

Digital learning continuance in higher education: The role of digital education, culture, and self-efficacy

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Abstract

The COVID-19 pandemic accelerated E-learning adoption in Indonesian universities, yet whether students sustain platform use after mandatory adoption, known as continuance intention (CI), remains underexplored despite its importance for long-term system viability. This study examines three factors influencing CI: digital education (DE), digital culture (DC), and digital self-efficacy (DSE), with student satisfaction tested as a mediating variable. Data were collected from students at four Indonesian public universities listed in the Times Higher Education Online Learning Rankings 2024 (Universitas Brawijaya, Universitas Negeri Surabaya, Universitas Padjadjaran, and Universitas Terbuka). Of 482 surveys collected, 381 were usable and analyzed using SEM-PLS with SmartPLS 4.0. Results revealed unexpected patterns: digital education had a significant negative effect on CI ($\beta = -0.344$; $p = 0.000$), digital culture had a small positive effect ($\beta = 0.141$; $p = 0.023$), while digital self-efficacy showed no significant direct effect ($p = 0.542$). However, satisfaction significantly mediated the relationships between DE and CI ($p = 0.003$) and between DSE and CI ($p = 0.022$), suggesting satisfaction is more than a byproduct of effective learning. The study offers guidelines for university administrators addressing institutional gaps in E-learning sustainability.

Keywords: Continuance intention, Digital culture, Digital education, Digital self-efficacy, SEM-PLS, Student satisfaction.

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Contribution of this paper to the literature
This study contributes to the existing literature by integrating digital education, digital culture, and digital self-efficacy into a unified continuance intention model. The paper's primary contribution is finding that digital education directly reduces continuance intention while satisfaction mediates its effect. This study documents evidence from four internationally ranked Indonesian universities.

1. Introduction

Many universities had been progressively integrating digital systems before 2020 and when the COVID-19 pandemic expedited the process ahead before higher education were ready. Almost overnight, universities had to pivot to online learning, and what might have taken a decade to adopt was compressed into a matter of months (Dhawan, 2020). PTN were no exception to this pattern. Jockeying for introduction of virtual learning was not a place to go and do, literally; it pushed universities to reframe how learning and teaching were basically defined and organized. In present, instruments like Learning Management Systems (LMS), synchronous video channels, multimedia content, collaborative environments, and by cloud-based elements have become commonplace regularly across in higher education institutions academic settings (Alenezi, 2023).

Institutions now face their main hurdle which has transformed from its previous condition. The decision-making process regarding digital tool implementation has reached its final determination. The research study continues to investigate whether students will maintain their usage of online tools through extended periods of study after their first usage period ends. Researchers explain this phenomenon through scholarly works which define CI as a framework that tracks user behavior with digital channels from their initial encounter to their subsequent interactions (Franque, Oliveira, Tam, & Santini, 2021) over time, CI has become one of the most matter lines for assessing the sustain viability of online education efforts.

The actual process of keeping learners involved in online education programs proves to be more difficult than educational experts predict. Studies across multiple reveal that many learners progressively lose interest in digital system, resulting in declining rather than stable participation rates steadily. Shikulo and Lekhetho (2020) noted that distance learners commonly require more than time than projected to obtain their qualifications. The main reason for this delay occurs because students need to repeat their courses after failing them due to insufficient resources and poor tutor-learner interactions and breaks in their study. The findings show that organizations face their main challenge which extends beyond their need to establish basic infrastructure and solve access issues. Educational institutions maintain a tendency to omit essential structured support which academic institutions require for achieving success in online educational programs.

Online platforms do not achieve lasting user engagement through technology because they need active human participation to maintain their digital platforms. Advanced platforms demand a strong institutional support system which ensures their correct and frequent usage. The concept of digital education holds essential importance in this particular situation. Sadiku, Shadare, and Musa (2017) define it as the intentional integration of digital technologies into educational activities that goes beyond simple tool usage. The actual usage of technologies in educational settings depends on both teaching methods and institutional rules which dictate their application.

The success of this process depends on its online integration which requires a specific digital culture that exists within the organization. Deuze (2006) defines online environments as digital spaces where shared values and practices create behavior patterns that govern social interactions. The research shows that technology adoption leads to behavioral changes which become immediate as organizations start using new technologies in their daily operations (Proksch, Rosin, Stubner, & Pinkwart, 2024). The educational system in universities evaluates digital environments according to how well institutions support their students and faculty and administrative staff in using technology throughout their educational activities.

The process of CI development receives major impact from personal characteristics in addition to institutional factors. Digital self-efficacy exists as a reliable measurement which forecasts how effectively students will use digital learning systems based on their belief that they can handle digital technology during their educational activities. The study should mainly focus on student satisfaction because it functions as a connection between the previous mentioned factors and their relationship to continuance intention through routes that reach beyond basic direct effects. People tend to maintain their intention to continue using a service based on their level of satisfaction with the initial experience and their assessment of the digital platform's benefits. The earlier findings in this document have shown that students who achieve online learning accomplishments report higher levels of satisfaction with their digital learning environment.

Serving as a valuable international reference point, the Times Higher Education Online Learning Rankings (OLR) 2024 enable an assessment of how effectively Indonesian PTNs deliver education globally. The Indonesian PTNs participating in THE OLR 2024 include:

Table 1. Indonesian PTN in THE OLR 2024.

Institution	Tier	Resources Score	Engagement Score	Findings Score	Environment Score
Universitas Negeri Surabaya	Bronze	20.2	24.6	23.6	37.8
Universitas Padjadjaran	Bronze	14.7	37.1	27.9	26.2
Universitas Terbuka	Bronze	9.2	33.9	42.1	34.9
Universitas Brawijaya	Reporter	-	-	-	-

Source: Times Higher Education Online Learning Rankings (Ellis, 2024).

Table 1 presents THE OLR 2024 rankings that three PTNs have achieved Bronze tier status, while Universitas Brawijaya remains in "Reporter" status because its complete data awaits assessment. The study investigates which factors at these universities affect student decisions to continue using digital learning platforms. The institutions recognized by THE OLR possess advanced digital environments that enable researchers to study the factors that sustain student engagement over extended periods.

The amount of research studying digital learning continuance intention has significantly increased during the past several years. The majority of this research work concentrates on technical aspects together with user experience yet fails to connect these elements to the larger institutional environment. Most existing models use perceived usefulness and satisfaction as their primary indicators, according to Bhattacharjee (2001); Davis (1989) and Venkatesh, Morris, Davis, and Davis (2003). The combination of digital culture and self-efficacy has been researched in limited studies that used common analytical methods to study these two elements in higher education after the pandemic. The Indonesian research community has studied e-learning success factors through research dedicated to system quality and content quality (Pham, Limbu, Bui, Nguyen, & Pham, 2019; Sun, Liu, Peng, Dong, & Barnes, 2014; Wang & Chiu, 2023) yet no research has investigated how digital education and online environment and digital self-efficacy together with learner satisfaction impact structural model development at internationally recognized PTN. This study investigates three element dimensions of the campus digital ecosystem through its analysis of digital education online environments and self-efficacy, which it studies through a unified analytical framework. The analysis process uses PTN universities that have received international online learning ranking awards. The present paper establishes its originality through its distinct research approach which distinguishes it from existing studies in the field.

This study addresses two key analytical questions. Primarily, it investigates the degree to which digital education, online environments, and digital self-efficacy shape learners' intentions to continue using digital learning channels at Indonesian public universities featured in the THE OLR 2024. Second, does student satisfaction mediate those relationships?

2. Literature Review

2.1. Continuance Intention in Digital Learning

Users decide to continue using a system or service after their initial experiences according to their continuance intention. Online education uses CI to measure whether students maintain their active participation in digital learning materials after their initial excitement has ended. Franque et al. (2021) conducted a meta-analysis across various information systems fields, which proved that user satisfaction and perceived usefulness were the most important factors that determined CI. The Expectation-Confirmation Model (ECM) explains that user satisfaction develops when system performance meets expected standards and this satisfaction drives users to continue using the system (Davis, 1989).

The post-pandemic period has made this issue more urgent than before. The sudden transition to digital education platforms revealed two critical problems for educational institutions: their technological systems failed to protect against cyber threats, while their student engagement and retention systems remained broken, which various universities still need to fix, according to Hodges, Moore, Lockee, Trust, and Bond (2020) and Shikulo and Lekhetho (2020).

2.2. Digital Education

Digital education involves using Internet-based technologies to support both teaching activities and student learning activities. Educational institutions use various tools and resources, which include Learning Management Systems (LMS) and multimedia content, collaborative channels, and other advanced educational technologies. The existence of these resources for learning purposes serves to provide better educational outcomes, but they do not create an automatic assurance of effective learning results. Alenezi (2023) describes digital educational systems as depending on three essential components that work together to create educational value, which include high-quality educational material, dependable technology systems and comprehensive service requirements. The entire learning process becomes disrupted when any single component of the system shows weakness or complete absence. Students who use platforms with poor design, who face technical issues without proper assistance and who lack sufficient learning materials tend to lose interest and become less active in their studies. The relationship between online learning quality and student satisfaction has been established by previous research, which also shows this relationship influences students' intention to continue using online learning systems (Al-Fraihat, Joy, Masa'deh, & Sinclair, 2020). This connection serves as one of the principal foundations that supports the current research investigation.

2.3. Digital Culture

The digital culture describes the complete set of values, norms and practices that determine how people in organizations and societies use technology, according to Deuze (2006). Higher education institutions demonstrate this concept through three measurable indicators. The indicators show institutional priorities for digital literacy through two different digitalization resource allocation methods and three campus technology use methods, which enable students to use technology as their regular practice according to Ilomäki, Paavola, Lakkala, and Kantosalo (2016) and Proksch et al. (2024).

Proksch et al. (2024) explain that an organization needs to establish a strong digital culture that serves more than its support function because it forms the core requirement for successful digital transformation. When learners perceive that their institution is truly dedicated to cultivating this culture not only through formal statements but also through consistent daily practices, it significantly influences the prevailing social norms related to technology adoption. The students begin to understand that they need to engage with digital activities throughout their school career because this behavior has become standard practice.

2.4. Digital Self-Efficacy

Digital self-efficacy (DSE) measures how confidently people use digital tools for their specific task objectives according to Bandura (1997) and Ulfert, Antoni, and Ellwart (2022). The essential requirement for success in this field extends beyond skill possession because true achievement relies on people having self-belief about their capacity to use their abilities. Users who understand how the system functions will achieve successful system operation, according to Ulfert et al. (2022), but this relationship contains multiple complex aspects. Self-efficacy leads to long-term engagement through two factors, which include actual user experience and their perception of platform benefits.

The real-world impacts of these elements show their actual effects. A student who possesses strong technological skills will find digital learning platforms easy to use, yet his proficiency will not maintain his interest in learning. Users who possess the ability to use the platform will stop using it when they encounter frustrating or disappointing learning experiences.

2.5. Student Satisfaction as a Mediator

Online learning studies use student satisfaction as a key measurement that assesses the quality of learning experiences since it has remained important for many years (Aheto, Barfi, Kwesi, & Nyagorme, 2024). Bhattacharjee (2001) demonstrates that satisfaction functions as an essential digital service mediator because it determines how users will maintain their system usage based on their system assessment. The first impression establishes immediate attractiveness, which leads to students' lasting dedication to using the platform.

The latest research provides critical details that were missing from previous studies. Aheto et al. (2024) discovered a strong connection between students' self-regulation abilities and their satisfaction levels. The learning environment requirements exceed the abilities of students, which creates a mismatch that results in decreased satisfaction.

In the structural models, pleasure has been considered, therefore, as a crucial variable playing an intermediating role between the different features of the digital ecosystem and the ultimate behavioral Intentions of students (Hew, Hu, Qiao, & Tang, 2020; Oliver, 1980).

2.6. Hypotheses Development

Drawing upon the theoretical framework and the body of literature reviewed in the preceding sections, the present study advances six hypotheses:

H₁: Digital education has a significant effect on continuance intention.

H₂: Digital culture has a significant effect on continuance intention.

H₃: Digital self-efficacy has a significant effect on continuance intention.

H₄: The effect of digital education has a significant effect on continuance intention mediated by student satisfaction.

H₅: The effect of digital culture has a significant effect on continuance intention mediated by student satisfaction.

H₆: The effect of digital self-efficacy has a significant effect on continuance intention mediated by student satisfaction.

3. Research Methods

3.1. Research Design

This research adopts a quantitative, explanatory survey model to investigate the associations among the targeted variables. Data were gathered using a closed-ended questionnaire in which each item was measured on a five-point Likert scale. The instrument assessed participants' perceptions of five constructs: digital education, digital culture, digital self-efficacy, student satisfaction, and continuance intention (Creswell & Creswell, 2018).

3.2. Population and Sampling

The study targeted students in online learning programs at four Indonesian PTNs included in THE OLR 2024: Universitas Brawijaya (UB), Universitas Negeri Surabaya (UNESA), Universitas Padjadjaran (UNPAD), and Universitas Terbuka (UT). Purposive sampling was applied to recruit participants who actively used online learning channels. The general student population was considered unsuitable for this purpose, given that the research questions required participants who could reflect meaningfully on their digital learning experiences rather than those with only limited or no prior exposure to such systems.

The Sample scale was determined by SEM-PLS guidelines, which required a minimum of 5 to 10 respondents per indicator variable (Hair, Hult, Ringle, & Sarstedt, 2017). The research model required at least 135 to 270 respondents because it included 27 indicators. The data collection process used Google Forms for digital data gathering which occurred during the period from July to August 2025. The distribution of questionnaires reached 420 but only 381 were found suitable for SEM-PLS analysis using SmartPLS 4.0.

3.3. Research Variables and Indicators

This study will examine the relationships among variables consisting of Digital Education (DE) with a total of 5 items, Digital Culture (DC) with a total of 5 items, Digital Self-Efficacy (DSE) with a total of 7 items, Student Satisfaction (SS) with a total of 5 items, and Continuance Intention (CI) with a total of 5 items. Each statement item for all variables is listed in Table 2.

Table 2. Research Variables and Indicators.

Variables	Item	Indicator Description
Digital Education (DE)	DE1	The e-learning methodology used is efficient and covers all aspects of the curriculum
	DE2	The university provides adequate technical support to facilitate the integration of technology into educational materials
	DE3	Students are provided with guidance on how to utilize educational material websites
	DE4	The e-learning system enables direct communication among all stakeholders within the educational system (administration, lecturers, and students)
	DE5	University leadership consistently evaluates the effectiveness of distance learning methods
Digital Culture (DC)	DC1	Information and Communication Technology has revolutionized the global cultural landscape
	DC2	Your university actively promotes digital literacy across various domains and raises awareness of the importance of digitalization
	DC3	Your university is engaged in the development of legislation and regulations to keep pace with the ongoing transformations in the digital world
	DC4	Your university has the capability to conduct all activities electronically and facilitates student engagement therein
	DC5	Your university allocates financial resources to implement digitalization processes
Digital Self-Efficacy (DSE)	DSE1	I am confident in my ability to store and organize digital documents so that they can be easily retrieved at a later time
	DSE2	I am confident in my ability to communicate effectively using digital technologies (e.g., email, forums, or chat groups)
	DSE3	I am confident in my ability to collaborate online with others on projects or group assignments
	DSE4	I am confident in my ability to create or edit digital content such as documents, images, or presentations using software or applications
	DSE5	I am confident in my ability to comply with copyright and licensing rules when using or sharing digital content
	DSE6	I am confident in my ability to protect my personal data while using the internet, including understanding privacy settings
	DSE7	I am confident in my ability to find solutions when encountering technical problems with digital devices or applications
Student Satisfaction (SS)	SS1	I am satisfied with the online learning system implemented at my university
	SS2	The flexibility offered by online learning meets my personal needs
	SS3	I am satisfied with the level of engagement and interaction in online learning
	SS4	I feel that the content delivered in online classes meets my expectations
	SS5	I would continue to use online learning if given the opportunity in the future
Continuance Intention (CI)	CI1	I intend to continue using online learning in the future
	CI2	I feel that online learning helps me achieve my academic goals
	CI3	If given the choice, I would prefer online classes over face-to-face classes
	CI4	I would recommend online learning to my friends or colleagues
	CI5	I believe that online learning will continue to be an integral part of the higher education system

3.4. Data Analysis Technique

Data analysis was conducted using SEM-PLS with SmartPLS 4.0. SEM-PLS is appropriate for testing complex conceptual models with relatively large numbers of indicators and non-normal data distributions. Studies were integrated in two sequential phases, first with the outer design (measurement model) and then with the inner design (structural model).

The outer model assessed indicator reliability (outer loading > 0.70), internal consistency reliability (Cronbach's alpha and Composite Reliability > 0.70), convergent validity (AVE > 0.50), and discriminant validity (Fornell-Larcker criterion, cross-loadings, and HTMT ratio < 0.90) (Fornell & Larcker, 1981; Hair et al., 2017). Assessment of the inner model covered several criteria: multicollinearity was checked using the variance inflation factor (VIF < 5.0), explanatory power was evaluated through the coefficient of determination (R-squared), and overall model fit was assessed via the standardized root mean square residual (SRMR < 0.10). The employed method of hypothesis testing entailed a bootstrapping approach where significance was determined through requisite p-values of less than 0.05 in all pinpointed path coefficients (Hair, Risher, Sarstedt, & Ringle, 2019).

4. Results

4.1. Respondent Characteristics

The sample demographic analysis in Table 3 shows that female respondents represented 61.9% of the total sample (236 females), while male respondents made up 38.1% of the total sample (145 males). The sample contained 270 learners aged between 18 and 22, forming the largest group, who showed typical undergraduate study patterns at Indonesian public universities because they used online learning systems. About two-thirds of the participants attended blended learning programs, including 64.0% of the sample (244 participants), while 36.0% (137 participants) attended fully online programs. The four universities provided adequate representation, enabling reliable institutional comparisons.

Table 3. Respondent Characteristics.

Characteristic	Category	Frequency	Percentage
Gender	Male	145	38.1%
	Female	236	61.9%
Age	18-22 years	270	70.9%
	23-26 years	111	29.1%
Learning Type	Blended Learning	244	64.0%
	Fully Online	137	36.0%
University	Universitas Brawijaya (UB)	107	28.1%
	Universitas Negeri Surabaya (UNESA)	98	25.7%
	Universitas Padjadjaran (UNPAD)	92	24.1%
	Universitas Terbuka (UT)	84	22.0%
Total		381	100%

4.2. Outer Model Evaluation

Table 4. Indicator Reliability (Outer Loadings).

Item	CI	DC	DE	DSE	SS
CI1	0.875				
CI2	0.842				
CI3	0.865				
CI4	0.864				
CI5	0.746				
DC1		0.828			
DC2		0.812			
DC3		0.796			
DC4		0.775			
DC5		0.764			
DE1			0.826		
DE2			0.761		
DE3			0.808		
DE4			0.795		
DE5			0.793		
DSE1				0.763	
DSE2				0.815	
DSE3				0.729	
DSE4				0.754	
DSE5				0.751	
DSE6				0.751	
DSE7				0.758	
SS1					0.829
SS2					0.773
SS3					0.810
SS4					0.779
SS5					0.785

4.2.1. Indicator Reliability

All indicator loadings in Table 4 exceeded the 0.70 minimum threshold for acceptable indicator reliability (Hair et al., 2017), with values ranging from 0.746 to 0.875 for continuance intention, 0.764 to 0.828 for digital culture, 0.761 to 0.826 for digital education, 0.729 to 0.815 for digital self-efficacy, and 0.773 to 0.829 for student satisfaction. Hence, these results reflect that several components determine their intended latent constructs with acceptable dependability and reliability.

Table 5. Internal Consistency Reliability.

Variables	Cronbach's Alpha	Composite Reliability
Continuance Intention	0.895	0.923
Digital Culture	0.855	0.896
Digital Education	0.856	0.897
Digital Self-Efficacy	0.886	0.906
Student Satisfaction	0.855	0.896

4.2.2. Internal Consistency Reliability

Table 5 presents all variables achieving Cronbach's Alpha values above 0.80 and Composite Reliability values above 0.89, far exceeding the recommended minimum of 0.70 (Hair et al., 2017). All constructs demonstrated strong internal consistency.

Table 6. Average Variance Extracted (AVE).

Variables	AVE Values
Continuance Intention	0.705
Digital Culture	0.633
Digital Education	0.635
Digital Self-Efficacy	0.579
Student Satisfaction	0.633

4.2.3. Convergent Validity

Table 6 presents all constructs exceeding the minimum AVE threshold of 0.50 (Hair et al., 2017), ranging from 0.579 (DSE) to 0.705 (CI). Each latent construct therefore explains more than half of the variance in its indicators, establishing adequate convergent validity.

Table 7. Fornell-Larcker Criterion.

Variables	Continuance Intention	Digital Culture (DC)	Digital Education (DE)	Digital Self-Efficacy (DSE)	Student Satisfaction
Continuance Intention	0.840				
Digital Culture (DC)	0.095	0.795			
Digital Education (DE)	-0.179	0.112	0.797		
Digital Self-Efficacy (DSE)	0.011	0.355	0.133	0.761	
Student Satisfaction	0.062	-0.076	0.542	-0.151	0.796

Table 8. HTMT Ratio.

Variables	Continuance Intention	Digital Culture (DC)	Digital Education (DE)	Digital Self-Efficacy (DSE)	Student Satisfaction
Continuance Intention					
Digital Culture (DC)	0.109				
Digital Education (DE)	0.205	0.138			
Digital Self-Efficacy (DSE)	0.063	0.422	0.211		
Student Satisfaction	0.072	0.094	0.630	0.141	

4.2.4. Discriminant Validity

In Table 7, the square root of each construct's AVE (diagonal, bold) exceeds all its inter-construct correlations, confirming discriminant validity via the Fornell-Larcker criterion. Table 8 showed HTMT values for all construct pairs were below 0.90, peaking at 0.630 among online learning and student satisfaction, well below the critical cutoff. These findings demonstrate discriminant validity, verifying that the constructs are sufficiently differentiated with no substantial overlap.

4.3. Inner Model Evaluation

Table 9 presents VIF values that were well within acceptable limits across all constructs, peaking at 1.526, which is comfortably below the 5.0 cutoff. With multicollinearity not posing a concern, the path coefficient estimates can be interpreted with reasonable confidence.

Table 9. Collinearity Issues Test (VIF).

Variables	Continuance Intention	Student Satisfaction
Digital Culture (DC)	-	1.150
Digital Education (DE)	1.518	1.023
Digital Self-Efficacy (DSE)	1.096	1.156
Student Satisfaction	1.526	-

4.3.1. Coefficient of Determination (R-Squared)

Table 10 presents that three constructs, which included digital education together with digital culture and digital self-efficacy explained 34.9% of student satisfaction because these three constructs function as digital learning satisfaction factors. The proposed model accounted for just 7.6% of the variance in students' continuance intention ($R^2 = 0.076$). The research results show limited ability to explain because continuance intention requires study of multiple factors which extend beyond the current research scope. The current study R^2 value needs additional research, which should include more variables to establish complete understanding of factors which affect student participation in online education.

Table 10. Coefficient of Determination.

Variables	R Square	R Square Adjusted
Continuance Intention	0.076	0.068
Student Satisfaction	0.349	0.343

4.3.2. Model Fit

The proposed model in Table 11 showed a reasonable fit to the data. The saturated model and estimated model both achieved SRMR values that remained below 0.10 and approached the stricter 0.08 threshold. The SRMR results showed strong similarity, which increased confidence in the structural arrangement and demonstrated that the model could accurately depict the relationships between elements in the dataset.

Table 11. Model Fit.

Evaluation	Saturated Model	Estimated Model
SRMR	0.065	0.068

4.4. Hypothesis Testing

Table 12 shows that four of the six hypotheses reached statistical significance. The results confirmed Hypothesis 1, which showed that digital education caused students to decrease their intention to continue learning ($\beta = -0.344$; $p = 0.000$). The data supported Hypothesis 2, which showed that digital culture had a positive and significant direct impact on continuance intention ($\beta = 0.141$; $p = 0.023$). Hypothesis 3 could not be proven because digital self-efficacy

did not show any significant effect on continuance intention ($p = 0.542$). The results supported Hypothesis 4 because student satisfaction functioned as a crucial mediator between digital education and continuance intention ($p = 0.003$). The results showed that satisfaction did not act as a mediator between digital culture and continuance intention ($p = 0.117$), which showed that Hypothesis 5 was not valid. The results of Hypothesis 6 showed that student satisfaction functioned as a vital mediator between digital self-efficacy and continuance intention ($p = 0.022$).

Table 12. Hypothesis Testing Results (Path Coefficients).

Hyp.	Path	Beta	T Statistics	P Values	Decision
H1	DE -> CI	-0.344	5.579	0.000	Supported
H2	DC -> CI	0.141	2.288	0.023	Supported
H3	DSE -> CI	0.049	0.610	0.542	Not Supported
H4	DE -> SS -> CI	0.153	2.946	0.003	Supported
H5	DC -> SS -> CI	-0.017	1.572	0.117	Not Supported
H6	DSE -> SS -> CI	-0.054	2.293	0.022	Supported

5. Discussion

5.1. Effect of Digital Education on Continuance Intention

The research reveals an essential finding which shows that online learning results in decreased educational progress for students. The study results display two findings that contradict each other. The data shows that students who have positive views about digital education will continue using the system. The findings showed that they found the opposite relationship. The individual components that students assessed provide some information about their assessment. The participants showed only moderate contentment when they evaluated teaching methods and technical assistance and communication systems. The quality of digital education depends on successful educational content delivery and infrastructure systems and teaching methods, which Alenezi (2023) identified in 2023. The system experiences negative effects when any part of this system breaks down, which leads to decreased intentions for long-term system usage.

The results need further examination because students' learning methods determine their study expectations, which shape their desired academic outcomes. Students who use digital learning platforms more frequently develop higher expectations about system performance and content delivery. Students who study through blended or online courses demonstrate better skills in recognizing the actual user experience of technology when it does not match the expected performance. People experience two effects from their perception of a major gap between actual results and expected performance. The findings of Franque et al. (2021) show that unmet expectations in digital environments reduce user loyalty to the system.

The investigation provides PTN with distinct practical guidance. The study requires additional research because improved infrastructure alone will not suffice to achieve better student digital learning platform usage. The educational institution needs to give equal weight to three areas, which include enhancing teaching standards, developing support systems and establishing a unified digital learning environment. The combination of these components works as essential factors that help students maintain their engagement throughout their studies.

5.2. Effect of Digital Culture on Continuance Intention

The research demonstrated that digital culture serves as a major factor that leads to students' intention to continue their studies ($\beta = 0.141$, $p = 0.023$), which confirmed hypothesis H2. The research found that students increase their usage of digital learning systems when digital culture becomes a fundamental element of university operating standards. The research established digital culture through the institution's efforts to enhance digital literacy, its commitment to digital expansion, and its capacity to treat technology integration as a standard operational procedure instead of an exceptional occurrence, according to Deuze (2006) and Proksch et al. (2024). Students who observe authentic dedication to digital transformation, which extends beyond digital policies into their everyday activities, tend to adopt digital transformation-supportive social norms while establishing higher standards for their future participation. The positive impact of this effect requires further investigation because it results in a decrease in effect strength.

The study results support Proksch et al. (2024), who demonstrate that organizations need a strong digital culture to achieve their digital transformation goals. Higher education institutions develop digital culture through their capacity to implement and manage technological resources. The academic community uses digital tools and platforms based on its values, expectations, and attitudes, which determine its digital practices (Deuze, 2006). PTNs create an environment that supports students who require assistance with their digital system learning process. Organizations need to spend their budgets on two essential areas: technological infrastructure and internet access capabilities. Students require digital values and norms to master technology-based learning skills, which they need to practice for extended periods.

5.3. Effect of Digital Self-Efficacy on Continuance Intention

The study found no significant impact from digital self-efficacy on continuance intention because the results showed a β value of 0.049 and a p value of 0.542, which led to Hypothesis 3 being rejected. The finding demands our attention because it presents important information. Prior studies showed that students with high online confidence levels would continue studying in digital environments (Ulfert et al., 2022). The absence of a direct relationship here is therefore quite notable. Digital self-efficacy serves as a barrier because it only establishes the initial effect, while users require digital self-efficacy to keep using digital platforms continuously. When students possess the necessary technical skills, they will only become engaged with learning content that meets their expected standards. Technical competencies function as a means to eliminate obstacles that exist between students and their objectives, but these skills do not create intrinsic learning incentives. The perceived value of the learning experience emerges as the more decisive factor. Digital proficiency exists as an essential requirement for online presence, but it does not ensure users

will engage with digital content on their own. Universities that concentrate mainly on building technical skills risk overlooking what truly drives retention: the actual quality and relevance of the educational experience those skills enable.

Mediation pathways demonstrate how digital self-efficacy (DSE) failed to create direct effects that led to continuance intention (CI). The study found that learner satisfaction presented a direct effect which led to the indirect relationship between the two variables (H6: $\beta = -0.054$; $p = 0.022$). The relationship between online confidence and ongoing engagement shows an indirect connection between both elements. Ulfert et al. (2022) discovered that self-efficacy in online environments supports effective system use, but this link depends largely on users' real experiences. The first learning period shows improvement through enhanced confidence, yet student dedication depends on their actual learning experience. Educational institutions should establish digital skills development programs for PTNs through student training programs while implementing educational outcome improvement strategies. Students who possess digital self-efficacy will develop ongoing intention to study when they experience a situation that they want to experience again.

5.4. Mediating Role of Student Satisfaction

The research found that learner satisfaction functioned as a major mediating factor that affected two of the three tested pathways. The study found that e-learning impacted students' intention to continue studying through its relationship with satisfaction, which the researchers tested as a hypothesis (H4). The result demonstrates an interesting aspect showing opposing effects on the direct relationship. Digital education appeared to decrease students' platform usage but created a positive indirect impact through satisfaction, which made students want to keep using it. Digital education generates genuine student satisfaction when it delivers authentic course content, flexible study options, and dependable system support. Bhattacharjee (2001) research found that satisfaction drives online users to continue their use of digital services. Users form a deep commitment to services after they experience positive results from their initial interactions with those services (Cidral, Oliveira, Di Felice, & Aparicio, 2018; Oliver, 1980). Students' continuous engagement with digital education depends on the educational experience that digital education creates for them.

The research established that learner satisfaction serves as a vital link connecting online self-efficacy to persistence intention (H6: $\beta = -0.054$; $p = 0.022$). The indirect effect produces negative results, which require an explanation. The pattern shows that digital self-efficacy leads to satisfaction, which subsequently results in stronger CI. One plausible explanation is that students who are more digitally capable tend to hold their learning environments to a higher standard. When students' expectations remain unfulfilled, the gap between anticipated and actual system performance tends to diminish satisfaction and, by extension, the intention to persist with online education. Learners with advanced digital skills establish higher standards for the learning environment; thus, unmet expectations create a greater negative impact on their satisfaction. The research results show that online self-regulation skills connect strongly with satisfaction, while mismatches between students' capabilities and their actual experiences lead to significant declines in satisfaction. Student satisfaction failed to mediate the relationship between digital culture and continuance intention according to H5 because digital culture affects CI directly, without requiring satisfaction to act as a mediator.

The mediation analysis results demonstrate that learner satisfaction functions as a crucial element that helps explain students' decision to continue using online learning platforms. The three exogenous variables collectively accounted for 34.9% of the variance in learner satisfaction ($R^2 = 0.349$), illustrating that the factors determining satisfaction in this context have been explained through substantial but incomplete evidence. This finding is largely consistent with the assertions of Venkatesh et al. (2003), who established that positive user experience and user satisfaction served as essential mediators connecting system evaluations with ongoing usage patterns. The PTN strategies that organizations use to promote student commitment to educational platforms need to improve digital system performance while building institutional digital capacity and creating educational environments that support students who learn through online platforms (Pham et al., 2019; Sun et al., 2014; Wang & Chiu, 2023).

6. Conclusion

The researchers examined three aspects of digital learning, online educational culture, and online self-efficacy to study their impact on undergraduate students from four Indonesian public universities that Times Higher Education identified as leading digital educational institutions in its 2024 Online Learning Rankings. The study used student satisfaction as a mediating element. The researchers obtained four main results through their analysis, which used structural equation modeling with partial least squares to analyze 381 valid survey responses.

The first finding shows that digital education at the four PTN institutions currently prevents students from maintaining their use of digital education resources. The research findings established that developing digital culture on campus leads to increased student online system usage through its positive effect on their intention to continue using those systems. Digital self-efficacy did not affect continuation intention directly but became relevant when student satisfaction functioned as a mediating element because it produced an indirect connection between the two factors.

The digital education-CI pathway and the digital self-efficacy-CI pathway both received student satisfaction as a mediator that built their connections to these pathways (H4 supported) (H6 supported), yet their relationship with digital culture failed to meet this requirement (H5 not supported). Learner satisfaction exists as the primary mediator that connects students' online perceptions to their digital education system usage and their digital education system usage to their intention to continue using these systems. PTN needs to develop three elements simultaneously because it must enhance online learning through better quality and relevant content, develop campus online culture, and create learning environments that provide students with genuine satisfaction through their educational experience. Attempts to solve these problems through separate solutions will not achieve any substantial progress.

The model demonstrated its ability to explain 34.9 percent of student satisfaction variance and 7.6 percent of continuance intention variance. The research findings of this paper provide valuable information, but researchers still need to identify multiple factors that influence both research outcomes. Future studies need to assess different

aspects, including the quality of instructor-student interaction, the channels that students perceive as useful, and the institutional technical support that exists. The cross-sectional design constitutes a limitation, as it does not allow for firm causal conclusions; the information reflects responses at one specific time point instead of changes occurring over time. The study's focus on four PTNs within THE OLR 2024 also naturally limits how far the findings can be generalized. Future research needs to adopt different research methods together with larger and more diverse participant groups to achieve better study results regarding how online education persists in Indonesian higher education institutions.

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