Factors influencing students' intention to use E-Portfolios through perceived benefits: A case study at Van Lang University

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Abstract:

This study aims to examine the factors influencing the intention to use electronic portfolios (E-Portfolios) among higher education students at Van Lang University (VLU). Drawing upon foundational technology acceptance theories, specifically the Information Systems Success Model and the Technology Acceptance Model (TAM), the research proposes a streamlined three-construct framework isolating system quality (SQ), perceived benefits (PEB), and intention to use (ITU). Data were collected through a cross-sectional survey from a diverse sample of 156 undergraduate students, graduate students, and alumni, and subsequently analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The empirical results reveal that SQ significantly and positively impacts PEB (β=0.755, *p*<0.001), and PEB robustly influences ITU (β=0.637, *p*<0.001). However, SQ does not have a direct statistically significant effect on ITU (β=−0.013, *p*>0.05). Instead, PEB fully mediates the relationship between SQ and ITU (β=0.482, *p*<0.001). These findings underscore that technical excellence acts as a hygiene factor, meaning it is a necessary but insufficient condition for E-Portfolio adoption. Ultimately, this study provides actionable insights for universities and developers, emphasising the need to translate technical capabilities into concrete academic and career-ready scenarios to foster sustained student engagement.

Keywords: **E-Portfolios, intention to use, perceived benefits, PLS-SEM, system quality**.

Classification numbers: **1.3, 3.2, 3.3**

1. Introduction

In the landscape of modern higher education, E-Portfolios have emerged as a powerful tool, providing learners with a comprehensive platform to integrate, organise, and showcase evidence of their learning competencies, soft skills, work experience, and personal achievements [1, 2]. Unlike traditional paper-based portfolios, E-Portfolios offer unlimited storage, ease of sharing, and seamless updates, thereby supporting learners in self-assessment, career development, and enhancing their competitiveness in the labour market [1, 3]. Numerous universities worldwide have integrated E-Portfolios into their curricula to actively support and enrich the overall learning experience [3, 4].

However, the successful implementation of a new technology depends not only on the availability of the tool but also on the level of acceptance and intention to use of the end users - in this case, the learners [5]. Despite the immense potential of E-Portfolios, if learners lack the intention or motivation to utilise them, the effectiveness of these tools will be significantly constrained [6, 7].

To address this issue, this study explores the key factors influencing the intention to use E-Portfolios among learners at VLU, focusing on the roles of SQ and PEB. Specifically, this research is driven by the following research questions (RQs):

RQ1: How does the SQ of the E-Portfolio application impact learners' PEB?

RQ2: How does PEB influence learners' ITU of the E-Portfolio?

RQ3: Does SQ exert a direct effect on the ITU, or is its influence fully mediated by PEB?

The distinctive contribution of this study lies in its streamlined three-construct framework (isolating SQ, PEB, and ITU), which is specifically designed to assess an educational technology during its critical early deployment stage. By providing a clear, empirical demonstration of a full mediation effect, this research proves that technical quality must be translated into cognitive value to drive adoption. These findings not only advance the theory of technology acceptance in education but also offer

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practical recommendations for VLU. Ultimately, these insights will assist the university in refining application quality and communication strategies, thereby fostering effective E-Portfolio adoption and supporting the holistic development of learners.

2. Literature review and hypotheses

2.1. Concepts of E-Portfolios

E-Portfolios are digital educational tools that have evolved from traditional paper-based portfolios. They leverage information technology to expand capabilities in storage, organisation, sharing, and reflection [1].

In simple terms, a portfolio is a collection of evidence gathered to demonstrate an individual's learning journey and abilities over time. When transitioned into a digital format, E-Portfolios act as collections of digitised products and achievements. These materials include evidence, resources, and accomplishments representing an individual, a group, or an organisation. These materials may include text, graphics, or multimedia elements stored on web platforms or other electronic media [1].

Furthermore, E-Portfolios serve as management tools for organising work created from various applications and controlling access to information [2]. Previous studies described E-Portfolios as digital adaptations of traditional paper portfolios [3]. They provide learners with repositories to collect and present their work, while also serving as mechanisms to document growth in professional knowledge and skills. It is also emphasised that E-Portfolios can be structured as online personal learning environments, supporting lifelong and life-wide learning [4].

At their core, E-Portfolios also encourage personal reflection on one's work, thereby creating meaningful learning experiences. This process helps learners document and track their learning, develop a holistic and coherent view of their educational experiences, and enhance self-awareness [1, 2].

In addition, E-Portfolios provide professional platforms for learners to showcase their skills and knowledge to potential employers and research supervisors. They can be used to demonstrate competencies and outcomes [3] by providing tools for documenting skills and capabilities [1].

In summary, E-Portfolios are purposeful digital tools used not only to collect academic achievements but also as spaces for reflection and the presentation of competencies, significantly contributing to the academic and professional development of learners.

2.2. Theoretical framework

To establish a robust theoretical framework for investigating the factors influencing the intention to use E-Portfolios, this study draws upon widely validated theories of technology acceptance and use.

2.2.1. Technology Acceptance Model (TAM)

The TAM [5] is one of the most extensively utilised models to explain user technology acceptance behaviour. TAM focuses on two core determinants:

Perceived usefulness (PU): The degree to which a person believes that using a particular system would enhance their job performance.

Perceived ease of use (PEOU): The degree to which a person believes that using a particular system would be free of effort.

According to TAM, PU and PEOU are the primary factors influencing a user's attitude toward system use, which in turn affects behavioural intention and, ultimately, actual usage behaviour [5]. TAM has been broadly applied across various fields, including education, to predict learners' intentions to adopt new learning technologies. In the context of this E-Portfolio research, the concept of PEB in our model is analogous to TAM's "PU", as it reflects the values and advantages learners expect to gain from using E-Portfolios [5].

2.2.2. DeLone and McLean information systems (IS) success model

The Information Systems Success Model (ISSM) [6] provides a comprehensive framework for evaluating the success of an information system. This model comprises factors such as SQ, information quality, and service quality, which lead to system use and user satisfaction, eventually resulting in net benefits.

In this study, the SQ of E-Portfolios is conceptualised based on foundational models [6]. SQ refers to the desirable technical characteristics of the information system itself, such as ease of use, functionality, reliability, flexibility, and responsiveness.

2.2.3. Unified theory of acceptance and use of technology (UTAUT)

The UTAUT is a synthesis model that integrates elements from eight leading technology acceptance models, including TAM [5, 7]. UTAUT explains up to 70% of the variance in technology usage intention and consists of four core constructs:

Performance expectancy: The degree to which an individual believes that using the system will help them

attain gains in job performance.

Effort expectancy: The degree of ease associated with the use of the system.

Social influence: The degree to which an individual perceives that important others believe they should use the new system.

Facilitating conditions: The degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system.

Our research model does not directly test all UTAUT constructs. However, concepts such as PEB share similarities with "performance expectancy" in UTAUT. This similarity emphasises the role of perceived advantages in driving technology usage intention [7].

These theories provide a solid foundation for a deeper understanding of the factors impacting E-Portfolio usage intention, facilitating the systematic development of the research model and hypothesis testing.

This study focuses on ITU rather than actual usage behaviour as the primary dependent variable. In technology acceptance research, behavioural intention is recognised as the most immediate and reliable predictor of actual behaviour. Furthermore, as the E-Portfolio system is currently in its deployment phase at VLU, measuring intention allows for a proactive assessment of student acceptance before full-scale long-term usage data is available. Our model systematically integrates the technical focus of the ISSM [6] with the user-centric cognitive evaluations of TAM [5] and UTAUT [7]. This integration suggests that SQ (a technical factor) must first be translated into PEB (a cognitive evaluation) to drive the final behavioural intention to adopt the technology.

2.3. Hypotheses development

Based on the aforementioned theoretical frameworks and previous empirical studies on technology acceptance, this research proposes a model consisting of three primary constructs: SQ, PEB and ITU [5-7]. The relationships between these constructs are operationalised into the following hypotheses:

2.3.1. System quality and perceived benefits

SQ is a core component of the ISSM [6]. This concept refers to the quality of the technical characteristics of the information system itself, including reliability, ease of use, functionality, flexibility, and performance [6]. A technically sound system facilitates user interaction and exploitation of its features. When users experience a high-quality system, they tend to perceive greater benefits and value from its usage [6].

In the context of E-Portfolios, an application with high SQ (user-friendly interface, fast loading speed, robust security, and stable storage) enables learners to easily perform tasks, manage documents, and interact with features [1, 2]. Consequently, learners can more clearly perceive the developmental benefits of E-Portfolios. These include the ability to share information, support project completion, track academic progress, and prepare job applications [3, 4]. This relationship is analogous to how PEOU in TAM can lead to PU, as an easy-to-use system is often viewed as high quality and therefore more useful [5].

Based on this argument, the following hypothesis is proposed:

H1: SQ of the E-Portfolio application has a positive impact on learners' PEB.

2.3.2. Perceived benefits and intention to use

PEB in this study reflects the degree to which learners believe that using an E-Portfolio will provide positive values and outcomes for their learning process, skill development, and career preparation [3, 4]. This concept is similar to "PU" in TAM [5] and "performance expectancy" in UTAUT [7]. Both theories assert that the perception of benefits or performance is the strongest predictor of the intention to adopt and use a technology [5, 7].

In the specific context of E-Portfolios, the relationship between perceived benefits and usage intention is particularly crucial because E-Portfolios require a higher level of cognitive engagement and long-term commitment than typical learning management systems. Learners must continuously reflect on their learning, curate artifacts, and update their achievements. Without a strong belief that these efforts will lead to tangible academic growth or career advantages (e.g., professional branding and employability), learners are unlikely to form a sustained intention to use the tool, regardless of its technical features [3, 4]. When learners believe that E-Portfolios help them learn more effectively or enhance career opportunities, they will be more motivated to actively use the application [2, 3].

Therefore, the following hypothesis is proposed:

H2: PEB of the E-Portfolio application has a positive impact on learners' ITU.

2.3.3. System quality and intention to use

The direct relationship between SQ and ITU has been explored in various technology acceptance models [6]. It has been reported that SQ is a factor that directly influences system use and user satisfaction, which indirectly leads to net benefits [6]. A high-quality system (fast, reliable, easy to operate) typically encourages users to interact with it more directly [6].

For E-Portfolio users, system quality acts as a hygiene factor or a technical enabler. Given that E-Portfolios involve storing sensitive personal data and high-resolution media artifacts, the security (SQ4) and stability (SQ6) of the platform are essential for building initial trust [6]. A technically sound system reduces user frustration and lowers the barrier to entry, theoretically fostering a direct intention to adopt the platform as a reliable workspace for their digital identity [8].

However, this relationship may not always be strongly direct, especially when other mediating factors are present. While some foundational studies, such as the ISSM [6], find a direct impact of SQ on usage, other empirical research in educational contexts suggests that this effect is predominantly mediated through users' cognitive evaluations like PEB [1, 5]. Nevertheless, according to foundational theory, a technically well-functioning system creates a positive initial impression and reduces potential barriers, thereby encouraging usage intention [5, 6].

From the above analysis, the following hypothesis is proposed:

H3: SQ of the E-Portfolio application has a positive impact on learners' ITU.

2.3.4. The mediating role of perceived benefits

Based on the developed relationships, it can be seen that PEB likely plays a mediating role in the relationship between SQ and ITU [6, 7]. A high-quality E-Portfolio system (SQ) helps users easily perceive the benefits it offers (PEB), and these PEB then directly drive the intention to use the application [5]. In other words, the technical quality of the E-Portfolio facilitates the exploration and perception of benefits. Consequently, this perception of benefits acts as the direct driver of usage behaviour [6, 8].

This mediating relationship is consistent with many technology acceptance studies where the technical characteristics of a system influence user perceptions (e.g., usefulness), which subsequently impact behavioural intention [5, 8].

Therefore, the following mediation hypothesis is proposed:

H4: PEB plays a mediating role in the relationship between the SQ of the E-Portfolio application and learners' ITU.

2.4. Proposed research model

Based on the theoretical framework and the developed research hypotheses, the proposed research model was constructed to examine the relationships between SQ, PEB and ITU E-Portfolio among learners and alumni at VLU (Fig. 1). The model hypothesizes that SQ exerts a positive influence on both PEB and ITU, while PEB is expected to positively impact ITU. Notably, this study emphasises testing the mediating role of PEB in the relationship between SQ and ITU.

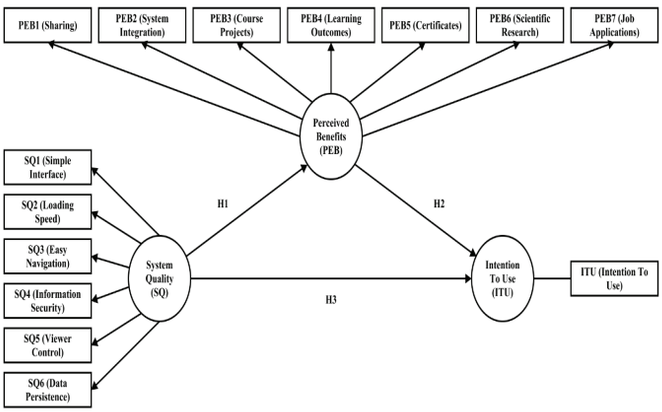

Fig. 1. Proposed research model. Source: Proposed by the author based on [5-7].

3. Methodology

3.1. Research design

This study was conducted using a quantitative approach with a cross-sectional survey design. The quantitative method was selected to test hypothesized causal relationships between factors in the model, specifically the impact of SQ and PEB on the ITU. A cross-sectional design allows for data collection from a target group at a single point in time, which is suitable for evaluating relationships between variables within the research context.

3.2. Data collection process

Participants: The survey targeted learners and alumni of VLU. Specifically, the sample encompasses diverse study levels, including undergraduate learners, graduate learners, and alumni. Selecting this varied group aims to gather a comprehensive perspective on E-Portfolio usage intentions and perceptions across different stages of the learners› experience at the university.

Sample size: The final sample of 156 valid responses is deemed sufficient for PLS-SEM analysis based on the widely used "10-times rule" [8]. According to this rule, the sample size should be at least ten times the maximum number of structural paths directed at a particular latent construct. In our model, the maximum number of paths directed at a construct is two (SQ and PEB pointing to ITU). Thus, a minimum of 20 samples would meet the basic requirement. With 156 samples, this study significantly exceeds the threshold. Although recent PLS-SEM guidelines increasingly advocate for formal

power analyses to determine optimal sample sizes, the current N=156 is adequate for this exploratory context. Nevertheless, future research should aim to expand the sample size to further enhance statistical power [8].

Data collection tool: Data were gathered through an online survey questionnaire. The questionnaire consists of two main parts:

Part 1: Demographic information: Collects basic participant information such as gender, education level (undergraduate, graduate, alumni), and faculty/major.

Part 2: Measurement scales: Includes questions evaluating the concepts of SQ, PEB, and ITU regarding E-Portfolios. Items were developed based on validated scales from previous studies and adjusted to fit the E-Portfolio context at VLU. All items were assessed on a five-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree). Detailed survey items, along with their respective theoretical sources, are comprehensively listed in Table A1 of the Appendix.

Collection procedure: The questionnaire was distributed online via internal communication platforms and social media networks for VLU learners and alumni. Participation was entirely voluntary, and anonymity was guaranteed.

The demographic profiles of the 156 valid respondents are summarised in Table 1 below.

Table 1. Demographic characteristics of the survey sample (N=156).

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	70	44.87
	Female	86	55.13
	Total	156	100.00
Education level	Graduate	63	40.38
	Alumni	50	32.05
	Undergraduate	43	27.56
	Total	156	100.00

Source: Results based on questionnaire responses from July 2025.

The descriptive statistics indicate a relatively balanced distribution between male and female participants. Regarding education levels, graduate learners account for the largest proportion (40.38%), followed by alumni (32.05%) and undergraduate learners (27.56%). This diversity in educational backgrounds allows the study to capture insights from various groups with different experiences and requirements concerning E-Portfolios.

3.3. Data analysis method

The collected data were analysed using SmartPLS 3 software and the PLS-SEM technique. PLS-SEM was chosen for the following advantages:

First, suitability for complex research models with multiple latent variables and causal relationships.

Second, minimal requirements regarding the normal distribution of data.

Third, efficiency in handling small to medium sample sizes.

Fourth, particular suitability for exploratory research or when the primary goal is the prediction and explanation of variance (R^2).

The PLS-SEM analysis process involves two main stages:

3.3.1. Measurement model assessment

This stage evaluates the reliability and validity of the measurement constructs in the model:

Indicator reliability: Evaluated through outer loadings. An indicator is considered reliable when its outer loading is greater than 0.7. Indicators with loadings below 0.4 were considered for removal.

Construct reliability: Assessed using Cronbach's alpha (CA) and composite reliability (CR). These values should exceed 0.7 to ensure internal consistency among indicators within the same construct.

Convergent validity: Evaluated through average variance extracted (AVE). The AVE value must be greater than 0.5, indicating the construct explains at least 50% of the variance of its indicators.

Discriminant validity: Checked using the heterotrait-monotrait ratio (HTMT). The HTMT value should be less than 0.90 (or 0.85 in stricter cases). High HTMT values suggest constructs may overlap or measure the same concept. In this study, potential discriminant validity issues among the initial benefit-related constructs were resolved by merging them into a single, comprehensive concept: PEB. This consolidation ensures a more robust model and clearer discrimination between the system's technical quality and its perceived advantages.

3.3.2. Structural model assessment

Once the measurement model is validated, the structural model is assessed to test the hypotheses regarding causal relationships between latent variables using the following criteria:

Multicollinearity test: Evaluated using the variance inflation factor (VIF). A VIF value below 5 indicates no serious multicollinearity issues between independent variables [8].

Path coefficients evaluation: Path coefficients (β) represent the magnitude and direction of relationships between variables. Statistical significance is tested

using the bootstrapping technique (5000 sub-samples) to calculate T-statistics and P-values. A relationship is considered statistically significant when the P-value is less than 0.05 (T-statistics >1.96).

Effect size (f^2): The f^2 value measures the relative impact of a specific predictor construct on an endogenous construct. According to foundational guidelines [8], values f^2 of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively.

Coefficient of determination (R^2): R^2 indicates the percentage of the dependent variable's variance explained by independent variables in the model. Values of 0.25, 0.50, and 0.75 are classified as weak, moderate, and strong [8].

Predictive relevance (Q^2): The Stone-Geisser Q^2 value, obtained through the blindfolding procedure, is used to assess the model's predictive power. A $Q^2 \geq 0$ indicates that the model has predictive relevance for a particular endogenous construct [8].

Mediation analysis: The study uses specific indirect effects analysis to test the mediating role of PEB in the relationship between SQ and ITU. Similarly, the statistical significance of indirect effects is determined via P-values from bootstrapping results.

4. Results

4.1. Measurement model assessment

The measurement model was evaluated based on indicator reliability, construct reliability, convergent validity, and discriminant validity.

4.1.1. Indicator reliability

Table 2 presents the outer loadings of all indicators. After removing indicators with negative or excessively low loadings, all remaining indicators exhibited positive outer loadings. Most indicators have loadings greater than 0.7, indicating a high level of explanation for the constructs they measure. Some indicators with loadings between 0.5 and 0.7 (such as SQ1=0.689, PEB2=0.523, and PEB5=0.615) were retained as they significantly contribute to the conceptual content and do not compromise the overall reliability and validity of the constructs.

4.1.2. Construct reliability and convergent validity

Table 2 also provides the values for CA, CR, and AVE for each construct.

Table 2. Measurement model assessment results.

Construct	Indicator	Outer loadings	Cronbach's alpha	Composite reliability	Average variance extracted
SQ	SQ1	0.689	0.878	0.907	0.621
	SQ2	0.799			
	SQ3	0.772			
	SQ4	0.789			
	SQ5	0.905			
	SQ6	0.757			
PEB	PEB1	0.713	0.840	0.878	0.513
	PEB2	0.523			
	PEB3	0.835			
	PEB4	0.833			
	PEB5	0.615			
	PEB6	0.739			
	PEB7	0.705			
ITU	ITU	1.000	1.000	1.000	1.000

Source: SmartPLS analysis results based on survey data from July 2025.

The results indicate that all constructs in the model meet the requirements for reliability (both CA and CR are greater than 0.7) and convergent validity (AVE is greater than 0.5). This confirms the consistency and robust measurement capability of the scales for the research concepts.

4.1.3. Discriminant validity

Discriminant validity was assessed using the HTMT criterion, which indicates the degree of distinction between constructs. Table 3 presents the HTMT values.

Table 3. HTMT matrix.

Construct	SQ	ITU	PEB
SQ			
ITU	0.461		
PEB	0.808	0.661	

Source: SmartPLS analysis results based on survey data from July 2025.

The results show that all HTMT values are below the 0.85/0.90 threshold, confirming that the constructs in the model possess distinct discriminant validity; in other words, they measure independent concepts. Notably, the HTMT value between SQ and PEB has been significantly improved, ensuring the discriminant validity between these two concepts.

4.2. Structural model assessment

Once the measurement model was validated, the structural model was assessed to test the research hypotheses. Before evaluating the path coefficients, the model was checked for potential multicollinearity issues

using the VIF. As shown in Table 4, all inner VIF values ranged from 1.000 to 2.328, which are well below the conservative threshold of 3.3 or the standard threshold of 5.0. This confirms that multicollinearity among the independent variables does not bias the results of the structural model.

4.2.1. Path coefficients, hypothesis testing, and effect sizes

The evaluation of the structural model also involved analysing path coefficients (β), T-statistics, P-values, and effect sizes (f^2). Table 4 presents the comprehensive results.

Table 4. Hypothesis testing results.

Relationship	Path coefficient (β)	T-statistic	P	VIF	f^2	Conclusion
SQ → PEB (H1)	0.755	19.303	<0.001	1.000	1.328	Supported
PEB → ITU (H2)	0.637	4.322	<0.001	2.328	0.288	Supported
SQ → ITU (H3)	-0.013	0.071	0.472	2.328	0.000	Not Supported

Source: SmartPLS analysis results based on survey data from July 2025.

Hypothesis H1: SQ has a positive impact on PEB.

The results show a path coefficient of β=0.755 with p<0.001 and a T-statistic of 19.303. Notably, the effect size of SQ on PEB is 1.328, which is considered a large effect based on established statistical thresholds (f^2>0.35), confirming the substantial role of technical quality in shaping student perceptions. This indicates a strong, positive, and statistically significant relationship between SQ and PEB. Thus, H1 is supported, implying that as the quality of the E-Portfolio system improves, learners perceive greater potential benefits from its use.

Hypothesis H2: PEB has a positive impact on ITU.

The results show a path coefficient of β=0.637 with p<0.001 and a T-statistic of 4.322. The effect size for this path is f^2=0.288, representing a medium-to-large effect on usage intention. This demonstrates a strong, positive, and statistically significant relationship between PEB and ITU. Therefore, H2 is supported, meaning that when learners recognise more potential benefits from the E-Portfolios, their intention to use the application increases.

Hypothesis H3: SQ has a positive impact on ITU.

The results show a path coefficient of β=−0.013 with p=0.472 (p>0.05). The f^2 value for this path is <0.001, indicating a complete lack of direct impact. This indicates that there is no statistically significant direct relationship between SQ and the intention to use the E-Portfolios. Consequently, H3 is not supported, suggesting that the impact of SQ on ITU may be transmitted entirely through other mediating variables.

4.2.2. Coefficient of determination (R^2) and predictive relevance (Q^2)

The R^2 coefficient measures the proportion of variance in the dependent variable explained by the independent variables in the model. R^2 values can be classified as weak (0.25), moderate (0.50), or strong (0.75) [8]. Additionally, the Stone-Geisser Q^2 value, obtained through the blindfolding procedure, is used to assess the model's predictive relevance. A Q^2 value greater than zero indicates that the model has adequate predictive capability [8] (Table 5).

Table 5. Results of R^2 and Q^2

Construct	R^2	R^2 Adjusted	Q^2 (=1-SSE/SSO)
ITU	0.394	0.386	0.365
PEB	0.571	0.568	0.257

Source: SmartPLS analysis results based on survey data from July 2025.

ITU: The SQ and PEB constructs together explain 39.4% of the variance in ITU (R^2=0.394). This is a moderate and significant level of explanation, showing that the model has good predictive capability for the E-Portfolio usage intentions of VLU learners. With a Q^2 value of 0.365, the model demonstrates a solid predictive performance regarding the E-Portfolio usage intentions of VLU learners.

PEB: The SQ construct explains 57.1% of the variance in PEB (R^2=0.571). This is a moderate-to-strong and significant level of explanation, indicating that SQ is a very important predictor of PEB. The Q^2 value of 0.257 confirms the model's predictive relevance for this construct.

4.2.3. Specific indirect effects

Testing for indirect effects helps determine whether the mediator (PEB) transmits the impact from the independent variable (SQ) to the dependent variable (ITU) (Table 6).

Table 6. Specific indirect effects results.

Relationship	Indirect effect (β)	T-statistic	P	Conclusion
SQ → PEB → ITU (H4)	0.482	4.040	<0.001	Supported

Source: SmartPLS analysis results based on survey data from July 2025.

Hypothesis H4: PEB play a mediating role in the relationship between SQ and ITU.

The results show that the indirect effect of SQ on ITU through PEB is 0.482 with p<0.001. This indicates a statistically significant indirect effect from SQ to ITU through PEB. Therefore, H4 is supported, confirming that PEB serves as a critical mediating variable in this relationship. Combined with the lack of support for H3

(the direct effect SQ → ITU), this indicates that PEB plays a full mediation role. In other words, the quality of the E-Portfolio system influences learners' intention to use primarily by increasing their awareness of the benefits the E-Portfolios provide.

5. Discussion

The validation of the research model reveals that SQ and PEB collectively explain 39.4% of the variance in learners' usage intentions. This provides a robust framework for understanding E-Portfolio adoption at VLU. A unique theoretical contribution of this study is the empirical validation of this streamlined model. Unlike complex multi-variable frameworks, this focused approach clearly isolates the critical mechanisms at play during the early deployment phase of an educational tool. The most significant finding emerging from this design is the identification of a full mediation effect. While SQ serves as the foundational engine driving PEB (f^2=1.328), it does not directly influence ITU. This suggests that for university learners, technical excellence must be cognitively translated into perceived value before any actual adoption occurs.

The critical link between SQ and PEB (H1) is evidenced by a strong positive influence (β=0.755, p<0.001). This aligns perfectly with the ISSM [6]. This model posits that high-quality technical attributes are the primary catalysts for user gains. This finding is further consistent with previous research [2], which argued that a seamless digital interface is essential for learners to engage effectively with E-Portfolio features. In the specific context of VLU, the high f^2 value confirms that unless the system provides fast loading (SQ2) and easy navigation (SQ3), learners will struggle to recognize its academic utility. This supports the evolutionary view of the TAM [5], where technical ease of use serves as a direct gateway to perceived usefulness.

Furthermore, the confirmation of PEB as the primary driver of ITU (H2, β=0.637) reinforces the core tenets of both TAM [5] and UTAUT [7]. These frameworks identify the perception of utility as the most significant predictor of technology adoption. Our results echo previous findings [3], university learners are essentially pragmatic users motivated by real-world outcomes, such as efficient document sharing (PEB1) and career profiling (PEB7). Unlike general-purpose social media, an educational E-Portfolio is viewed as a competency certificate. Therefore, usage intention is not driven by the novelty of the platform but by its capacity to satisfy specific academic and professional goals.

Perhaps the most profound insight arises from the paradox of SQ and the subsequent full mediation effect (H3 and H4). The rejection of a direct path from SQ to ITU (H3) challenges foundational assumptions that technical ease directly translates to usage. These findings are built on the concept of SQ as a hygiene factor. They emphasise that a technically sound platform is a necessary, but not sufficient, condition for adoption. E-Portfolios are relatively effortful tools compared to passive, familiar learning management systems; they demand continuous curation and reflection. Therefore, learners must clearly perceive concrete academic and career advantages if they are to commit to sustained use. This pattern diverges from previous empirical work on general learning-technology adoption, where interface novelty often drives initial use. It underlines that for effort-intensive platforms, value-added outcomes are the ultimate deciding factor. The full mediation through PEB implies a sophisticated cognitive filter. Learners first evaluate how the system enhances their future before committing to its use.

6. Conclusions and recommendations

6.1. Conclusions

This study has successfully tested the model of factors influencing the intention to use E-Portfolios among learners at VLU, based on a theoretical framework developed from prominent technology acceptance models. The findings provide profound insights into the roles of SQ and PEB in shaping learners' intentions toward these digital tools.

Specifically, the research confirms that:

Firstly, SQ exerts a strong and positive impact on learners' PEB of E-Portfolios. This emphasises that a well-designed, stable E-Portfolio application with useful features enables learners to more readily recognize the value it offers.

Secondly, PEB serves as the most powerful predictor of the Intention to Use E-Portfolios. When learners believe that the application yields practical advantages for their academic performance, personal development, and career preparation, they exhibit a higher desire and intention to use it.

Notably, SQ does not have a statistically significant direct impact on ITU. Instead, the influence of SQ on usage intention is fully transmitted through PEB. This implies that a high-quality E-portfolio system is not sufficient on its own to directly drive usage intention; it must facilitate the users' recognition of specific benefits, which in turn fosters their intention to use the tool.

These results reinforce the perspective that, in the context of educational applications, focussing on enabling users to perceive and exploit the genuine values of technology is paramount.

6.2. Recommendations and practical implications

The empirical findings of this study offer a strategic roadmap for VLU and educational developers to foster sustainable technology adoption. The following recommendations are deeply rooted in the observed relationships between system quality, perceived benefits, and usage intention.

6.2.1. Enhancing system quality as a foundation for trust

While the results indicate that SQ does not directly drive ITU, its overwhelming influence on PEB (f^2=1.328) confirms that technical excellence is the non-negotiable prerequisite for user value. VLU must prioritise the optimisation of the user interface and overall experience (SQ1). Developers should move beyond basic functionality to create a student-centric ecosystem where navigation is intuitive (SQ3), and page responses are near-instantaneous (SQ2). A lag-free environment prevents frustration that often masks the potential benefits of the tool, ensuring that learners' first interaction with the E-Portfolio is positive and professional.

Beyond performance, the university must establish a privacy-first infrastructure to address concerns regarding data security (SQ4) and user control (SQ5). Learners are more likely to perceive E-Portfolios as beneficial if they feel in total command of their digital identity. Implementing a robust "viewer control" dashboard allows learners to selectively share specific artifacts - such as projects (PEB3) or transcripts (PEB4) - with designated mentors or recruiters. This sense of agency, coupled with a guarantee of data persistence (SQ6), transforms E-Portfolios from a mere mandatory requirement into a trusted lifelong digital vault.

6.2.2. Transforming perceived benefits into actionable success scenarios

Drawing a direct line from the empirical finding that PEB fully mediates the relationship between system quality and usage intention (β=0.482), it is evident that technical training alone will fail. Consequently, the university's communication strategy must shift fundamentally from describing software features to illustrating concrete life outcomes. VLU should initiate "career-ready scenarios" where E-Portfolios are positioned as a competitive advantage in the labour market. By organising mock interview sessions where learners use their digital portfolios to showcase verified certificates (PEB5) and cover letters (PEB7), the university provides a vivid demonstration of how organised document storage directly translates into professional employability. When learners see their peers successfully securing internships through these digital showcases, the PEB becomes a tangible reality.

Furthermore, the academic integration of E-portfolios should be framed as a "learning growth scenario" to maximise the sharing and integration benefits (PEB1, PEB2). Faculty members can play a pivotal role by designing "process-based" assignments where learners are rewarded for documenting the evolution of their course projects (PEB3) and scientific research (PEB6). By making E-Portfolios a mandatory reflection space, the university helps learners recognise that these tools are not just archives, but dynamic platforms for self-improvement. This shift in perception ensures that learners utilise the system not because they have to, but because they clearly see it as an essential partner in their educational journey.

6.2.3. Strategic integration into the Van Lang University digital ecosystem

To ensure long-term sustainability, E-Portfolios must be seamlessly woven into the broader VLU digital landscape, addressing the need for system integration (PEB2). The university should develop a "single sign-on" link between the E-Portfolio and the existing learning management system (LMS). This connectivity allows for a one-click transfer of high-quality assignments from a completed course directly into the student's permanent showcase. Such technical synergy reduces the effort required to maintain the portfolio, thereby reinforcing the perception that the system is both easy to use and highly valuable for academic continuity.

Finally, the university can foster a culture of achievement by gamifying the E-Portfolio experience. By introducing digital badges or "competency certifications" that automatically appear when a student uploads a new skill certificate (PEB5) or completes a research milestone (PEB6), VLU can trigger a continuous cycle of motivation. These small but meaningful digital rewards serve as constant reminders of the tool's utility, keeping the ITU high throughout the student's four-year tenure and beyond. This comprehensive approach ensures that technical quality and perceived value work in harmony to drive effective E-Portfolio adoption.

7. Limitations and future research

Despite its contributions, this study has certain limitations that provide avenues for future research.

Firstly, the sample size of 156 respondents, while statistically sufficient for PLS-SEM, is relatively modest and limited to a single institution (VLU) within the Vietnamese higher education context. This specific setting limits the generalisability of the findings to other types of institutions or different national contexts. Future studies should aim for larger, multi-institutional samples to enhance the external validity of the model.

Secondly, as all measures were collected via self-report questionnaires, the study may be subject to common method variance (CMV) and social desirability bias. While these are inherent limitations of cross-sectional survey designs, they suggest that learners might over-report their intentions. Future research could strengthen the findings by triangulating self-reported data with objective usage logs from the E-Portfolio system or incorporating qualitative insights through in-depth interviews.

Thirdly, the research model focused strictly on SQ and PEB to evaluate early-stage deployment. Future research could incorporate broader constructs from the UTAUT2 framework [9], such as "social influence" or "facilitating conditions" to provide a more holistic understanding.

Finally, future research should move toward evaluating E-Portfolios not just as standalone tools, but as integrated components of a comprehensive national digital learning ecosystem.

APPENDICES

Table A1. Questionnaire items used in the study.

Construct	Indicator	Survey statement	Source
SQ	SQ1	The E-Portfolio has a simple, intuitive, and easy-to-understand interface.	[6]
	SQ2	The system provides fast page loading speeds and smooth responsiveness.	[6]
	SQ3	It is easy to search for information and navigate within the system.	[6]
	SQ4	The application ensures high security for personal information and documents.	[6]
	SQ5	The system allows full control over who can view specific parts of the E-Portfolios.	[6]
	SQ6	The application guarantees data persistence (no loss of documents/data).	[6]
PEB	PEB1	Flexible sharing functions (public, private, or with specific individuals) are important.	[1, 5]
	PEB2	Integration with the university's existing systems (E-Learning, Portal) is essential.	[2, 3]
	PEB3	E-Portfolios are valuable for storing course projects, assignments, and practical products.	[3, 4]
	PEB4	The system is important for managing academic results and transcripts.	[1, 3]
	PEB5	Storing certificates (languages, soft skills, IT) in E-Portfolios is highly beneficial.	[1, 4]
	PEB6	E-Portfolios are suitable platforms for scientific research and graduation theses.	[3, 4]
	PEB7	The system effectively supports the storage of CVs and cover letters for job applications.	[4, 5]
ITU	ITU	I intend to use the E-Portfolios for my future academic and professional needs.	[5, 7]

COMPETING INTERESTS

The author declares that there is no conflict of interest regarding the publication of this article.

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