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Factors influencing teaching staff's adoption of Learning Management Systems in three Nigerian universities

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Abstract

Educational institutions of higher learning in most countries are moving to virtual learning, but the acceptance and deployment of learning management systems (LMSs) by teaching staff in some Nigerian universities are still a problem. Published research that details the use of LMSs by Nigerian academic staff is sparse, hence, this study investigates factors that influence reception and utilization of LMSs by staff who teach at 3 chosen universities in Nigeria using a quantitative correlational approach. The modified Unified Theory of Acceptance and Use of Technology (UTAUT) framed the study. Also, two variables were added to the instrument namely, 'Design decision' and 'Staff performance' to garner additional data about the usage of LMSs in the circumstances of HEIs in Nigeria. One hundred and twenty-two (122) teaching staff completed the online survey. Regression analyses suggested that effort expectancy contributed most to LMS's actual use. Moreover, facilitating conditions, performance expectancy, and social influence had a statistically significant effect on LMS actual usage and design decisions. The findings may inform university HEI administrators in countries of developing economies on essential factors to consider when digitizing teaching and learning.

Keywords: Higher Education Institutions, Learning Management Systems, Information and Communications Technology, Technology Acceptance Model II, Unified Theory of Acceptance and Use of Technology.

1. Introduction

Digital technologies have percolated practically all facets of modern-day living. Therefore, it is not a surprise that education is not spared of the digitalization obvious in all components of

society (Joy & Srihari, 2018; Marr, 2018). Essentially, it has become important for one to possess digital skills to do well in present day society (Jamieson, 2020). Thus, for the reasons mentioned above, higher education institutions (HEIs) have the responsibility to make sure that students are well prepared for the digital transformation (Hinds, 2018).

HEIs now make use of digital technologies to complement instructive undertakings (Altbach & Wit, 2020; Ngwenya & Njenga, 2021). Accepting to use Learning Management Systems (LMSs) is seen to be the starting point of digitalizing teaching and learning for these HEIs (Mansfield, 2017). Usually, teaching staff could use LMSs to design and share instructional materials, assess assigned tasks, record and post students' scores, expediate online collaborative meetings, monitor performance, etc. Equally, students can collaborate with their tutors and colleagues to contribute to the learning experience (Mtebe, 2015).

Nigerian HEIs have been known to develop custom-made LMSs appropriate to their instructional needs or made use of the Moodle or Blackboard systems (Ipaye, 2009; Chigozie-Okwum, Ezeanyeji & Odii, 2018). Nonetheless, the conventional style of teaching was much in use before LMSs were introduced into Nigeria's HEIs (Laleye, 2015). Notably, instructional activities have been enriched since the coming of the LMS (Chigozie-Okwum et al., 2018). The Universities of Jos, Lagos and a few others now use the LMS to augment the conventional style of facilitating instruction (Liverpool et al., 2009).

Nevertheless, these efforts to digitalize instructional activities have been affected by the lack of the essential infrastructural and organizational skills (Ipaye, 2009; Liverpool et al., 2009). For example, the government in Nigeria has not funded HEIs adequately. Thereby, making the required materials teaching staff need to perform their roles efficiently to be absent or deficient (Daily Post, 2020). Consequently, the quality of education obtained at HEIs is generally poor (Akintimehin, 2019; Muftahu, 2020).

Furthermore, the way staff who teach in Nigeria engage the LMS for instruction is not clear. In other words, little literature abounds in this area (Alabi, 2016; Tayo, 2015). It would seem that academic staff are not yet competent in using digital technologies in their activities and so may not be able to pass on the required digital skills to students (ITNewsAfrica.com, 2018). Insufficient infrastructure and training, and lack of ongoing support are reasons digital technologies are yet to be fully integrated in their practices (Alabi, 2016; Laleye, 2015).

Therefore, the paper examining what influences the embracing and deployment of Learning Management Systems by academic staff at select universities in Nigeria.

2. Theoretic Frame

The Unified Theory of Acceptance and Use of Technology (UTAUT) model crafted by Venkatesh et al. (2003) frames this study. Venkatesh et al. (2003) had the mission to progress the extrapolative power of behavioral intention (BI) to assent and utilize technology, using Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC) as the bases, since these were noteworthy in elucidating the embrace and usage of any technology by people and organizations (John, 2015; Olugbara et al., 2021). They had studied the eight competing models of technology reception and articulated a combined model that amalgamated elements of these models (Bradley, 2009). It had a much better explanatory power of user acceptance and explained variance of up to 70 percent, which made it important for this study.

According to Venkatesh et al. (2003), PE is seen as an individual's conviction that using a system will assist to accomplish advantages in work performance, EE to be the ease related with the use of the system, SI to be an individual's confidence that important others believe he or she should use the new system and FC to be that the organizational and technical infrastructure exist to support the use of the system. Similarly, the technology acceptance model II (TAM II) which is a component of the UTAUT suggests that attitude has an influence on BI and behavioral use to utilize a technology (Davis, 1989; John, 2015) but this has been a contentious issue. Taylor and Todd (1995) postulated that the construct of attitude is captured by PE and EE. The relationship between attitude and PE and EE is probably explained by the fact that if something is useful and easy, an individual would have a positive behavior toward it.

3. Conceptual Framework and Hypotheses Formulation

The conceptual framework has its basis on UTAUT simply because it has a better expounding power on BI of users to acknowledge and employ a technology (Dwivedi et al., 2011). The model explicated variances of 75%, 50% and 25% respectively (Bellaaj et al., 2015). Besides, a bit of modification was done to the model with the inclusion of 'Design decision' and 'Staff performance' variables (see Figure 1 - Research Model).

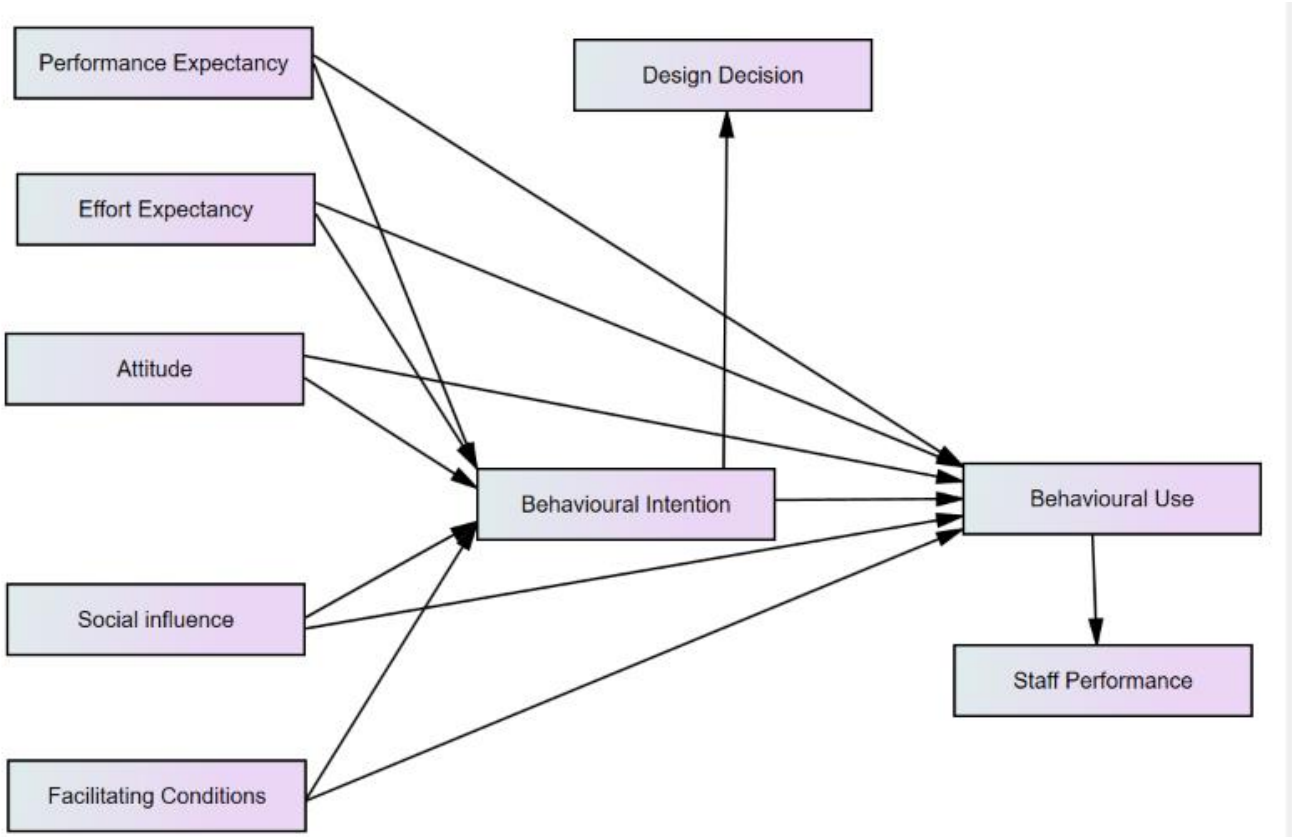


Figure 1: *Research model*

Source: Venkatesh and Davis (2000); Venkatesh et al. (2003); modified from Venkatesh and Davis to include 'Design decision' and 'Staff performance' variables.

3.1. Attitude

In this study, the attitude variable is a mindset to either say a yes or no to the use of LMSs. Studies show that users' positive or negative attitude toward any information system substantially affects it. Institutions of higher learning have planned and executed digital technologies to progress teaching and learning practices, but the teaching staff's attitudes have frustrated such efforts (Alabi, 2016; John, 2015). Therefore, a positive attitude by respondents (teaching staff) toward LMSs may suggest a willingness to use them in their practices. At the same time, a negative attitude may stifle such a disposition. Consequently, the following hypothesis is generated:

H1a: Statistically meaningful association exists amongst respondents' attitude (A) and their embracing of the LMS for instruction.

H1b: A statistically significant relation is seen among respondents' attitude (A) and their BI to adopt the LMS for tutoring.

3.2. Performance Expectancy

PE is seen as respondents' conviction that using the LMS would advance the outcome of their practices. Technology users tend to show interest in a technology that would enhance the quality of their work (John Paul et al., 2015). PE is a significant reason teaching staff may accept digital technologies in their practices since the tools in question could help them reach the height of their career (Ogunniyi & George, 2016). Nonetheless, for a country like Nigeria, where the status of the utilization of the LMS by staff who teach is not detailed, it may be challenging to establish the effect of the use of such systems in their practices. For this reason, the following hypothesis is pondered:

- H2a A statistically significant association is observed amongst respondents' PE and their embracing (actual use) of an LMS for instruction purposes.
- H2b Statistically substantial connection exists among respondents' PE and their BI to assume an LMS for teaching purposes.

3.3. Effort Expectancy

EE is the belief that the LMS would be easy to understand and used in the passing of knowledge to students. Literature suggests that technology users are motivated to employ it when they adjudge it to be easy to use (Bradley, 2009; Maina & Nzuki, 2015). However, in institutions where digital technologies are in use, it is crucial to assess whether teaching staff find them easy to use or not. Otherwise, these systems may never be used. Again, for a country like Nigeria, where the conventional style of teaching was prominent in HEIs, coupled with the slow employ of LMSs by academic staff, it could be difficult to know whether academic staff find LMSs easy to use or not (Laleye, 2015). Thus, a proposition considered:

H3: A statistically significant association is seen amongst teaching team's effort expectancy and their embrace of an LMS for instruction.

H3: Statistically meaningful relation exists amid academic team's effort expectancy and their BI to embrace an LMS for tutoring purposes.

3.4. Social Influence

SI is understood as how respondents see other important persons (colleagues, leaders, mentors, students, policymakers) as an influence to utilize the LMS for tutoring. Available literature affirmed that social influence was instrumental to accepting technological innovations (Kulviwata et al., 2009; Vannoy & Palvia, 2010). Nevertheless, in Nigeria, policies on ICT have not been properly implemented by HEIs (Bassey et al., 2009). Therefore, policymakers may not be influenced to use digital technologies. Also, LMSs are used by teaching staff merely for administrative purposes and not necessarily for teaching innovation. Hence, teaching staff may not be influenced by one another to use LMSs in their practices. The following hypothesis is put forward:

H4a: A statistically significant association is seen among teaching workforce's social influence (SI) and their reception of the LMS for teaching purposes.

H4b: A statistically significant correlation is noted amongst teaching team's social influence (SI) and their BI to embrace an LMS for teaching.

3.5. Facilitating Conditions (FC)

Ordinarily, a technology user is motivated to use such where the required resources are put in place. A few of the required resources would include adequate computer hardware and software, fast and reliable internet, uninterrupted power supply, training and ongoing support for staff, and support from top management encourage usage of LMSs in institutions of higher learning (Maina & Nzuki, 2015). Nonetheless, the government of Nigeria has not shown interest in adequately funding institutions of higher learning. Consequently, teaching staff are deprived of the required resources to function proficiently. (Muftahu, 2020). Nevertheless, the mere presence of the necessary resources does not mean teaching staff would integrate digital technologies into their practices. Therefore, the following are considered:

H5: A statistically significant association is seen among FC and respondents' adoption of LMSs for instruction.

H5b: A statistically significant relation exists amongst facilitating conditions (FC) and academic staff and their BI to accept LMSs for instruction.

3.6. Behavioral Intention (BI)

BI studies the intention of those who teach to use the LMS for instructional activities because they have a positive intention toward it. One's behavioral intention is pivotal to technology reception (Davis, 1989; Lin et al., 2013). Therefore, could the teaching staff's deliberate act to use LMSs enhance their practices? However, Alabi (2016) clarified that the Nigerian academic staff's acceptance of various automated tools to advance teaching and learning is yet to permeate their practices. Therefore, the following hypothesis is considered:

H6: Statistically meaningful relationship is observed amongst respondents BI and their adoption of LMSs for teaching purposes.

3.7. Design Decision (DD)

DD is the didactic understanding of respondents and their online design experience on the LMS. DD was included in the research model (Figure 1) to further comprehend the reasons respondents at HEIs in Nigeria embrace and utilize LMSs in their practices. For example, research points to the need of the Technological, Pedagogical and Content Knowledge (TPACK) for academic staff to use ICTs efficiently (Scherer et al., 2018). That is, teaching staff need to understand any subject matter and, with the help of technology, present it in such a way that students of all categories can comprehend it. There is more to efficient use of LMSs than just uploading course content. Teaching staff at Nigerian HEIs would need to be more creative and accommodate students with different learning styles in delivering course content on the LMS (Alabi, 2016; Scherer et al., 2018). So, the research would want to know whether respondents' use of LMSs influences their design decision. Consequently, a proposition is cogitated:

H7: Statistically significant relationship exists between respondents' use of the LMS and their design decision.

3.8. Staff Performance

Staff performance investigated the outcome of teaching staff's efficient utilization of the LMS for instructional activities. Also, staff performance as a variable was added to the research model. Staff performance in this research, is understood to be the efficient use of the LMS by

respondents. Literature implies that one may want to know the competent use of these systems by higher institutions of learning in developing countries such as Nigeria. Again, literature insinuates that despite these systems having been planned and deployed, they were never used consistently by staff (Dube & Scott, 2014; Mtebe, 2015). Therefore, the following proposition is pondered:

H8: Statistically substantial association is acknowledged amongst respondents' embrace of LMSs for instruction and their performance.

4. Design of the Study

A quantitative, explicatory correlational study that considered the positivist's perspective (Creswell, 2011). Additionally, the theoretical perspective of technology acceptance study is focused on the positivist's stance.

4.1 Research instrument

The data collection tool was formulated from the TAM II and UTAUT models and comprised the DD and SP variables to further understand the reasons respondents may consider the LMS for instruction (Pardamean & Susanto, 2012). Respondents (teaching staff) completed the tool.

Table 1: *Concepts and survey foundations.*

Construct	Item	Number of items	Source
Attitude	A1-A4.	4	Davis, 1989; John, 2015.
PE	PE1-PE8.	8	Maina & Nzuki, 2015; Venkatesh et al., 2003.
EE	EE1-EE5.	5	Bradley, 2009; Maina & Nzuki, 2015.
SI	S1-SI4.	4	John, 2015; Marchewka et al., 2007; Venkatesh et al., 2003.
FC	FC1-FC7.	7	John Paul et al., 2015; Venkatesh et al., 2003.

Construct	Item	Number of items	Source
BI	BI1-BI4	4	Davis, 1989; Lin et al., 2013.
AU	AU1-AU4.	4	Bradley, 2009; Davis, 1989; John Paul et al., 2015; Venkatesh et al., 2003.
DD	DD1-DD3.	3	Penfold, 2016.
SP	SP1-SP4.	4	Shee & Wang, 2008.

The study had two sections. The demographics of teaching staff (respondents) and their training needs on the LMS shaped the initial part. The succeeding section discuss statements concerning the variables of the study which had 43 items as described in Table 1. Therefore, to rate the variables to determine how much teaching staff approved or differed with the statements, the study considered the five-point Likert-type scale (Chomeya, 2010).

4.2. Validity of the instrument

In this research, content validity ensured that the items on the data collection tool were not ambiguous and achieved its purpose of measurement (Creswell, 2011). Also, content validity was fulfilled with a review of the items on the tool. The constructs were clearly associated and yet distinct from each other (Garcia, 2017). This ensured that there was no multicollinearity in the data. Statistical analyses were conducted to measure construct validity.

4.3. Respondents

Staff who teach at Nigerian HEIs where LMSs had been designed and executed over a period of 10 years were the target population. Teaching staff (respondents) numbering about 122 accomplished and submitted the survey virtually. The outcomes implied the respondents were between the ages of 30 and 50 and were lecturers. They had a Ph.D., and their teaching experience did not exceed 10 years. 65% of respondents needed competence building on using the LMS for their practices. 35% of them did not require such training. The Moodle LMS was the most used.

4.4. Sampling

Thirteen Nigerian universities that had designed and executed LMSs for instruction over a period of ten years were the focus. Consequently, 3 universities were randomly selected from the 13. Additionally, at each of the study location, total (census) sampling was applied that targeted all academic staff at the institutions (Denscombe, 2010; Creswell, 2011).

4.5. Data Collection

The study considered LimeSurvey application for online deployment of the survey. Respondents had access to the survey via their email addresses. Deploying the survey online, enabled it to get to a good number of respondents within a brief period and reduced data entry errors since the respondents entered the data directly (Agruma & Zollett, 2007).

5. Data analysis and statistical measures

LimeSurvey application was useful in capturing the data and in Microsoft Excel file format; these were then cleaned, organized and coded. In addition, considering further analyses, in terms of checking and constructing the model and proving the factor structure, statistical package for the social sciences 26 (SPSS 26) and Amos version 26 were employed.

5.1. Reliability

Consistency of the tool was proven and a value of .962 was adequate which alluded the tool's responses were reliable (Marchewka et al., 2007). Description of individual constructs is seen in Table 2.

5.2. The Exploratory Factor Analysis (EFA)

The EFA authenticated the questionnaire for the reason that Design decision and Staff performance were added to the initial model. Additionally, it was pertinent that before performing the factor analysis, the data met the conditions for applying an EFA which included lack of multicollinearity and sampling adequacy. The Kaiser Meyer Olkin (KMO) and Bartlett's tests were essential to measure sampling adequacy. Usually, the KMO should be higher than 0.5 but less than 1, and Bartlett's test significant (below 0.05) (Field, 2018). The KMO tests for the individual constructs were more than the lowest threshold of 0.5.

Table 2: *Descriptive statistics.*

Construct	Mean	Std. Deviation	KMO	Determinant	Cronbach's alpha	Item number
EE	2.9951	1.38623	.864	.001	.963	5
PE	4.2787	.79445	.880	.001	.934	8
ATT	4.2520	.75069	.750	.242	.796	4
SI	2.8730	.86378	.682	.299	.769	4
FC	2.6136	1.08606	.871	.015	.894	7
BI	3.8709	1.10420	.754	.059	.858	4
AU	2.7623	1.40095	.800	.017	.941	4
DD	2.6475	1.59850	.762	.009	.978	3
SP	4.0307	1.21738	.818	.037	.922	4
EE, PE, ATT, SI, FC, BI, AU, DD, SP					.962	43

In Table 2, the KMO values were more than 0.5, which implies some good sampling adequacy (see Field, 2009). The determinant values were more than 0.001, which means that there is no multicollinearity in the data (see Field 2018).

5.3. One-dimensionality

Factor analysis using the principal component analysis with the Varimax Rotation option was employed to check for one-dimensionality of the items in each construct. A one-factor solution indicated that the items were related and measured the same thing. A minutest Eigen value of 1 was maintained as a cut-off for extraction, and items with factor loadings fewer than 0.5 were removed (see Table 3).

***Table 3**: Factor loadings.*

ITEM	PE	EE	ATT	SI	FC	BI	AU	DD	SP
1	.759	.965	.582	.783	.808	.733	.830	.970	.835
2	.806	.950	.844	.635	.790	.979	.947	.990	.862
3	.927	.921	.754	.603	.870	.924	.904	.943	.942
4	.797	.961	.701	.684	.615	.535	.900		.850
5	.913	.784			.847				

6	.740	.579
7	.697	.668
8	.777	

The factor loadings were more than 0.5, which signifies some good reliability (Hair et al., 2010).

5.4 Factor analysis for all the constructs

The Factor analysis with principal component analysis (PCA) and oblimin rotation was undertaken for all the constructs resulting in nine factors with Eigenvalues greater than 1. Table 4 depicts the factor analysis results for all the constructs.

***Table 4*:** Exploratory Factor Analysis.

Factor	1	2	3	4	5	6	7	8	9
PE3	.842								
PE5	.830								
PE6	.771								
PE1	.769								
PE4	.761								
PE2	.729								
PE7	.696								
PE8	.672								
FC3		.936							
FC5		.883							
FC2		.710							
FC1		.626							
FC6		.578							
FC4		.542							
EE2			-.945						
EE1			-.926						
EE4			-.878						
EE3			-.873						
EE5			-.689						

Factor	1	2	3	4	5	6	7	8	9
SI4			.884						
SI1			.794						
SI2					.843				
SI3					.739				
ATT2						-.858			
ATT3						-.723			
AU2							.943		
DD2							.938		
AU1							.895		
DD1							.882		
AU3							.835		
AU4							.818		
DD3							.778		
SP2								.899	
SP1								.870	
SP3								.844	
SP4								.685	
BI2									.906
BI1									.802
BI3									.779

Table 4 conveys that the initial items loaded strongly during the EFA. Notably, the 'actual usage' (AU) and 'design decision' (DD) variables merged during the EFA, and the researchers renamed them: 'Utilization of the LMS'.

Figure 2 displays the revised research model.

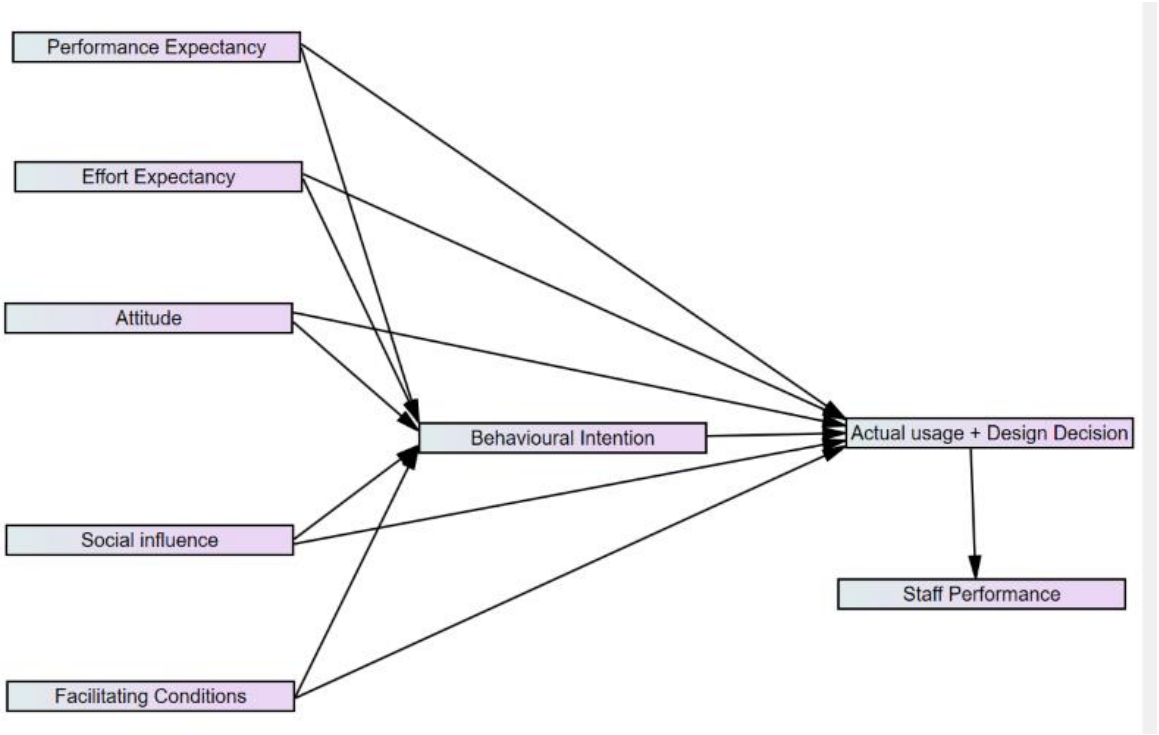


Figure 2: Proposed research model after factor analysis.

6. Regression Analysis

The Kaiser Meyer Olkin (KMO) size signified the sample size was satisfactory. The association among the latent variables was beneath the 0.7 cut-off mark, which insinuated no presence of multicollinearity. The variance inflation factor (VIF) values were lesser than the cut-off mark of 10, denoting the absence of multicollinearity. Outliers were not present because the greatest standardized residual attained was 2.427, which was below the full cut-off value of 3.3. The highest Cook's Distance for the study was 0.189, fewer the highest cut-off value of 1 (Creswell, 2011; Pallant, 2013; Tabachnick & Fidell, 2013).

7. Results

7.1. Testing of hypotheses

Hierarchical multiple regression analysis was used to determine the predictive value of explanatory variables on the dependent variable. Multiple regression analysis was performed, with Utilization of the LMS, BI and SP as outcome variables. The results are explained in the tables below.

7.2 Regression analysis with Utilization of the LMS as outcome variable.

The regression outcomes inferred the model elucidated 76.5% of the variance and the adjusted R squared value 74.1%; a considerable goodness-of-fit measure for regression analysis (Bellaaj et al., 2015; Pallant, 2007).

The F statistics for the model was statistically significant (F (9; 88) = 31.883, p<.001).

Table 5: *Regression analysis with Utilization of the LMS (actual usage and design decision) as outcome variable.*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
3	(Constant)	-1.640	0.570		-2.878	0.005					
	Performance expectancy	0.291	0.137	0.139	2.129	0.036	0.384	0.221	0.110	0.622	1.609
	Facilitating conditions	0.276	0.078	0.239	3.532	0.001	0.651	0.352	0.182	0.584	1.711
	Effort expectancy	0.502	0.070	0.460	7.206	0.000	0.657	0.609	0.372	0.654	1.529
	Social influence: factor 1 (2 item factor)	0.230	0.065	0.213	3.535	0.001	0.370	0.353	0.183	0.734	1.363
	Social influence: factor 2 (2 item factor)	0.180	0.063	0.166	2.843	0.006	0.294	0.290	0.147	0.785	1.274
	Attitude factor (2 item factor)	-0.160	0.099	-0.098	-1.616	0.110	0.263	-0.170	-0.083	0.726	1.378
	Behavioral intention	0.046	0.101	0.029	0.451	0.653	0.345	0.048	0.023	0.629	1.591

a. Dependent Variable: Utilization of the LMS (Actual use and Design decision)

Table 5 exposes that EE (β = .46, p< 0.05) made the utmost statistically significant contribution, followed by FC (β = .24, p< 0.05); SI 1(β = .21, p< 0.05); SI 2 (β = .17, p< 0.05); and PE (β = .14, p< 0.05).

Table 6: Hypothesis testing results.

Hypothesis number	Hypothesized relationship	Results
H1a	A statistically significant association is observed amongst respondents' attitude (A) and embracing (actual use) of the LMS for instruction.	Not Supported
H1b	A statistically significant connection is seen among respondents' attitude (A) and BI to embrace LMSs for coaching.	**Supported**
H2a	Statistically significant association exists amongst teaching staff's PE and acceptance (actual use) of LMSs for instruction.	**Supported**
H2b	A statistically significant connection is observed among respondents PE and BI to employ an LMSs for instruction.	**Supported**
H3a	Statistically significant association occurred amongst respondents' EE and acceptance (actual use) of the LMS for passing on knowledge.	**Supported**
H3b	A statistically significant connection is seen amongst respondents' EE and BI to employ an LMS for passing on knowledge.	Not Supported
H4a	A statistically significant association is noted amongst teaching team's SI and their adoption (actual use) of LMSs for instruction.	**Supported**
H4b	Statistically significant connection exists amid teaching team's SI and BI to use an LMS for instruction.	Not Supported
H5a	Statistically significant association is seen amid FC and academic workforce's approval (actual use) of the LMS for teaching.	**Supported**
H5b	A statistically substantial connection is noted amongst FC and academic staff and BI to use an LMS for teaching.	**Supported**
H6	A statistically meaningful connection is observed amid respondents' BI and embracing (actual use) of LMSs for imparting knowledge.	Not Supported
H7	Statistically important connection exists amid respondents' usage of LMSs and design decision.	*
H8	A statistically significant association is seen between respondents' embracing (actual use) of LMSs for instruction and performance in meeting students' learning needs.	**Supported**
	* Design decision and LMS use measure the same construct	

8. Discussions

The findings from the study are discussed below:

8.1. The influence of Attitude

Attitude deduced a statistically noteworthy effect on BI to use LMSs. The result supports the findings of several authors and the mean of 4.3 scored for attitude (Mafuna & Wadesango, 2016; Fearnley & Amora, 2020). The outcome did not support the findings by Matarirano et al. (2021).

The attitude variable implied a statistically insignificant impact on the behavioral usage of the LMS ($p = 0.110$). The outcome is consistent with Venkatesh et al. (2003) findings. Although respondents may have the behavioral intention to use LMSs, they do not get to put their intention to use because of several reasons, which may include fear of technology and resistance to embracing the digital way of teaching probably because they are used to the conventional ways of teaching. The other reason is that attitude is captured in PE and EE and thus influences behavioral use indirectly. This is in congruence with the findings of several authors (Davis, 1989) who postulated that attitude is indirectly comparative to behavioral use for inexperienced users, which was the case with Nigerian lecturers at the time of the study.

8.2. The influence of PE

PE indicated a statistically substantial ($p = .002$) influence on BI to utilize LMSs. This corroborates the works of Opoku (2020); Widjaja et al. (2019); Fearnley and Amora (2020); Pagan and Medina (2021). However, in some cases, PE did not significantly affect BI to use LMSs (Sukandi & Ariyanti, 2022; Zwain, 2019).

8.3. The influence of Effort Expectancy.

There is a statistically insignificant relationship ($p = .265$) amongst respondents EE and their BI to embrace LMSs for passing on knowledge. This outcome is inconsistent with findings from several authors (Pagan & Medina, 2021, Venkatesh et al., 2003) but consistent with findings from several authors (Sukandi & Ariyanti, 2022; Widjaja et al., 2019; Radovan & Kristl, 2017; Zwain, 2019). On the contrary, effort expectancy significantly affected the behavioral use (actual use) of the LMSs. Effort expectancy made the most significant contribution ($\beta = .46$, $p < 0.05$),

probably signifying that respondents would show interest in the system if they found it easier to use.

8.4. The influence of SI

The SI variable inferred statistically insignificant effect (p = .719) on behavioral intention to utilize LMSs. The outcome confirms the work done by author (Zwain, 2019) but inconsistent with findings from other authors (Raza, et al., 2021; Sukandi & Ariyanti, 2022; Radovan & Kristl, 2017; Pagan & Medina, 2021). Academic staff did not consider importance of the significant other in the BI to use LMS. Moreover, SI (factor 1 and factor 2) implied a statistically meaningful outcome on behavioral usage (actual use) of LMSs. Although the mean score for SI was low (2.9), academic staff at Nigerian HEIs acknowledged the importance of getting help from the significant other.

8.5. The influence of Facilitating Conditions

Facilitating conditions made a statistically important result (p = .002) on BI to use LMSs. This result strengthens the findings of several authors (Radovan & Kristl, 2017; Pagan & Medina, 2021) and weakens findings from other authors (Widjaja et al., 2019; Zwain, 2019). Similarly, FC made a statistically noteworthy effect (p = 0.001) on factual usage of the LMS. This supports the work done by author (John Paul et al., 2015) and inconsistent with findings from some other authors (Widjaja et al., 2019). This result contradicts the fact that the government's meagre funding of HEIs does not provide resources required for respondents to function effectively. Despite poor funding, the lecturers were able to innovate and do well with limited resources and support.

8.6. Influence of BI on Utilization of the LMS

BI to utilize the LMS implied a statistically insignificant outcome (p = 0.653) on actual use of LMSs. This does not support the findings from several authors (Opoku, 2020; Radovan & Kristl, 2017; Zwain, 2019). This probably means having an intention does not necessarily translate into action.

8.7. The influence of Usage of the LMS on SP

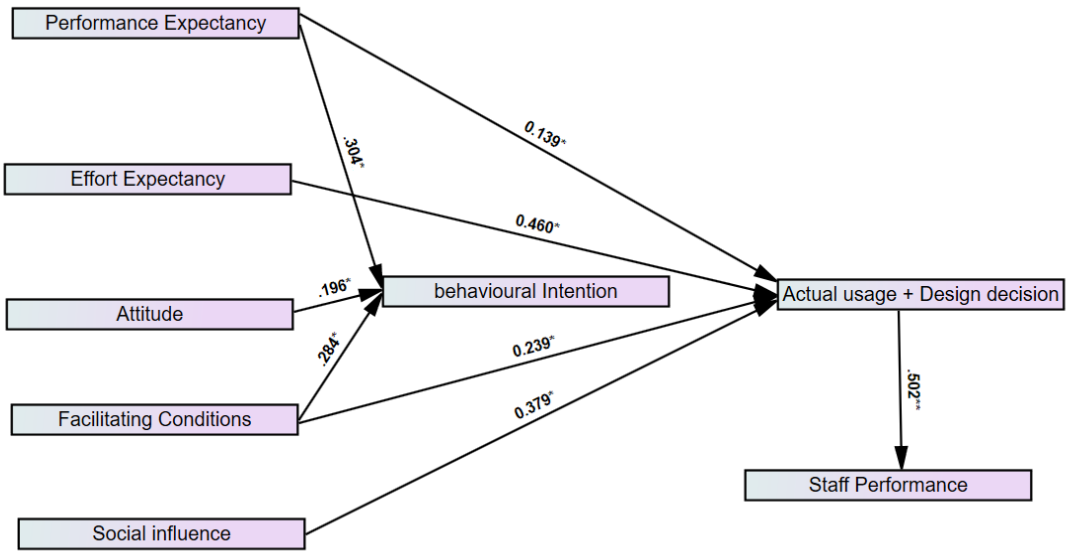
Regression analysis results indicated that employment of the LMS inferred a statistically meaningful effect on Staff performance. The explained variance was low (24.6 %) which is a

weak relationship. The implication is that lecturers are yet to reach that high level of proficiency in using the LMS. Nevertheless, the low explained variance could also be due to other factors affecting staff performance besides actual usage and design decision.

9. Theoretical Contributions

The original UTAUT model denoted that performance expectancy, effort expectancy, facilitating conditions and social influence directly influenced BI. However, concerning this study only PE and FC do affect BI. In addition, in the original UTAUT model, only BI and FC directly influenced behavioral use but, in this study, behavioral influence had no influence, but PE, EE, FC and SI do influence behavioral use (Figure 3).

The findings confirm the importance of cultural dimension on the application of the UTAUT and the level of economic development that gives different levels of technology acceptance (LMS) in different contexts of developed and developing economies. For instance, in countries with a developing economy such as Nigeria, behavioral intention becomes unimportant due to limited or a lack of physical, technical and organizational resources but the actual usage of the technology (LMS) when the resources are available as with countries with developed economies. Hence, due to a lack of resources to facilitate usage common in developing economies, behavioral intention influence on actual usage becomes a pipe dream. Further, in a university setup where lecturers are compelled to use LMSs, the importance of attitude on actual usage becomes irrelevant since attitude influenced behavioral intention. The outcome is ground-breaking and emphasizes the importance of actual usage in developing economies with poor or non-existent physical, human capital and organizational and technical infrastructure and the need to put these resources in place to enhance actual usage.



** p < 0.05* ***p < 0.001*

***Figure 3**:Final model for LMS usage*

In addition, this study cross culturally validated the questionnaire as a means for collecting data for future research. Last but not the least, the study extended the UTAUT framework to include Staff performance and Design decision where the design decision becomes important when universities migrate to full blown online learning especially for short online programs (SLPs) and micro credentials which have recently gained traction worldwide.

10. Practical Contributions and Implications/Policy

The results will inform policymakers on what interventions to implement to improve LMS's usage. One such strategy could be to ensure that all stakeholders are involved from the inception to completion of the LMS's plan. Similarly, support services on the LMS must be sustained if respondents are to continually achieve success in using the system for instruction. Respondenst may be given support services by email, face-to-face, over the phone or even online.

The analysis reveal that actual usage and design decision were highly correlated, indicating they occur together, thus, online pedagogical strategies must be embedded with LMS usage training. HEIs in Nigeria or in countries with developing economies may include actual

LMS usage and design decision as key performance indicators (KPIs) as components of Staff performance.

11. The Implication for Countries with Developing Economies

For actual usage of the LMS, effort expectancy contributed the most explained variance with a standardized coefficient, $\beta = 0.460$, followed by the combined social influence factors 1 and 2(β =0.379) and facilitating conditions (β =0.239) and lastly, performance expectancy. The implication is that providing technical and organizational support and social learning where the academic staff learn from the significant other will make the LMS easy to use, enhancing teaching and learning and resulting in increased staff performance.

12. Limits and Propositions for Further Research

A bigger sample size may have been helpful to the analysis but a total of 122 respondents finished and tendered their responses. Further, extending the study to other universities in Nigeria and beyond would help validate the findings. A mixed-method approach could have provided more depth to the study. Also, a longitudinal approach would measure LMS usage as lecturers gain experience and confidence.

13. Conclusion

From the final model (Figure 3), acceptance and use of LMSs have nothing to do with attitude and BI. Henceforth, the leading bases of reception and utilization of LMSs by respondents at Nigerian HEIs were EE, FC and SI. Therefore, interventions to improve LMS's usage must revolve around EE, SI and FC. Institutions of higher learning in Nigeria must invest in professional development courses that will increase LMS's usage, leading to increased staff performance, consequently leading to enhanced scholarly activities. Additionally, HEIs need to make available the technical and organizational infrastructure (facilitating conditions) and foster social learning (for instance, using mentorship programs), which will then make it easier for respondents to proficiently put to use LMSs, thus increasing effort expectancy and perceived usefulness resulting in improved teaching and learning outcomes.

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