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DETERMINANTS OF STUDENTS' CONTINUANCE INTENTIONS TO USE LEARNING MANAGEMENT SYSTEMS BEYOND MANDATORY USE

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Abstract

As universities in Sub-Saharan Africa increasingly embrace digital learning technologies, the continued use of these technologies is crucial for their sustainability and for developing a future-ready education system. This study investigated students' intentions to continue using a Learning Management System (LMS) beyond mandatory courses as they progress to higher academic levels. Drawing upon the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Expectation-Confirmation Model (ECM), the study employed a quantitative survey design. Data were collected from 439 first-year undergraduate students at a public university in Nigeria using multistage sampling. Structural Equation Modelling was employed for data analysis. The measurement model demonstrated acceptable fit and satisfactory evidence of reliability, convergent validity and discriminant validity. The structural model showed that the standardised path coefficients for performance expectancy ($\beta = .263$, $p < .001$), satisfaction ($\beta = .273$, $p = .002$), and effort expectancy ($\beta = .208$, $p = .003$) positively and significantly predicted students' continuance intentions. In contrast, social influence ($\beta = .039$, $p = .493$) and facilitating conditions ($\beta = .138$, $p = .087$) were not significant predictors. The structural model explained 57.6% of the variance in continuance intentions ($R^2 = .576$). The findings suggest that students' LMS continuance intention is more closely associated with satisfaction, perceived academic benefits, and ease of use than with social influence or facilitating conditions. The study highlights the importance of enhancing user experience and system usability to promote continued LMS engagement beyond mandatory use.

Keywords: Digital technology, Higher education, Learning Management System (LMS), mandatory environment

1. Introduction

Digital technologies are increasingly reshaping higher education. Among these emerging digital technologies, Learning Management Systems (LMSs) have become widely adopted to facilitate e-learning in universities. An LMS refers to a "variety of software that are used to manage, track, and deliver educational materials and manage students' records" (Rosário & Dias, 2022, p. 47). LMS platforms provide a one-stop environment where students can communicate with instructors and peers from anywhere, access and exchange course materials, participate in discussions, complete assignments and submit coursework remotely. Students do not have to be in physical classrooms, as teaching and learning activities can occur virtually through synchronous and asynchronous interactions. Due to their flexibility and ability to provide unlimited access to education via the Internet, LMSs and other e-learning technologies have become valuable tools for designing fully online and hybrid courses.

While higher educational institutions (HEIs) in developed countries have increasingly embraced LMSs to facilitate teaching and learning, the implementation of LMS platforms in Nigeria remains constrained by several challenges, despite growing recognition of their benefits (Nwokike et al., 2023; Alumona & Akinseinde, 2023; Orji et al., 2025). Several studies, for instance, have shown how HEIs in Nigeria struggle with the implementation of online learning due to non-existent operational policies, inadequate infrastructure, financial constraints, poor internet connectivity, and user resistance to online learning (Musa et al., 2021; Adetona et al., 2021; Eli-Chukwu et al., 2023; Alumona & Akinseinde, 2023). Although some of these studies focused on emergency remote learning and examined broader e-learning implementation rather than LMS continuance, they provide relevant context for understanding students' experiences with digital learning technologies at Nigerian universities, including the present study context. For instance, Egielewa et al. (2022) revealed that students at many higher education institutions in the country were dissatisfied with online learning during the COVID-19 lockdown and did not want to continue after the pandemic. However, these studies do not specifically examine students' intentions to continue using LMSs beyond mandatory use, highlighting the need for research on post-adoption LMS continuance in Nigerian higher education.

Therefore, as universities increasingly adopt LMSs to deliver distance education and uninterrupted access to learning, students' intention to continue using the technology cannot be ignored. Students are the "main users of the offered teaching technique and can cooperate in implementing and improving an e-course" (Aristovnik et al., 2016, p. 290). However, they may be unwilling to continue using a university-adopted LMS if the platform does not fulfil their academic and learning needs. In other words, institutional adoption alone does not guarantee the students' willingness to continue engaging with an LMS, especially when its use is no longer mandatory. Thus, understanding the factors influencing students' continuance intentions to use the LMS is critical to improving and sustaining online learning programmes, particularly as universities in Sub-Saharan Africa continue to invest in e-learning technologies.

The Federal University of Technology Akure (FUTA), a public university in Nigeria, uses a Learning Management System for hybrid learning. The university uses one of the most popular LMSs, Moodle (Modular Object-Oriented Dynamic Learning Environment), to support instruction in two required courses for first-year undergraduates. English for Academic Purposes (EAP) courses are taken by first-year undergraduates in the first two semesters using a hybrid learning approach. However, the use of the LMS for other courses across departments is discretionary and uneven, with many courses still conducted in physical classes. The present study focuses on students' intentions to continue using the LMS for academic activities beyond these compulsory courses**.** Data were collected between October and December 2024 after the participating first-year students had completed the required EAP courses for which LMS was required. This timing enabled students to reflect on their LMS experiences before indicating their intentions regarding future use. Consequently, this study examines the factors influencing students' intentions to continue using the Learning Management System (LMS) beyond mandatory use.

2. Literature Review

2.1. Continuance intentions beyond mandatory use

There has been a growing interest among Information System (IS) scholars to understand technology acceptance and continuance intentions in mandatory environments. Such environments have increasingly attracted scholarly attention because much of the acceptance literature has traditionally focused on voluntary technology use (Hwang et al., 2016; Lehmann et al., 2023). In voluntary contexts, users have the discretion to decide whether or not to use a technology (Bhattacherjee, 2001), whereas, in mandatory environments, users' lack of will does not halt usage (Sørebø and Eikebrokk, 2008). However, continuance intention after mandatory use represents a distinct post-adoption condition. In this context, users initially acquire experience with a technology because its use is required, but subsequently have the discretion to decide whether to continue using it when the mandatory requirement ends. This distinction is central to the present study, which examines students' intentions to continue using the LMS after completing the courses for which its use was mandatory.

In mandatory settings, variables such as intentions to use or usage may not fully capture users' true perceptions of technology since usage is driven by organisation requirements (Hwang et al., 2016). As a result, factors influencing continuance may differ between voluntary and mandatory settings. For instance, Hwang et al. (2016) argued that, in mandatory adoption environments, satisfaction is a better measure of success for users of specific technology because it reflects users' evaluations of their experiences beyond mere compliance. Similarly, social influence has been found to play a significant role in shaping technology-related behaviours in organisational contexts, particularly when technology use is non-volitional (Hwang et al., 2016). In such settings, individuals may continue using a system because of expectations from

lecturers, peers, supervisors, or institutions rather than personal preference alone. Considering these contextual peculiarities, it is important to examine the determinants of continuance intentions beyond mandatory LMS use.

2.2. Theoretical background

The Unified Theory of Acceptance and Use of Technology (UTAUT) is one of the most widely used theories for examining technology adoption and continuance intention (Venkatesh et al., 2011; Mustafa & Garcia, 2021; Veronika et al., 2025). The model explains behavioural intention through four constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (Venkatesh et al., 2003). Recent studies have tested the applicability of UTAUT as a single framework for explaining the determinants of continuance intentions to use online learning systems (Chen et al., 2021) or combined with other models (Venkatesh et al., 2011; Vasuthevan et al., 2024). Similarly, studies have noted that the UTAUT model has been applied more widely in voluntary technology use settings than in mandatory learning environments (Lehmann et al., 2023).

Although UTAUT was initially developed to explain technology acceptance and use, its constructs have also been applied to explain continuance intentions after initial adoption (Venkatesh et al., 2011; Chen et al., 2021; Vasuthevan et al., 2024). In the present study, performance expectancy and effort expectancy capture students' evaluations of the LMS based on their prior experience, while social influence reflects perceived expectations of relevant others, and facilitating conditions represent the resources and support available for continued use. These factors may therefore influence students' willingness to continue using the LMS after the mandatory requirement ends, because the factors capture user expectations about important aspects related to technology use – i.e., ease of use, interpersonal consideration, usage environments. Nevertheless, because continuance represents a post-adoption decision, UTAUT alone may not fully capture users' accumulated evaluations of their experience. Users may initially adopt technologies due to social pressure or herd behaviour, but such motivations may weaken during the post-adoption stage (Panigrahi et al., 2018).

Therefore, the Expectation-Confirmation Model (ECM) by Bhattacherjee (2001) provides a complementary perspective to understand continuance intentions. The model proposes that perceived usefulness, confirmation, and satisfaction determine continued technology use (Bhattacherjee, 2001). Researchers have integrated the ECM with other theories to explain users' continuance intentions in e-learning contexts (Nikou, 2021; Chen et al., 2021; Vasuthevan et al., 2024). For instance, Vasuthevan et al. (2024) employed UTAUT and ECM to explain academics' continuance intentions to use learning technologies during and after COVID-19. The study found that the combined theories enriched understanding of sustained use of learning technologies in higher education.

The present study adapted the ECM rather than applying the full model. Satisfaction was retained as the ECM construct because it captures students' overall evaluation of their LMS experience. The exclusion of 'confirmation' was a model specification decision rather than an assumption that students could not form expectations during their initial LMS use. Although students may develop expectations through their initial experience with the LMS, confirmation was not measured in the present study and could therefore not be incorporated into the structural model. Perceived usefulness was also not included as a separate construct because of its conceptual overlap with performance expectancy in UTAUT; performance expectancy was adopted to represent students' perceptions of the LMS usefulness for their academic activities. Consequently, the study should be understood as an adapted UTAUT-ECM model rather than a full integration of the two frameworks. The omission of confirmation limits the model's ability to account for the expectation-experience comparison proposed by ECM and should therefore be considered when interpreting its explanatory scope.

The adapted UTAUT-ECM model provides a framework for explaining students' continuance intentions after mandatory LMS use, where students' post-adoption evaluations of technology use may shape their willingness to continue using the system. While *satisfaction* from the ECM captures students' overall evaluation of their LMS experience, selected UTAUT constructs – performance expectancy, effort expectancy, social influence, and facilitating conditions – capture perceptions of usefulness, ease of use, social expectations and available support. By combining the explanatory power of these constructs, the study contributes to the growing literature on continuance intention examining students' intentions to continue using an LMS after mandatory use. Therefore, this study contributes to the growing literature on continuance intention by combining the explanatory power of selected UTAUT and ECM constructs to understand LMS continuance intention in a mandatory use context.

2.3. Research model and hypotheses

Based on the adapted UTAUT-ECM framework, this study developed a model of students' continuance intentions to use the LMS beyond the mandatory requirement. The model comprises six constructs: performance expectancy (PE), effort expectancy (EE), facilitating conditions (FC), social influence (SI), satisfaction (SA), and continuance intention (CI). The model tests only the direct effects of PE, EE, FC, SI, and SA on CI. Although ECM commonly specifies relationships among confirmation, perceived usefulness, satisfaction, and continuance intention, the present study did not specify mediating paths through satisfaction because it adopted selected constructs from UTAUT and ECM to examine the direct determinants of continuance intention in a post-mandatory use context. Figure 1 presents the conceptual framework.

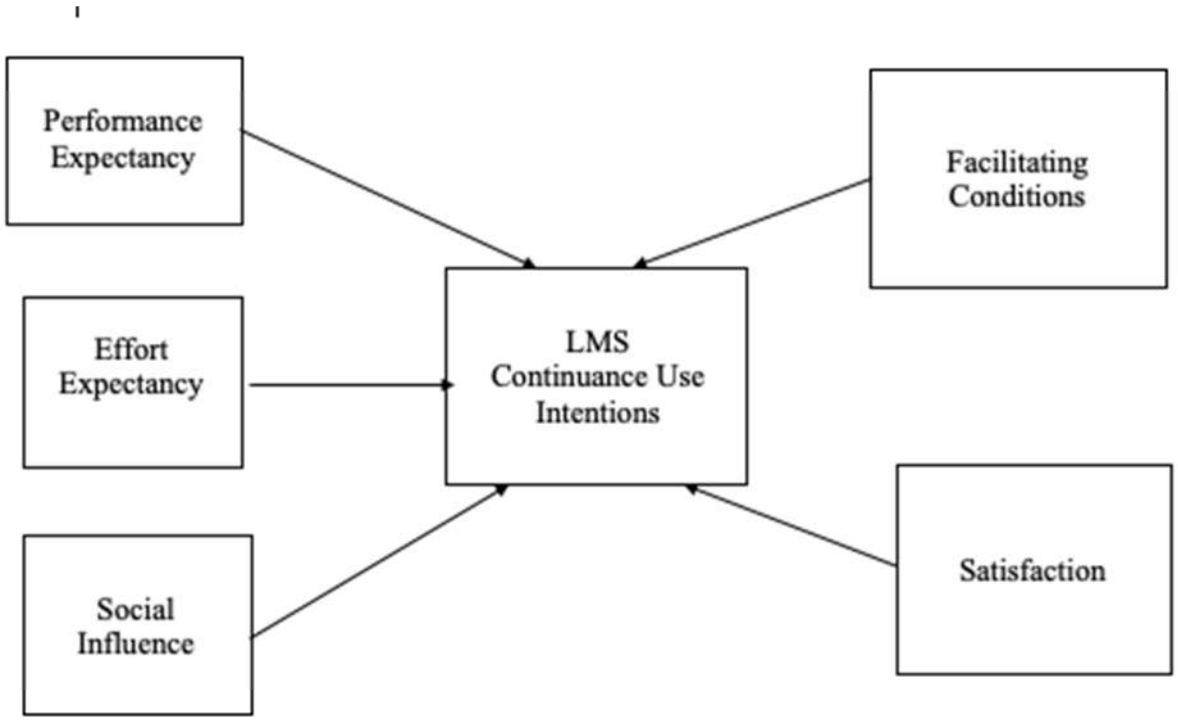


Figure 1: *Conceptual Model*

2.3.1. Performance Expectancy

Performance expectancy is the degree to which an individual believes that using the system will enhance their job performance (Venkatesh et al., 2003). Although the original UTAUT conceptualises PE in relation to job performance, the construct has been applied in educational contexts to capture students' perceptions of how technology can enhance their academic performance (Chao, 2019; Buabeng-Andoh & Baah, 2020; Abbad, 2021). In the present study, PE refers to students' perceptions of the extent to which using the LMS can improve their academic performance. Thus, students who perceive the LMS as beneficial to their academic performance are more likely to develop stronger intentions to continue using the system. Previous studies have reported a positive relationship between PE and CI (Chen et al., 2021; Saeed et al., 2021; Nikou, 2021).

H_1: Performance expectancy is significantly related to students' continuance intentions to use the LMS

2.3.2. Effort expectancy

Effort expectancy is the perceived ease of using a system (Venkatesh et al., 2003). The technological characteristics and features of e-learning systems, such as LMS, are critical in shaping students' perceptions of how easy the technology is to use. Scholars have, however, debated the significance of ease of use in IS continuance. Bhattacherjee (2001) argued that the ease-of-use construct may become less important during the post-adoption stage because users become more familiar

with the technology over time. In contrast, Sørebø and Eikebrokk (2008) maintained that ease of use remains important in determining users' willingness to continue using technology when use is mandated. Studies have established the relationship between EE and CI to use online platforms (Chen et al., 2021; Vasuthevan et al., 2024).

H_2: Effort expectancy is significantly related to students' continuance intention to use the LMS

2.3.3. Facilitating conditions (FC)

Facilitating Conditions refer to the state in which all necessary facilities, tools, equipment, and assistance are provided to an individual to support the use of a system. In e-learning contexts, facilitating conditions refer to the extent to which an individual believes that schools have the necessary facilities and technical support for users to use digital technologies. In developing societies like Nigeria, existing studies have suggested that infrastructural limitations could hinder a successful implementation of technology, thereby affecting intentions to use (Olanrewaju et al., 2021; Nwokike et al., 2023). Previous studies have shown that facilitating conditions influence intentions to use (Kamarozaman & Abdul Razak, 2021).

H_3: Facilitating Conditions are significantly related to students' continuance intentions to use the LMS

2.2.4. Social influence

Social influence refers to the extent to which individuals perceive that important others believe they should use a particular technology (Venkatesh et al., 2003). In educational settings, social influence may shape students' willingness to adopt or continue using e-learning systems through the opinions and expectations of peers, lecturers, and other significant referent groups (Abdullah & Ward, 2016). The influence of social factors may be particularly relevant in mandatory technology-use environments, where institutional expectations and social norms can encourage technology use beyond individual preferences (Venkatesh & Davis, 2000).

Empirical evidence on the role of social influence in technology continuance remains mixed. Some studies have found that social influence positively influences students' continuance intention toward e-learning technologies (Bakar & Abdul Razak, 2014), whereas others have reported no significant relationship (Edumadze et al., 2022). These inconsistencies suggest that the influence of social factors may vary across contexts and technology-use environments. Given the mandatory nature of LMS use in the present study setting, it is important to examine whether students' continuance intentions are shaped by the opinions and expectations of peers and lecturers.

H4: Social influence is significantly related to students' continuance intention to use the LMS.

2.3.5. Satisfaction

Satisfaction refers to students' cumulative feelings and overall evaluation of their experiences with the LMS. Previous studies have suggested that users' satisfaction with technology use is a critical factor influencing continued use of technology. In mandatory technology-use environments, satisfaction has also been regarded as an important indicator of information systems (IS) success and continuance behaviour (DeLone & McLean, 2003; Sørebø & Eikebrokk, 2008). Existing studies have consistently reported a significant relationship between satisfaction and continuance intention (CI) toward digital learning technologies (Ashrafi et al., 2020; Soria-Barreto et al., 2021).

H_5: Satisfaction is significantly related to students' continuance intention to use the LMS

2.3.6. Continuance intention

Continuance use intention refers to users' willingness to continue using the LMS in future academic activities and courses. Bhattacherjee (2001) argued that the long-term success and sustainability of IS depend largely on continued use, as infrequent, inappropriate, and ineffective use of IS may undermine the benefits of initial adoption.

3. Methods

3.1. Sample and Procedure

This study employed a quantitative survey design to investigate the determinants of students' continuance intention to use the LMS. The study was conducted at the Federal University of Technology Akure (FUTA), Nigeria, where first-year students used Moodle to complement face-to-face instruction in GNS 101 and GNS 102, English for Academic Purposes (EAP) courses.

A multistage procedure was employed. FUTA was purposively selected because of its LMS-supported programme, while first-year students were selected because they had experienced the LMS-supported courses. The population comprised 4,146 first-year undergraduate students across nine schools. Students were allocated across the nine schools in proportion to approximately 10% of each school's first year population. The allocation was 39 students from School of Computing (SOC); 84 from School of Infrastructure, Mining and Manufacturing (SIMM); 25 from School of Logistics and Innovation Technology (SLIT); 40 from School of Basic Medical Sciences (SBMS); 45 from School of Environmental Technology (SET), 47 from School of Physical Sciences (SPS); 35 from School of Life Sciences (SLS); 33 from School of Earth and Mineral Sciences (SEMS); and 68 from School of Agriculture and Agricultural Technology (SAAT). Students were then selected randomly from student lists within each school. The final dataset comprised 439 completed questionnaires, exceeding the initial target sample of 416 due to a higher-than-expected response volume.

Participants were eligible if they were first-year students who had used the LMS for the EAP courses and had therefore completed the required LMS-supported courses before responding to the questionnaire. The questionnaire was administered online between October and December 2024. Institutional approval was obtained from the Institute of Technology-Enhanced Learning and Digital Humanities (INTEDH), Federal University of Technology, Akure, which authorised data collection through the General Studies Unit. Before completing the questionnaire, participants were provided with information about the study and gave informed consent to participate. The questionnaire informed respondents that their responses would be treated confidentially and used solely for research purposes.

3.2. Measures

The study examined students' continuance intention (CI) to use the LMS beyond mandatory first-year courses. The predictor variables were drawn from the UTAUT and the ECM. In the questionnaire, PE (4 items) and EE (4 items) were adapted from Venkatesh et al. (2003), social influence (SI, 3 items) from Venkatesh et al. (2003), facilitating conditions (FC; 3 items) from Buabeng-Andoh and Baah (2020), satisfaction (SA; 3 items) from Rabaa'i (2016); continuance intention (CI, 3 items), comprising two items adapted from Bhattacherjee (2001) and one item developed by the researchers for the present study. The adapted items were reworded where necessary to reflect the LMS and higher education context. For instance, the original item of performance expectancy: "*I would find the system useful in my job"* (Venkatesh et al., 2003) was reworded to "*The LMS is useful for virtual classes"*; the original item of effort expectancy: "*My interaction with the system is clear and understandable*" was revised to "*My interaction with the LMS was clear and understandable*". Altogether, there were 20 items on a 5-point Likert scale of "strongly disagree" to "strongly agree". Table 1 illustrates the detailed measurement items, their sources, and the adaptation for the study.

Table 1: Measurement items of the constructs used in the study

Items	Source	Original	Adapted item
Performance Expectancy			
PE1	Venkatesh et al. (2003)	I would find the system useful in my job	The LMS is useful for virtual classes
PE2	Venkatesh et al. (2003)	Using the system enables me to accomplish tasks more quickly	Using the LMS helps to improve my learning outcomes

PE3	Venkatesh et al. (2003)	Using the system increases my productivity	Using the LMS helps my understanding of course materials
PE4	Venkatesh et al. (2003)	If I use the system, it will increase my chances of getting a raise	I am convinced that the LMS enables valuable interactions that aid my learning
Effort Expectancy			
EE1	Venkatesh et al. (2003)	My interaction with the system would be clear and understandable	My interaction with the LMS is clear and understandable
EE2	Venkatesh et al. (2003)	It would be easy for me to become skillful at using the system	I found it easy to use the features of the LMS
EE3	Venkatesh et al. (2003)	I would find the system easy to use.	I found the LMS easy to use
EE4	Venkatesh et al. (2003)	Learning to operate the system	I am skilled at using the LMS
Social Influence			
SI1	Venkatesh et al. (2003)	People who influence my behavior think that I should use the system.	My lecturers believe I should continue to use the LMS platform
SI2	Venkatesh et al. (2003)	People who are important to me think that I should use the system.	My classmates recommend continued use of the LMS
SI3	Venkatesh et al. (2003)	In general, the organization has supported the use of the system.	The university management supports continued use of the LMS
Facilitating Conditions			
FC1	Buabeng-Andoh and Baah (2020)	I have the resources necessary to use the system.	I have the necessary resources (e.g. internet connectivity, power supply, device) to use the LMS

			for online learning
FC2	Buabeng-Andoh and Baah (2020)	I have the knowledge necessary to use the system.	The university provides adequate resources and infrastructure to support the use of LMS for online learning
FC3	Buabeng-Andoh and Baah (2020)	A specific person (or group) is available for assistance with system	A specific person is available to assist in case there are difficulties with the LMS
Satisfaction			
SA1	Rabaa'i (2016)	All things considered, I am very satisfied with Moodle	All things considered, I am very satisfied with the interactions on the LMS
SA2	Rabaa'i (2016)	I am very satisfied with the information I receive from Moodle	I am very satisfied with the lectures I receive on the LMS
SA3	Rabaa'i (2016)	Overall, the information I get from Moodle is very satisfying	Overall, my interaction with the LMS is very satisfying
Continuance Intentions			
CI1	Bhattacherjee (2001)	I intend to continue using OBD rather than discontinue its use.	I will use the LMS in future online learning
CI2	Bhattacherjee (2001)	My intentions are to continue using OBD than use any alternative means (traditional banking).	I look forward to other opportunities to use the LMS for online learning
CI3	Developed by researchers	N/A	I will not hesitate to attend classes on the LMS if the occasion arises.

3.3. Pilot testing

A pilot study was conducted with 15 undergraduate students from a university outside the study site who had experience using digital technology to complement face-to-face instruction. Participants were selected using convenience sampling because of the similarity between their technology-supported learning context and that of the study population. The pilot was used to assess the clarity, relevance and internal consistency of the questionnaire items. The measurement instrument was also reviewed by a statistician for validity and reliability before the main survey. The internal consistency of the measures was assessed using Cronbach's alpha. PE (α = .728), EE (α = .851), FC (α = .710), SA (α = .970), and CI (α = .933) demonstrated acceptable to excellent internal consistency. However, SI recorded a low reliability coefficient (α = .220), indicating weak internal consistency among its three items. This result is considered when interpreting the findings for social influence.

3.4. Data Analysis

Prior to testing the structural relationships, a confirmatory factor analysis (CFA) was conducted using AMOS version 23. The model parameters were estimated using the Maximum Likelihood (ML) estimation method. Data screening indicated that no missing values were present in the dataset. Assessment of normality revealed acceptable univariate normality; however, evidence of multivariate non-normality was observed. Consequently, bootstrapping procedures were employed to obtain robust parameter estimates and confidence intervals.

3.5. Measurement model

Table 2 presents the results of the measurement model assessment. Reliability and convergent validity were evaluated using standardised factor loadings, Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE).

Table 2. Standardised Factor loading, Cronbach's alpha, Composite reliability, and AVE

Construct	Item	Std. Loading	Cronbach's α	CR	AVE
Performance Expectancy (PE)	PE1	.609	.785	.787	.482
	PE2	.718			
	PE3	.700			
	PE4	.743			
Effort Expectancy (EE)	EE1	.603	.773	.779	.471
	EE2	.656			
	EE3	.755			
	EE4	.721			
Social Influence (SI)	SI1	.699	.757	.767	.525
	SI2	.662			
	SI3	.805			
Facilitating Conditions (FC)	FC1	.686	.710	.710	.450
	FC2	.690			
	FC3	.634			
Satisfaction (SA)	SA1	.819	.836	.838	.633
	SA2	.809			
	SA3	.758			
Continuance Intention (CI)	CI1	.815	.817	.822	.608
	CI2	.844			
	CI3	.670			

As presented in Table 2, the standardised factor loadings ranged from .603 to .844, exceeding the recommended minimum threshold of .50 and indicating that the indicators adequately represented their respective latent constructs.

The Cronbach's alpha coefficients ranged from .710 to .836 for Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, and Satisfaction, while Continuance Intention recorded an alpha coefficient of .817. These values exceeded the recommended threshold of .70, demonstrating satisfactory internal consistency reliability.

Similarly, Composite Reliability (CR) values ranged from .710 to .838 for the exogenous constructs and .822 for Continuance Intention, exceeding the recommended benchmark of .70 and indicating adequate construct reliability.

The Average Variance Extracted (AVE) values ranged from .450 to .633. Social Influence, Satisfaction, and Continuance Intention exceeded the recommended threshold of .50, while Performance Expectancy (.482), Effort Expectancy (.471), and Facilitating Conditions (.450) fell slightly below this benchmark. However, because their factor loadings were acceptable and their Composite Reliability values exceeded .70, convergent validity was considered adequate.

Furthermore, the Continuance Intention construct demonstrated adequate reliability and convergent validity, with standardised factor loading ranging from .670 to .844, Composite Reliability of .822, and Average Variance Extracted of .608.

3.6. Discriminant validity

Discriminant validity was assessed using the Fornell-Larcker criterion and the heterotrait-monotrait ratio of correlations (HTMT). According to the Fornell-Larcker criterion, the square root of each construct's Average Variance Extracted (AVE) should exceed its correlations with other constructs. As shown in Table 3, the square roots of the AVE values were

greater than the inter-construct correlations, providing evidence of discriminant validity according to the Fornell–Larcker criterion.

Table 3: Fornell–Larcker Discriminant Validity

Construct	PE	EE	FC	SI	SA	CI
PE	**.694**					
EE	.639	**.686**				
FC	.542	.607	**.671**			
SI	.395	.484	.501	**.725**		
SA	.671	.715	.734	.510	**.796**	
CI	.647	.645	.606	.440	.697	**.780**

To provide additional evidence, discriminant validity was further assessed using the heterotrait-monotrait ratio (HTMT). As presented in Table 4, the HTMT values ranged from .387 to .736, which were below the recommended threshold of .85 and provided additional evidence of discriminant validity.

Table 4: HTMT Discriminant Validity Matrix

Construct	PE	EE	FC	SI	SA	CI
PE	—					
EE	.655	—				
FC	.535	.605	—			
SI	.387	.487	.522	—		
SA	.665	.729	.736	.532	—	
CI	.651	.674	.617	.469	.717	—

Taken together, the combined results from the Fornell-Larcker and HTMT assessments support the distinctiveness of the study constructs.

3.7. Common Method bias assessment

As all study variables were collected using a single questionnaire administered at one point in time, common method bias (CMB) was assessed using Harman's single-factor test. Therefore, Table 5 presents the results of the assessment.

Table 5: Common Method Bias Assessment Using Harman's Single-Factor Test

Diagnostic	Result	Interpretation
KMO	.920	Excellent sampling adequacy
Bartlett's test χ^2(df)	4709.818 (253), $p < .001$	Suitable for factor analysis
Number of retained items	20	All retained items included
Components with eigenvalue > 1	6	Multiple factors emerged
Variance explained by first factor	38.49%	< 50% threshold

As presented in Table 5, all 20 retained measurement items were entered simultaneously into an unrotated principal component analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .920, indicating excellent sampling adequacy, while Bartlett's test of sphericity was significant, $\chi^2(253) = 4709.818$, $p < .001$. Six factors with eigenvalues greater than one emerged, accounting for 65.87% of the total variance. The first factor explained 38.49% of the variance, which is below the commonly accepted threshold of 50%. Therefore, no single factor accounted for the majority of the covariance among the measures, suggesting that common method bias was not a serious concern in this study.

3.8. Structural Equation Model

Before examining the hypothesised relationships among the constructs, it was necessary to assess the overall fit of the structural model to determine whether the proposed model adequately represents the observed data. Model fit indices provide evidence of how the theoretical model corresponded with the empirical data and indicate whether the model is suitable for hypothesis testing. Therefore, Table 6 presents the model fit indices:

Table 6: Model Fit Indices

Fit Index	Value
Chi-square (χ^2)	587.764
Degrees of Freedom	239
Chi-square/df (χ^2/df)	2.459
GFI	0.902
AGFI	0.877

CFI	0.924
RMSEA	0.058
PCLOSE	0.016

The results in Table 6 indicate that the structural model demonstrates an acceptable fit to the data. The χ^2/df ratio was 2.459, below the recommended threshold of 3. The CFI (.924) and GFI (.902) exceeded the recommended value of .90, while the RMSEA (.058) was below the recommended maximum of .08, indicating a reasonable model fit. Although the AGFI (.877) was slightly below the threshold of .90 and the PCLOSE value (.016) suggested that the hypothesis of close fit was rejected, the overall pattern of fit indices supports the adequacy of the structural model for hypothesis testing.

4. Results

4.1. Hypothesis Testing

Table 7 presents the results of the hypothesis testing examining the relationships between the study constructs and students' continuance intention to use the LMS.

Table 7: Hypothesis test results of the research model

Hypothesis	Path	β (Standardized)	C.R.	p-value	95% CI	Decision
H1	PE → CI	.263	3.868	< .001	[0.073, 0.478]	Supported
H2	EE → CI	.208	2.948	.003	[0.037, 0.428]	Supported
H3	SI → CI	.039	0.686	.493	[-0.097, 0.218]	Not Supported
H4	FC → CI	.138	1.710	.087	[-0.060, 0.361]	Not Supported
H5	SA → CI	.273	3.070	.002	[0.018, 0.393]	Supported

***Note**: β values are standardised path coefficients obtained from the AMOS standardised regression weights output.*

As shown in Table 7, performance expectancy (β = .263, C.R. = 3.868, p < .001), effort expectancy (β = .208, C.R. = 2.948, p = .003), and satisfaction (β = .273, C.R. = 3.070, p = .002) were significant positive predictors of continuance intention. In contrast, social influence (β = .039, C.R. = 0.686, p = .493) and facilitating conditions (β = .138, C.R. = 1.710, p = .087) were not significant predictors. Thus, H1, H2, and H5 were supported, whereas H3 and H4 were not supported. The structural model explained 57.6% of the variance in continuance intention (R^2 = .576). Bootstrapped 95% confidence intervals for performance expectancy (0.073, 0.478), effort expectancy (0.037, 0.428), and satisfaction (0.018, 0.393) excluded zero, further supporting the statistical significance of these relationships. Satisfaction exhibited the largest standardised coefficient (β = .273), although this value was only slightly higher than that of performance expectancy (β = .263).

5. Discussion

The findings revealed that satisfaction, performance expectancy and effort expectancy significantly influence continuance intentions, while social influence and facilitating conditions did not. Satisfaction showed the largest standardised coefficient among the predictors, although its coefficient was only slightly larger than that of performance expectancy. This result indicates that students who are content with their experiences on the LMS are more likely to sustain their engagement with the platform. This result supports the core assumption of the ECM that satisfaction is a key determinant of continuance intentions. It also aligns with prior studies that found satisfaction to be a significant determinant of continuance intentions (Bhattacherjee, 2001; Li et al., 2022; Nikou, 2021; Nguyen & Dao, 2024). The finding emphasises the importance of positive user experiences in promoting post-adoption use of the LMS beyond mandatory use.

Performance expectancy also had a significant and direct influence on continuance intention. This indicates that students who perceived the LMS as useful were more willing to continue using it. This finding is consistent with previous studies (Ashrafi et al., 2020; Abbad, 2021; Vasuthevan et al., 2024; Mathugamage & Galhena, 2022), which reported a significant positive relationship between performance expectancy and continuance intentions to use online technologies. The consistency of this finding across studies suggests that the academic benefits of LMS use remain central to students' post-adoption decisions.

Similarly, effort expectancy significantly influenced continuance intention, indicating that when students perceive that using the LMS requires little effort, their likelihood of continuing to use the system increases. The finding supports the UTAUT assumption that ease of use plays an important role in determining intentions to use systems and further reveals its importance in determining continuance use. This finding is consistent with previous studies (Chao, 2019; Mathugamage & Galhena, 2022), which reported the significant influence of EE on users' intentions to use LMS. Even in a mandatory environment, usability appears to remain a critical factor in encouraging sustained use.

However, social influence had no significant influence on continuance intention. This suggests that the influence of peers, lecturers, or important others played a limited role in determining students' continuance intentions to use the LMS within the study context. The finding contradicts previous studies which identified social influence as a significant determinant of continuance intention and an important component of effective online experiences (Li et al., 2022; Ruangkanjanases et al., 2020). Nevertheless, the finding is consistent with Camilleri and Camilleri (2022), who also reported no significant positive relationship between social influence and intentions to use VLE. A possible explanation is that students' continuance intentions are driven more by personal experiences and perception of LMS usefulness than by social pressure, especially in the mandatory-use setting.

The study also revealed that facilitating conditions did not significantly predict students' continuance intention. Although institutional and technical support are often considered important for technology continuance, the non-significant relationship observed in this study suggests that facilitating conditions did not explain students' continuance intentions within the fitted model. This finding aligns with Buabeng-Andoh & Baah (2020) and Kamarozaman & Abdul Razak (2021), who similarly reported no significant relationship between facilitating conditions and intentions to use. Taken together, these findings suggest that students' post-mandatory continuance intentions are influenced more by their evaluations of the LMS itself than by external social or institutional factors.

5.1. Theoretical Implications

The findings indicate that continuance intention following mandatory LMS exposure may be shaped differently from continuance intention in voluntary technology-use settings. While prior UTAUT-ECM studies have generally reported the importance of social influence and facilitating conditions during technology adoption and use, the present study found that

these factors did not significantly predict continuance intention after students gained mandatory experience with the LMS. Instead, satisfaction, performance expectancy, and effort expectancy emerged as the key determinants of post-mandatory continuance intention. This suggests that, once users become familiar with a system through mandated use, continuance decisions may be driven more by accumulated personal evaluations of usefulness, usability, and experience than by external social pressures or institutional support. The study therefore extends existing continuance-intention research by highlighting the importance of distinguishing between technology adoption under mandatory conditions and technology continuance after mandatory exposure has ended.

However, because the study used an adapted UTAUT-ECM framework and did not compare competing theoretical models, its contribution is better understood as a contextual extension of existing continuance research rather than evidence that the combined model provides superior explanatory power. In summary, the findings highlight the relevance of post-use evaluations in explaining continuance intentions following mandatory LMS use. Satisfaction, performance expectancy, and effort expectancy were significant predictors of continuance intentions, whereas social influence and facilitating conditions were not. These results underscore the importance of users' perceptions of usefulness, ease of use, and overall experience in shaping continuance intentions beyond mandatory use.

6. Conclusion

The primary objective of this study was to investigate the determinants of students' continuance intentions to use the LMS beyond mandatory use in specific courses. The findings indicate that satisfaction, performance expectancy, and effort expectancy were significantly associated with students' continuance intentions, whereas social influence and facilitating conditions were not significant predictors. The findings suggest that students' intentions to continue using the LMS may be closely related to their evaluation of its usefulness, ease of use and overall learning experience.

In the context of higher education, this research affirms the utility of the UTAUT and the ECM in predicting continuance intentions in the institutional context studied. However, the study used an adapted framework that incorporated selected constructs from UTAUT and ECM and excluded confirmation from the original ECM. The findings should therefore be interpreted as evidence for the explanatory relevance of the selected constructs rather than as a validation of the full UTAUT-ECM framework. Given the results, universities should focus on enhancing the usefulness, usability, and overall experience of LMS platforms, as these factors appear to be closely associated with students' willingness to continue using the systems beyond mandatory courses.

The study is limited by its single-institution, cross-sectional design and reliance on self-reported data, which constrain the generalisability of the findings and do not permit conclusions about actual continued LMS use over time. Future studies could examine continuance behaviour longitudinally and across multiple higher education institutions, and incorporate additional ECM constructs, particularly confirmation, to provide a more comprehensive understanding of post-adoption LMS continuance.

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Conflict of Interest

The author declare no conflict of interest.

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