University of Ibadan DLC based on the identified factors?

Table 7: showing the model that best fit the data among student using R-squared

R-Squared	***Students***	***Lecturers***	***Models***		***CFI***	***RMSEA***
	R^2	***R^2***		***Benchmark***	***.950***	***0.06***
LMS adoption	*0.974*	*0.977*	***Model 1(Students)***		*.900*	*0.12*
Perceived Usefulness	*0.869*	*0.913*	*Model 2 (Lecturers*		*.930*	*0.08*
Perceived Ease of Use	*0.888*	*0.806*				
Behaviour intention	*0.757*	*0.564*				

Table 7 reveals that 97.4% change in students adoption of LMS is explained by the whole model, while 97.7% change in Lecturers adoption of LMS is accounted by the variables in the model. By implication the variables of the model provided a slightly higher explanation of the % change (0.003%) lecturers' adoption of LMS over the students. More so, the comparative fit index of LMS adoption among lecturers (CFI = 0.930) appears slightly superior to that of the students (CFI = 0.900).

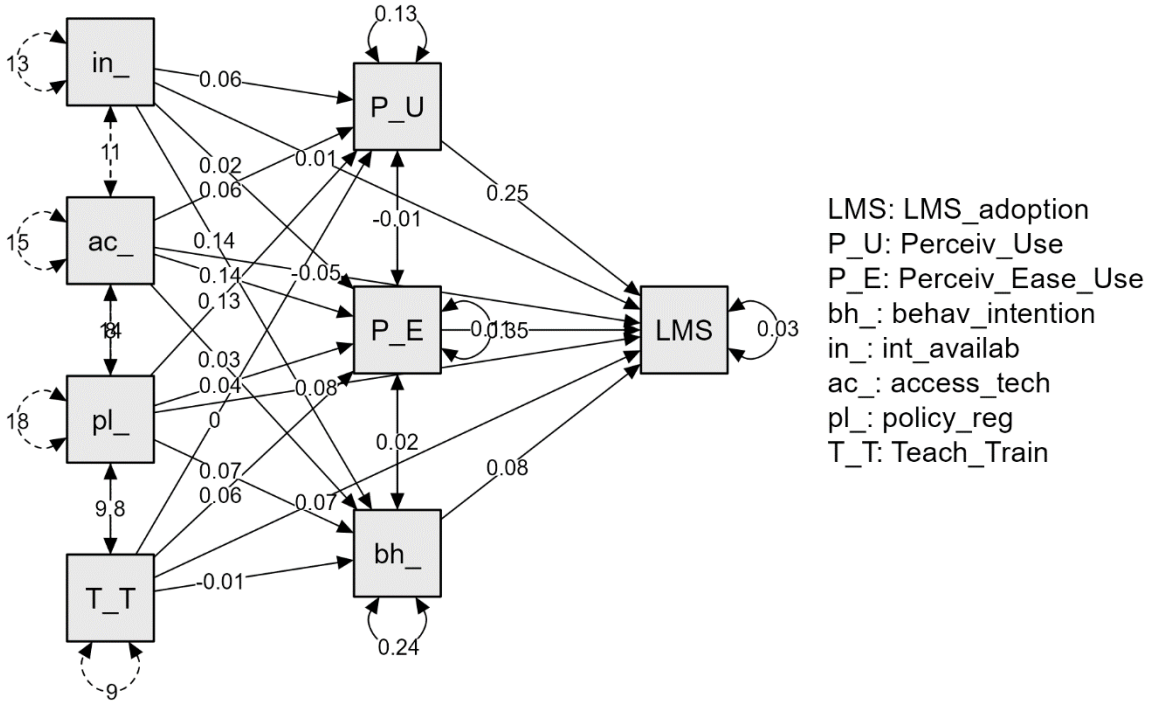

Fig 1: Path model showing factors predisposing LMS adoption among students of University of Ibadan DLC, a representation of table 5 and 7

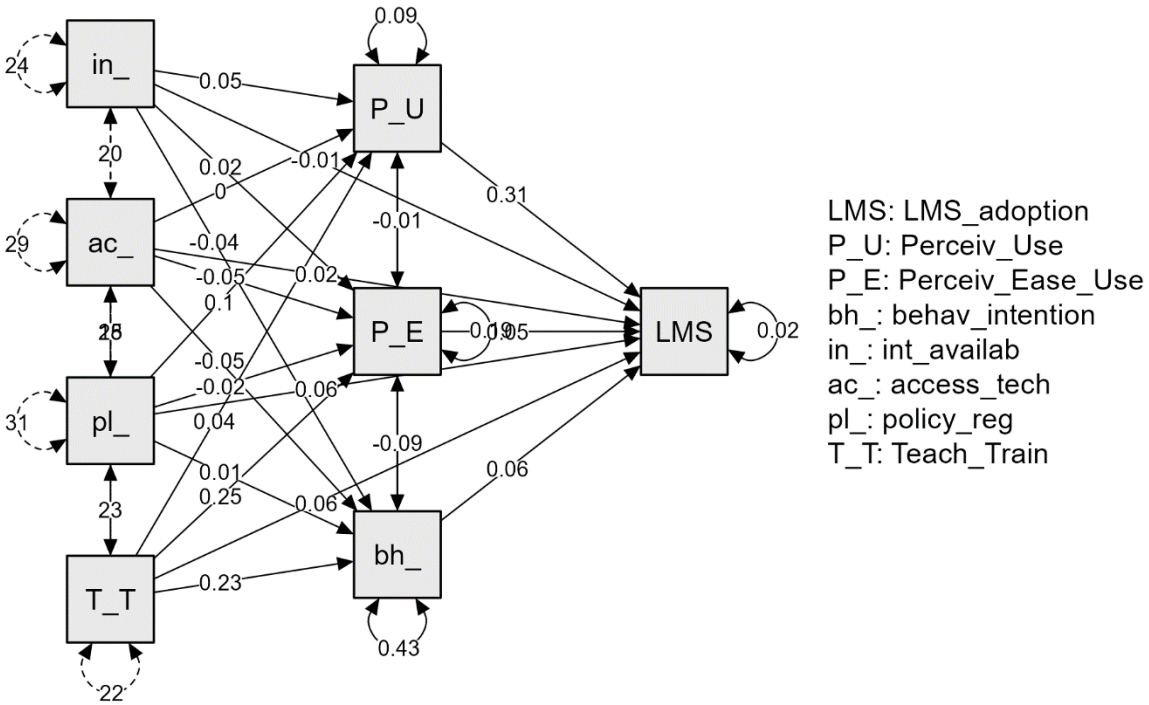

Fig 2: Path model showing factors predisposing LMS adoption among lecturers of University of Ibadan DLC, a representation of table 6 and 7.

IV. Discussion of Findings

This segment presents discussion of result extracted from this study as well as agreement the findings had with previous studies and its implications.

Research Question 1: Relationship Between Factors and LMS Adoption Among Students in Nigerian Universities

The research findings regarding the relationship between factors and Learning Management System (LMS) adoption among students in Nigerian universities shed light on the critical determinants of successful LMS implementation in this context. One of the prominent findings of this study is the significant role played by policy regulation in shaping LMS adoption among students. This finding aligns with existing literature, as demonstrated by Al-Qahtani (2019). Policy regulation refers to the presence of institutional support and clear guidelines for the implementation of LMS within educational institutions. When universities establish robust policies that support the integration of LMS into teaching and learning, it creates an environment conducive to adoption. Such policies may include incentives for educators, guidelines for content creation, and support for technical issues. Policy regulation serves as a foundational pillar for the successful deployment of LMS and can foster a culture of acceptance and engagement among students.

Another significant predictor of LMS adoption among students is teacher training, consistent with the findings of Al-Harbi (2016). This underscores the importance of adequately preparing educators to use LMS effectively. When teachers receive comprehensive training on LMS tools, they are better equipped to design engaging online courses, provide timely feedback, and facilitate interactive learning experiences. In turn, students benefit from well-prepared instructors who can navigate the digital learning environment with confidence. The positive correlation between teacher training and LMS adoption emphasizes the need for ongoing professional development programs for educators in Nigerian universities.

Access to technology emerged as another crucial factor influencing LMS adoption among students. This finding aligns with the fundamental requirement for students to have reliable internet access and suitable devices to engage with online learning platforms effectively. As Kirkwood and Price (2014) note, students' ability to access course materials, participate in discussions, and submit assignments online is contingent upon having the necessary technological infrastructure. Therefore, universities and policymakers must prioritize efforts to ensure that students have equitable access to technology and internet connectivity. Failure to do so can present significant barriers to LMS adoption, hindering the educational experiences of many students.

Interestingly, the study did not find a significant direct effect of internet availability on LMS adoption among students. While this result might appear counterintuitive, it could be attributed to the assumption that internet access is relatively widespread among university students in Nigeria. It is essential to recognize that this finding is context-specific and may not apply universally. Internet access can vary significantly across regions and institutions within Nigeria, and assumptions about widespread availability should be validated through further research and data collection. Additionally, factors such as the quality of internet service and affordability may also influence students' ability to fully engage with LMS.

Research Question 2: Relationship between Factors and LMS Adoption among Lecturers in Nigerian Universities

The findings related to the relationship between factors and Learning Management System (LMS) adoption among lecturers in Nigerian universities provide valuable insights into the factors influencing technology adoption among educators. A core significant findings of this study is the strong association between policy regulation and LMS adoption among lecturers, which is consistent with previous research (Cavanaugh, 2005). Policy regulation, which encompasses institutional guidelines and support for technology integration, plays a pivotal role in fostering technology adoption among educators. Clear policies can provide a structured framework that encourages instructors to embrace new teaching tools such as LMS. These policies may include incentives for adopting technology, guidelines for creating digital content, and mechanisms for technical support. When universities establish policies that support LMS adoption, it signals a commitment to digital transformation in education and provides lecturers with the necessary guidance to navigate the technological landscape effectively.

A similar significant predictor of LMS adoption among lecturers is teacher training, in line with the findings of Al-Harbi (2016). This highlights the critical role of professional development and training programs in empowering educators to use LMS effectively. Lecturers who receive comprehensive training are better equipped to design engaging online courses, leverage LMS features for interactive learning, and provide students with a seamless online experience. Teacher training not only enhances educators' technological skills but also boosts their confidence in incorporating technology into their teaching practices. Therefore, universities should prioritize ongoing professional development opportunities to support lecturers in adapting to the digital learning environment.

In a nut shell, the study did not find a significant direct effect of internet availability on LMS adoption among lecturers. This finding suggests that lecturers, who are often more tech-savvy than students, may already have reliable internet access. Consequently, internet availability may not serve as a significant barrier to their adoption of LMS. This result underscores the importance of recognizing the varying levels of digital literacy and technology readiness among educators. While some lecturers may be adept at using technology and have access to reliable internet, others may require additional support and training. It is crucial for institutions to tailor their support and professional development programs to meet the diverse needs of their teaching staff.

Research Question 3: Indirect Factors Contributing to LMS Adoption at the University of Ibadan DLC

The research findings related to indirect factors contributing to Learning Management System (LMS) adoption among students at the University of Ibadan DLC shed light on the intricate dynamics that influence students' perceptions and behaviours regarding technology adoption.

The result showcased access to technology as a factor that indirectly influences LMS adoption through perceived ease of use. This finding aligns with prior research highlighting the positive relationship between technology access and user experience (Venkatesh et al., 2003). When students have access to the necessary technological infrastructure, including devices and reliable internet connectivity, it enhances their overall experience with LMS platforms. Access to technology reduces barriers and challenges related to using the system, making it more user-friendly and intuitive. As a result, students are more likely to perceive LMS as easy to use, which, in turn, positively influences their adoption and engagement with the platform.

Another notable indirect factor is policy regulation, which indirectly affects LMS adoption through perceived usefulness. This finding underscores the critical role of institutional support and guidelines in shaping students' perceptions of LMS platforms. When universities establish clear policies that promote the integration of LMS into teaching and learning, students perceive LMS as a valuable tool for their academic journey. These policies may include incentives for educators to use LMS, guidelines for content creation, and mechanisms for addressing technical issues. The presence of supportive policies signals to students that LMS is an integral part of their educational experience, enhancing its perceived usefulness.

Teacher training emerged as another significant indirect factor, impacting LMS adoption through perceived ease of use. This finding underscores the importance of adequately preparing educators to effectively use LMS platforms (Alqurashi, 2016). When lecturers receive comprehensive training on LMS tools and best practices for online teaching, they are better equipped to create engaging and accessible online courses. Students benefit from well-prepared instructors who can navigate the digital learning environment with confidence. The positive correlation between teacher training and perceived ease of use highlights the role of professional development programs in promoting a seamless and user-friendly LMS experience for students.

These findings emphasize the complexity of LMS adoption, as multiple factors interact to shape students' perceptions and behaviours. Access to technology, policy regulation, and teacher training are interconnected elements that collectively influence the adoption process. While access to technology is a fundamental prerequisite, it is enhanced by supportive policies and effective teacher training. The interplay of these factors creates an environment where students perceive LMS as both easy to use and useful for their academic pursuits.

Research Question 4: Model Comparison for LMS Adoption Patterns

The comparison of path analytical models for Learning Management System (LMS) adoption patterns among students and lecturers at the University of Ibadan DLC provides valuable insights into the similarities and differences in the factors influencing technology adoption in these two distinct groups. The research findings reveal that both the model for students and the model for lecturers explain a high percentage of variance in LMS adoption patterns. This implies that there are common factors that significantly influence LMS adoption among both students and lecturers at the University of Ibadan DLC. This aligns with the broader literature on technology adoption in education, which emphasizes the importance of factors such as policy regulation, teacher training, and access to technology (Al-Harbi, 2016; Cavanaugh, 2005; Venkatesh et al., 2003).

Interestingly, the model for lecturers at the University of Ibadan DLC provided a slightly better fit, as indicated by the Comparative Fit Index (CFI). While both models explained a high percentage of variance, this result suggests that the factors influencing LMS adoption may have a more pronounced impact on lecturers than on students within this specific context.

The differential fit between the two models may be attributed to the distinct roles and expectations of students and lecturers in the adoption of educational technologies. Lecturers often play a pivotal role in designing and delivering courses through LMS platforms, and their adoption may be influenced by institutional policies and support to a greater extent. On the other hand, students primarily interact with LMS as end-users, and their adoption may be influenced by factors such as perceived ease of use and usefulness. These differing roles may contribute to the variations in model fit observed in the study.

While the findings from both models align with the broader literature on technology adoption, they also highlight the importance of considering the specific contextual factors that influence adoption patterns at the University of Ibadan DLC. Further research could delve into these contextual factors, including institutional culture, technological infrastructure, and the unique dynamics of the learning environment. Understanding the nuances of technology adoption within this specific context can inform tailored strategies and interventions to promote LMS adoption effectively among students and lecturers.

V. Conclusion

This study investigated the factors influencing the adoption of Learning Management Systems (LMS) among students and lecturers at the University of Ibadan Distance Learning Centre (UI DLC). The research addressed four key research questions aimed at understanding the relationships between various factors and LMS adoption, both directly and indirectly, as well as comparing the models that best explain adoption patterns among these two stakeholder groups. The study revealed that policy regulation, teacher training, and access to technology emerged as significant predictors of LMS adoption among students in Nigerian universities. Similarly, policy regulation and teacher training were identified as significant factors influencing LMS adoption among lecturers. These findings align with existing literature, emphasizing the importance of institutional support, training, and access to technology in facilitating LMS adoption.

The research identified significant indirect factors contributing to LMS adoption among students at the UI DLC. Access to technology, policy regulation, and teacher training indirectly influenced adoption through perceived ease of use and perceived usefulness. These findings highlight the complexity of LMS adoption, with multiple factors interplaying to shape users' perceptions and behaviors. Educational institutions should consider a holistic approach, including technology access, supportive policies, and teacher training programs, to effectively facilitate LMS adoption.

Comparing path analytical models for students and lecturers, both models explained a high percentage of variance in LMS adoption. However, the model for lecturers provided a slightly better fit, suggesting that the factors influencing LMS adoption may have a more pronounced impact on lecturers within this specific context. The differential roles and expectations of students and lecturers in technology adoption processes may contribute to these variations in model fit. Future research should explore context-specific factors influencing adoption patterns (Kirkwood & Price, 2014).

While this study contributes valuable insights into LMS adoption at UI DLC, it is not without limitations. The research was conducted within a specific educational context and may not fully capture the diversity of factors influencing adoption in different settings. Future studies could expand the scope to include a broader range of institutions and explore the role of cultural and contextual factors in adoption patterns.

VI. Recommendations

Based on the findings and implications of this study, several recommendations are proposed to promote the effective adoption of Learning Management Systems (LMS) among students and lecturers in educational institutions, with a focus on the University of Ibadan Distance Learning Centre (UI DLC):

UI DLC and other educational institutions should establish clear and comprehensive policies that outline the roles, responsibilities, and expectations related to LMS adoption. These policies should encompass aspects such as faculty and student training, technical support, content management, and data security.

Policies related to LMS should be dynamic and responsive to changing technological and educational landscapes. Regular reviews and updates should be conducted to ensure that policies remain relevant and effective.

UI DLC should allocate resources to provide continuous and tailored training opportunities for lecturers. These programs should cover not only the technical aspects of LMS but also pedagogical strategies for effective online teaching.

Educational institutions should create a culture of continuous professional development among educators. Lecturers should be encouraged and incentivized to participate in workshops, conferences, and online courses focused on educational technology.

UI DLC should work to bridge the digital divide by providing equitable access to technology and internet connectivity for both students and lecturers. This may involve initiatives to provide affordable devices or reliable internet access.

Continuous investment in technological infrastructure, including servers, network capacity, and software licenses, is essential to ensure a seamless LMS experience for all users.

When selecting or designing LMS platforms, prioritize user experience and usability. Consider conducting user testing and gathering feedback from students and lecturers to refine the platform's design and functionality.

Tailor the LMS platform to align with the specific educational goals and needs of UI DLC. Ensure that the LMS supports various teaching and learning modalities, including asynchronous and synchronous learning.
UI DLC should engage in ongoing research to understand the unique contextual factors that influence LMS adoption within its specific setting. This research can inform the development of context-specific strategies.
Collaborate with educational technology researchers and experts to stay informed about emerging trends and best practices in LMS adoption and implementation.
Encourage lecturers to collaborate and share best practices for LMS usage. Establish forums, communities of practice, or online platforms where educators can exchange ideas and experiences.
UI DLC should establish mechanisms for continuous monitoring and evaluation of LMS adoption. Collect data on usage, student outcomes, and user satisfaction to make informed decisions and improvements.

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