

Preferences For Using An Integrated eCampus To Support Learning In Higher Education

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Keywords

eCampus, integrated data, organizational structure.

Abstract

This study adopts the Technology Acceptance Model (TAM) as a theoretical framework to analyze the influence of system factors and organizational structure on the successful implementation of integrated eCampus systems in higher education. Digital transformation in higher education is a complex challenge influenced by system quality, information quality, organizational support, managerial support, and human resource capacity. The research uses a quantitative approach, with data collected through surveys and analyzed using PLS-SEM. The results confirm that the measurement model exhibits adequate validity and reliability. The inner model analysis reveals that all hypothesized relationships between constructs are statistically significant. Crucially, the paths demonstrating the greatest influence were the relationship of Perceived Ease of Use to Perceived Usefulness ($\beta = 0.735$) and Behavioral Intention to Use to User Satisfaction ($\beta = 0.727$). These findings confirm that perceived ease of use and behavioral intention to use are key factors in increasing perceived benefits and user satisfaction with the eCampus system. This research offers theoretical contributions to the development of the TAM model and practical implications for policymakers in designing effective and sustainable academic information system implementation strategies.

INTRODUCTION

Almost all aspects of human life have been connected to digital technology amid the rapid pace of technological development. This phenomenon makes technology very important for modern life (Cholik, 2021). Companies around the world are encouraged to actively utilize big data and other technological advances as strategic opportunities during the Industrial Revolution 4.0 (Syafie, 2022).

As a continuity of technology, big data has become an essential part of many aspects of modern life (Daniel, 2015). For analytical needs, many organizations and business entities use these large-scale data sets (Efgivia, 2020). In the education sector, big data is used to analyze learning data derived from characteristics and performance in the learning and examination process (Ferdiansyah & Nasution, 2023). This analysis helps educational institutions discover learning patterns, understand individual needs, and develop customized curriculum to improve learning outcomes (Faisol & Astuti, 2024).

Data management is very important for universities because it is the basis for evidence-based decision making and allows them to make more strategic and targeted policies (Hanum et al., 2024). Universities can optimize employee and lecturer productivity and reduce data redundancy and inconsistency between units with an integrated data system (Bernardo et al., 2024). In addition, good data management increases transparency and accountability, allowing people to see how funds are used, how the admissions system works, and how education is evaluated (Prabowo & Rifqo, 2022). Ultimately, organizations can improve learning and learning outcomes, retention, and experiences for students and faculty by using accurate and centralized data (Abidin, 2021).

The role of information technology allows various administrative and academic tasks to be combined into a single platform that can be accessed anytime and anywhere, so the role of information technology in this regard is very important (Finogeev et al., 2018). This not only supports flexibility and mobility in learning, but also encourages innovation in higher education management that is more in line with the times (Kwon et al., 2021). Therefore, the development of a robust academic information system is an important factor in improving the competitiveness of higher education at the national and international levels.

The development of academic information systems is an important part of contemporary higher education management. With the rapid development of information technology, universities must adopt systems that can properly manage academic data (Bernardo et al., 2024). Academic information systems not only ease administrative tasks such as student enrollment, lecture schedules, assessment (S et al., 2022). An integrated academic information system also helps integrate various administrative and academic functions, which results in a more organized environment and responsiveness to the needs of Learning, Lecturers, and employees (Hardika, 2021). Therefore, the implementation of an integrated academic information system is the key to the success of higher education in facing global challenges and improving the quality of education.

To achieve continuous improvement, more accurate data collection, faster analysis, and better progress tracking are all goals of this integrated technology model (Rahman, 2023). Digital transformation in the Internal Quality Assurance System increases operational efficiency and improves data accountability in the process of establishing, implementing, evaluating, controlling, and improving (Sugiyono, 2023). It also accelerates the quality improvement cycle and facilitates evidence-based decision making and represents an important step towards a more responsive and adaptive quality assurance in the digital era (Nugroho, 2023).

In this context, the Technology Acceptance Model (TAM) is a relevant framework for understanding the factors that influence the acceptance and use of technology by users, such as lecturers and students. TAM emphasizes two main variables, namely perceived ease of use and perceived usefulness, which play an important role in determining user attitudes and intentions to use technology.

Research on the acceptance of technology use at the university level using TAM theory has been conducted extensively. For example, studies by Al-Adwan et al. (2023); Masitah and Ilhamsyah (2020) and Sayaf et al. (2022) used TAM as the theoretical basis for evaluating technology use in the learning process. Furthermore, the study by Yuniarto (2018) used it to evaluate technology in the Lecturer Workload system. On the other hand, the study by Masitah and Ilhamsyah (2020) evaluated the Siakad system using the TAM theory. Siakad is a system used to manage academic data. In this study, the researchers also used TAM as the theoretical basis for evaluating the use of technology in academic data management. Unlike previous studies that used the SIAKAD application, this study focused on the use of the eCampus system.

In addition to individual factors, organizational structure and supporting systems also play an important role in the successful implementation of eCampus. Adaptive organizational structures and reliable systems can facilitate the technology adoption process more effectively. Therefore, this study

aims to analyze the influence of system factors and organizational structure on the success of integrated eCampus implementation using the TAM approach as a theoretical framework.

By understanding these factors, it is expected that educational institutions can design more effective technology implementation strategies and increase the level of user acceptance of the eCampus system, so that the goal of improving the quality of learning can be achieved optimally.

This study aims to analyze the effect of system quality and information quality (system factors) on the perceived usefulness and ease of use of integrated eCampus in higher education, analyze the effect of organizational support, management support, training, and organizational culture (organizational structure factors) on the perceived usefulness and ease of use of integrated eCampus, analyze the effect of perceived usefulness and ease of use on behavioral intentions and actual use of integrated eCampus. Developed an extended conceptual model based on TAM to explain the success of integrated eCampus implementation.

METHODS

This research used a quantitative approach (Sugiyono, 2013). The quantitative approach was chosen to test hypothesized relationships between variables and to generalize findings to a larger population. This design allows for numerical measurement of variables and statistical analysis to determine the strength and direction of hypothesized causal relationships in an extended model.

The research population is users of the integrated eCampus system at Universitas Ma'arif Lampung. The sampling technique used cluster simple random sampling. Cluster random sampling can be applied to select respondents from various user groups (for example, students from various study programs, lecturers from various faculties, and staff from various departments). Researchers then collect data from all members within the selected clusters or randomly sample individuals from within those clusters. The sample in this study amounted to 291 respondents consisting of students, lecturers and education personnel who used the integrated eCampus system.

Primary data will be collected through a structured survey questionnaire. This questionnaire will be developed based on validated items from previous studies that are relevant to the TAM constructs.

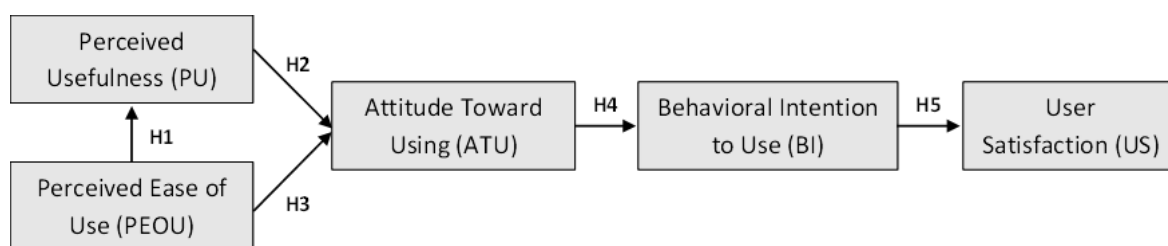


Figure 1. TAM Model Research

This research instrument was developed based on a modified Technology Acceptance Model (TAM) model (Figure 1) by adding user satisfaction variables. There are five main variables measured, namely: (1) Perceived Usefulness (PU), which consists of 4 statements and includes indicators of the usefulness of the e-Academic system in accelerating access to information, increasing efficiency, facilitating academic data management, and supporting the smooth lecture process; (2) Perceived Ease of Use (PEOU), with 4 statements measuring the perceived ease of learning, comfort of use, ease of understanding features, and clarity of navigation system; (3) Attitude Toward Using (ATU), consisting of 4 statements that reflect positive attitudes toward use, convenience, and users' general views on the importance of the e-Academic system; (4) Behavioral Intention to Use (BI), also consisting of 4 statements that assess users' intentions to continue using, recommending, and increasing the frequency of use of the e-Academic system; and (5) User Satisfaction (US), which includes 4 statements regarding the level of overall user satisfaction,

conformity to expectations, comfort of experience, and system performance (Amali et al., 2022; Nurdin et al., 2023). In total, this instrument consists of 20 statement items arranged using a 5-point Likert scale.

The collected data were analyzed using the Structural Equation Modeling (SEM) approach with the Partial Least Squares (PLS) method operated through software such as SmartPLS. SEM-PLS analysis is carried out in two main stages, namely: outer model testing and inner model testing. Outer model testing aims to evaluate the validity and reliability of indicators that reflect latent constructs. The outer model test includes: (a) outer loading value (> 0.70 recommended) to measure the contribution of each indicator to its construct; (b) construct reliability as seen from the Composite Reliability (CR) value (> 0.70) and Cronbach's Alpha (> 0.60); and (c) convergent validity, indicated by the Average Variance Extracted (AVE) which must be ≥ 0.50 . In addition, discriminant validity is also tested to ensure that each construct has a clear difference from each other, usually assessed through the Fornell-Larcker Criterion or HTMT (Heterotrait-Monotrait Ratio) (Hair et al., 2019).

Inner model testing is used to assess the relationship between latent constructions based on the hypothesis that has been formulated. This test includes: (a) path significance test (path coefficients) using bootstrapping, to determine the direct effect between latent variables; (b) R^2 value (coefficient of determination) to assess how much the independent variable is able to explain the dependent variable (a good R^2 value is generally > 0.25); (c) model predictability test (Q^2) using the blindfolding method to assess the predictive ability of the model; and (d) f^2 value (effect size) to determine the relative contribution of each independent variable to the dependent variable. With this approach, the research model can be thoroughly analyzed both in terms of measurement quality and the strength of the relationship between constructions.

The hypotheses to be tested are as follows:

- H1: Perceived Ease of Use (PEOU) eCampus has a positive effect on Perceived Usefulness (PU) in supporting learning at universities.
- H2: Perceived Usefulness (PU) eCampus has a positive effect on Attitude Toward Using (ATU) in supporting learning in higher education.
- H3: Perceived Ease of Use (PEOU) eCampus has a positive effect on Attitude Toward Using (ATU) in supporting learning in higher education.
- H4: Attitude Toward Using (ATU) eCampus has a positive effect on Behavioral Intention to Use (BI) in supporting learning in higher education.
- H5: Behavioral Intention to Use (BI) eCampus has a positive effect on User Satisfaction (US) in supporting learning in higher education.

RESULTS AND DISCUSSIONS

Collinearity Analysis

The collinearity test is used to find out whether there are

Table 1 <Structure Model VIF Verification>

Dimension	Item	Variance Inflation Factor (VIP)
Perceived Usefulness (PU)	PU1	2.346
	PU2	2.544
	PU3	2.189
	PU4	2.477
Perceived Ease of Use (PEOU)	PEOU1	2.293
	PEOU2	2.464
	PEOU3	3.409
	PEOU4	3.062
Attitude Toward Using (ATU)	ATU3	1

Dimension	Item	Variance Inflation Factor (VIP)
Behavioral Intention to Use (BI)	BI4	1
	US1	4.528
User Satisfaction (US)	US2	3.744
	US3	4.665
	US4	3.77

The collinearity test is carried out to ensure that there is no multicollinearity between the independent variables in the model. The test results (table 1) show that the VIF (Variance Inflation Factor) value for all constructs in the model is in the range of 1 to 4,528. This value is below the general threshold recommended (Hair et al., 2019) of 5, so it can be concluded that there is no significant collinearity problem in the model.

Reliability Analysis

Construct reliability is measured using Cronbach's Alpha value to assess the internal consistency between indicators in each latent construct. The test results show (table 2) that all constructs show Cronbach's Alpha values above 0.7, namely between 0.887 and 0.946, which indicates that the constructs meet acceptable reliability criteria (Nunnally & Bernstein, 1994).

Furthermore, Composite Reliability (CR) is used to evaluate the internal consistency of latent constructs in the measurement model. The test results show (table 2) that all constructions have a Composite Reliability (CR) value above the recommended minimum threshold, which is 0.70 (Hair et al., 2019). This indicates that all constructions used in the model have good composite reliability.

Construct Validity Analysis

Convergent validity measures the extent to which indicators measuring the same construction are highly correlated with each other. In this study, convergent validity was tested through two main indicators, namely the factor loading value and Average Variance Extracted (AVE). The analysis results (Table 2) show that all indicators have factor loadings ranging from 0.851 to 1 and all constructs have AVE values between 0.747 and 0.86. This shows that more than 50% of the variance of indicators can be explained by the latent constructs measured, so that all constructs meet the criteria for convergent validity (Fornell & Larcker, 1981; Hair et al., 2019).

Furthermore, discriminant validity is used to test the extent to which construction is different from other constructions in the model. Discriminant validity is carried out using the Cross-loading and Fornell-Larcker criteria. Based on table 3, the cross-loading value for each dimension is greater than the cross-loading value for other dimensions. Furthermore, based on the Fornell-Larcker criterion, namely by comparing the square root of the AVE with the correlation between constructs. The test results show that (table 4) the AVE square root value of each construct ranges from 0.864 to 1 and is higher than its correlation with other constructs, which means that each construct in the model can be clearly distinguished from other constructs. Thus, it can be concluded that each dimension has good construct validity.

Table 2 < Factor Loadings of All Dimensions of the TAM>

Dimension	Item	Factor Loading	Cronbach's α	CR Value	AVE Value
Perceived Usefulness (PU)	PU1	0.856	0.887	0.908	0.778
	PU2	0.869			
	PU3	0.851			
	PU4	0.881			

Dimension	Item	Factor Loading	Cronbach's α	CR Value	AVE Value
Perceived Ease of Use (PEOU)	PEOU1	0.853	0.905	0.89	0.747
	PEOU2	0.869			
	PEOU3	0.907			
	PEOU4	0.898			
Attitude Toward Using (ATU)	ATU3	1	-	-	-
Behavioral Intention to Use (BI)	BI4	1	-	-	-
User Satisfaction (US)	US1	0.933	0.946	0.946	0.86
	US2	0.919			
	US3	0.937			
	US4	0.921			

Table 3< Cross-loading Scale of All Dimensions of the TAM>

Dimension	Item	1 ^a	2 ^b	3 ^c	4 ^d	5 ^e
Perceived Usefulness (PU)	PU1	0.856				
	PU2	0.869				
	PU3	0.851				
	PU4	0.881				
Perceived Ease of Use (PEOU)	PEOU1		0.853			
	PEOU2		0.869			
	PEOU3		0.907			
	PEOU4		0.898			
Attitude Toward Using (ATU)	ATU3			1		
Behavioral Intention to Use (BI)	BI4				1	
User Satisfaction (US)	US1					0.933
	US2					0.919
	US3					0.937
	US4					0.921

Table 4< Discriminant Validity Test Using Fornell-Larcker Criterion>

Dimension	Formell-Larcker				
	ATU	BI	PEOU	PU	US
Attitude Toward Using	1				
Behavioral Intention to Use	0.533	1			
Perceived Ease of Use	0.663	0.681	0.882		
Perceived Usefulness	0.712	0.65	0.735	0.864	
User Satisfaction	0.699	0.727	0.834	0.776	0.928

Structural Model Analysis

This research uses SmartPLS 4 to analyze the path analysis between various dimensions in the research framework. The bootstrapping procedure was applied to conduct path analysis as well as test the research hypothesis through the resampling method 5000 times. The test was conducted using a two-tailed test approach with a significance level of $p < 0.05$. The statistical test results of the entire model are shown in Figure 1.

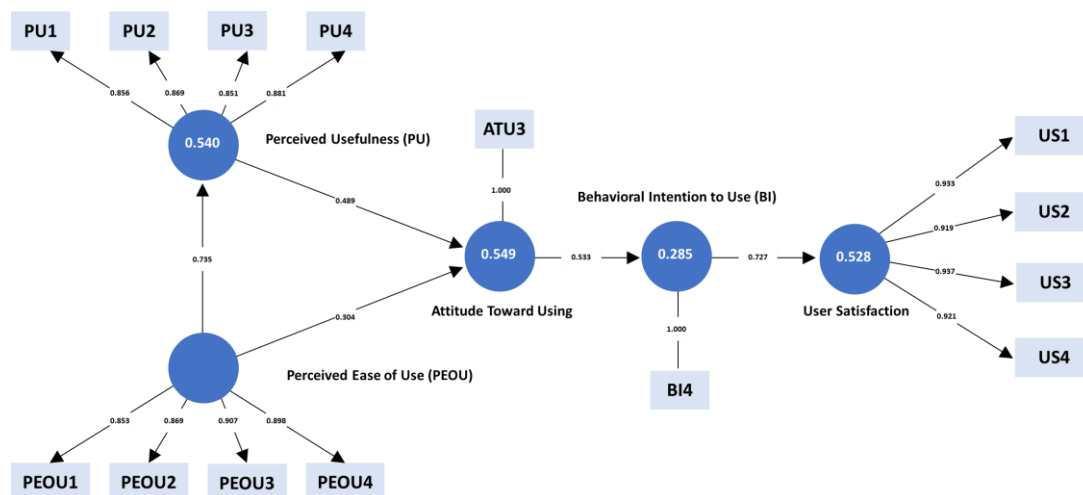


Figure 1 <Overall model of the TAM>

Table 5< T Structural Model Evaluation and Verification Table of the TAM>

Hypothesis	Relationship	Path Coefficient	t Value	Decision	R ²	F ²	Fitness
H1	PEOU → PU	0.735	24.746	True	0.54	1.173	SRMR = 0.042; Chi-square = 286.773; NFI = 0.923
H2	PU → ATU	0.489	6.718	True	0.549	0.244	
H3	PEOU → ATU	0.304	4.003	True		0.094	
H4	ATU → BI	0.533	9.95	True	0.285	0.398	
H5	BI → US	0.727	18.619	True	0.528	1.121	

At the inner model analysis stage, the results show (table 5) that all relationships between latent constructs in the model are statistically significant. *The path coefficients* ranged from 0.304 to 0.735, with all *t-statistic* values exceeding the 1.96 threshold ($p < 0.05$), thus supporting all proposed hypotheses. The *R-squared* (R^2) value for each dependent construct is also at a moderate to high level, namely PU (0.54), ATU (0.549), BI (0.285), and US (0.528), which indicates that the independent constructs have a good predictive ability of these variables. Furthermore, the *effect size* (f^2) analysis shows that the effect of Perceived Ease of Use on Perceived Usefulness ($f^2 = 1.173$) and the effect of Behavioral Intention on User Satisfaction ($f^2 = 1.121$) is in the large category, which indicates a substantial contribution to the model. The overall model feasibility index also supports the fit of the model, indicated by the SRMR value of 0.042 and NFI of 0.923, which indicates that the model has an adequate level of *goodness of fit*. Thus, this modified Technology Acceptance Model (TAM) based research model is declared valid and reliable in explaining users' technology acceptance behavior towards the e-Academic system.

The analysis results show that the relationship between Perceived Ease of Use (PEOU) to Perceived Usefulness (PU) is the path with the strongest influence in the model, with a path coefficient of 0.735 and an effect size (f^2) of 1.173. This finding shows that the perceived ease of use of the e-Academic system makes a very large contribution in shaping perceptions of system benefits. The easier the system is to use—both in terms of interface, navigation, and understanding of features—the higher the level of usefulness perceived by users. These results reinforce TAM theory and previous findings (Davis et al., 1989; Venkatesh & Davis, 2000) which state that ease of use is a key predictor in increasing perceived benefits of technology. Therefore, for universities, investing in superior and continuous user experience (UX) is not merely an option but a critical defensive measure against underutilization and ultimate rejection of the system.

In addition, the path from Behavioral Intention to Use (BI) to User Satisfaction (US) also shows a very strong influence, with a path coefficient of 0.727 and an f^2 effect size of 1.121. This means that the behavioral intention to continue using the system has a direct and significant impact on the level of user satisfaction. When users have a high intention to use the system continuously, recommend it, and increase the frequency of use, the perceived satisfaction with the system also increases substantially. This finding is in line with the study of [Rahi et al. \(2019\)](#), which states that usage intentions in the context of educational information systems are strongly correlated with positive experiences and user satisfaction. This result critically indicates a positive feedback loop where a strong intent to use reinforces the satisfaction derived from that usage, solidifying acceptance. Therefore, the strategic focus for system administrators must move beyond initial adoption efforts to creating incentives for sustained, voluntary usage, as this is the primary driver for long-term user satisfaction and loyalty.

On the other hand, the path from Attitude Toward Using (ATU) to Behavioral Intention (BI) also shows a considerable influence ($f^2 = 0.398$), indicating that a positive attitude towards the system plays an important role in shaping usage intention. While the effects of PEOU and PU on ATU are each in the small to medium category, indicating that although the ease and usefulness of the system affect user attitudes, the contribution is not as great as the previous two main paths. This distribution of effects suggests that while a positive attitude is necessary, it acts primarily as a mediator rather than a core driver in the final decision to use the e-campus. This pragmatism highlights that academic users are more persuaded by the instrumental value (Ease of Use and Usefulness) than by simple likeability or affective feelings towards the technology. Consequently, a great attitude alone cannot sustain usage if the system fails to deliver on ease and perceived performance benefits.

Thus, the focus in the development of academic information systems should be directed at increasing ease of use and strategies for building sustainable intentions in using the system, because these two factors are proven to have the most influence on perceived benefits and user satisfaction.

Although the model built shows good and predictive power, this study has several limitations that need to be considered. The quantitative approach with a (cross-sectional) design limits understanding of the dynamics of changes in user perceptions over a period. The limited scope of the study to one educational institution may also affect the level of generalization of the results to a broader context, especially to institutions with different system characteristics, policies and levels of digital literacy. In addition, the model has not considered external factors such as management support, training availability or technical constraints that may affect system acceptance. These limitations leave room for further research development with a wider range of respondents, the use of a longitudinal approach, or the incorporation of qualitative methods to deepen the understanding of the factors that influence satisfaction and acceptance of information technology in educational settings.

CONCLUSIONS

This study concludes that all relationships in the modified Technology Acceptance Model (TAM) *model* are proven significant based on Structural Equation Modeling analysis with the Partial Least Squares (SEM-PLS) approach using SmartPLS. The outer model test results show that all indicators have an *outer loading* value above 0.70, with an Average Variance Extracted (AVE) value > 0.50 and Composite Reliability and Cronbach's Alpha values above the threshold, indicating that this research instrument is valid and reliable. Meanwhile, the results of the inner model test show that all relationships between constructs are significant at the $p < 0.05$ level, with the highest path coefficient values in the relationship between Perceived Ease of Use (PEOU) to Perceived Usefulness (PU) ($\beta = 0.735$) and Behavioral Intention to Use (BI) to User Satisfaction (US) ($\beta = 0.727$), which are also supported by large *effect size* values ($f^2 = 1.173$ and $f^2 = 1.121$). This finding confirms that system ease of use significantly increases perceived usefulness, which shapes positive attitudes, increases usage intentions, and leads to user satisfaction. The

implications of these results indicate the importance of developing academic information systems that are not only easy to use, but also supported with training, clear navigation, and institutional support to encourage sustainable usage intentions. Future research can develop this model by adding external variables and expanding the scope of respondents so that the results are more comprehensive and generalizable in various contexts of educational institutions.

This research confirms that the usage preference of integrated eCampus in higher education is the result of a complex interaction between the benefits offered and the challenges faced and is fundamentally changing the landscape of higher education. These benefits are critical in preparing in fostering academic innovation and collaboration as well as offering significant administrative efficiencies, enhancing the learning experience through flexibility and accessibility ensuring institutional relevance in the digital age.

The results of this study indicate that investment in the information technology sector as well as human resource capacity building should not be an obstacle to the adoption and utilization of advanced technological features.

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