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Enhancing quality assurance and accreditation readiness through a digital portfolio in higher education

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ABSTRACT

The digital portfolio system is increasingly adopted in higher education. However, empirical evidence regarding their effectiveness in enhancing usability, ensuring compliance with accreditation standards, improving audit efficiency, and supporting academic documentation management remains limited. To address these gaps, this study evaluates the users' experience and perception of the system's usability, accessibility, and effectiveness in facilitating quality documentation, audit readiness, and compliance with accreditation requirements. A mixed-methods approach was employed, involving 58 lecturers who participated voluntarily from the Faculty of Electrical Engineering, UiTM Cawangan Pulau Pinang. Data were collected using a validated questionnaire with a Cronbach's alpha of 0.873, indicating high reliability, and were complemented by system log analysis to examine usage patterns, update frequency, audit trails, and feature utilization. A *t*-test analysis comparing completion rates of course files and teaching portfolios revealed no significant difference, $t(161) = 0.92$, $p = .36$, indicating comparable effectiveness. Findings revealed that system features such as automated document compilation, completion status tracking, real-time WhatsApp notifications, and an intuitive interface contributed to improved compliance rates and reduced reliance on physical documentation. The system also offers centralized and quality-focused document management, enhancing consistency and streamlining academic documentation.

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Overall, the system received a high satisfaction rating (mean = 4.73/5), reflecting strong user acceptance. Despite being limited to a single faculty, the findings suggest strong scalability across institutions. Ultimately, the system serves as a strategic tool for enhancing audit readiness, strengthening quality assurance compliance, and supporting the digitalization of the academic quality management system in higher education.

1. INTRODUCTION

In higher education, maintaining quality assurance (QA) and preparing for accreditation are essential for institutional success. Engineering programmes are periodically audited and evaluated by national accrediting bodies such as the Malaysian Qualifications Agency (MQA) for postgraduate programmes, the Engineering Accreditation Council (EAC) for undergraduate engineering degrees, and the Engineering Technology Accreditation Council (ETAC) for diploma-level programme in engineering technology (MQA, 2021; EAC, 2024; ETAC, 2024). Because of this, the need for academic records that are efficient, well-structured, and properly documented has become increasingly important. Well-organized documentation not only supports teaching and learning (T&L) but also provides clear evidence of an institution's compliance with accreditation standards (Durmuş Şenyapar & Bayındır, 2024; Xe et al., 2019).

Traditionally, the preparation and filing of course file (CF) and teaching portfolio (TP) were carried out manually or through semi-automated processes, relying on physical storage systems and decentralized practices. This approach is often prone to redundancy, inconsistencies, and difficulties in document retrieval during audits (Mukred et al., 2021). These issues present significant challenges in sustaining accreditation standards and executing effective quality-focused management within the higher education system. As a result, many institutions have transitioned to digital platforms equipped with document management systems. These systems are designed to enhance transparency, traceability, and accountability, which are essential in supporting academic audits and external reviews (Hussein et al., 2024; Mahmud & Abdul Rahman, 2020).

In response to these challenges, a digital portfolio system was developed specifically for the Quality Unit of the Faculty of Electrical Engineering at UiTM Cawangan Pulau Pinang. The system streamlines and centralizes the management of course and teaching documentation, enabling systematic record tracking and automating key audit-related processes in alignment with accreditation requirements (Aliazas et al., 2024). It incorporates an integrated database with modules for academic staff profiles, course information, assessment tracking, submission logs, and audit trails, supporting real-time monitoring and institutional compliance with national QA frameworks.

Despite the growing adoption of digital solutions in higher education, there is limited empirical evidence of their effectiveness in supporting structured documentation, ensuring usability, and fulfilling accreditation requirements. To address this gap, the study explores lecturers' experiences and perceptions, focusing on the system's usability, accessibility, and effectiveness in supporting quality documentation practices. This paper presents the design and implementation of a digital portfolio system tailored to the needs of faculty and specific requirements of the engineering programme. Furthermore, the study evaluates

how the system assists academic staff in managing documentation, ensuring compliance with national accreditation standards, and enhancing audit readiness for academic reviews.

This study is significant as it provides practical insights into how the system supports academic staff in managing documentation practices, strengthening audit readiness, and enhancing compliance with the national QA framework. The findings provide valuable guidance for higher education institutions (HEIs) aiming to modernize their quality management system (QMS) by adopting evidence-based digital solutions.

2. METHODOLOGY

2.1 Research Design and Instruments

This study adopted a mixed-methods approach, integrating system-generated data with both qualitative and quantitative methods to evaluate the academic staff's satisfaction, perceived effectiveness, and actual usage of the system. For the qualitative component, data on users' perceptions and experiences were collected through a structured survey designed to capture feedback. Quantitative data were derived from system-generated logs, which recorded actual user interactions with the system. These logs provided detailed understandings into usage patterns such as frequency of access, specific features utilized, percentage of completion, and other relevant indicators. This integrative approach enabled a comprehensive evaluation by strengthening the validity of findings through triangulation, which involved merging subjective users' perception with objective usage data.

A. System Log Reports

The system automatically generated reports to track user engagement, including login frequency, document uploads, completion rates, access history, and internal audit logs. The system administrator had full access to these data for extraction and analysis. These records provided valuable insights into system performance, supported reporting and decision-making for QMS at the faculty level.

B. Structured Survey Questionnaire

A structured questionnaire was developed to assess user experience and system usability. This instrument used a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), along with a few open-ended questions to gather additional feedback. The questionnaire is organised into six sections, as shown in Table 1, each focusing on a specific aspect of the study.

Table 1. Structure of the Questionnaire

Section	Focus Area
A	User Experience and System
B	Professional Growth and Reflection
C	Compliance, Audit, and Career Relevance
D	Challenges and Support Needs
E	Effectiveness and Impact
F	Feedback and Enhancement Suggestions

To ensure the content relevance and accuracy, the instrument was reviewed by three senior lecturers to confirm that each item aligned with the study's objectives. A pilot test was conducted with a small group

of ten participants to observe the clarity and the overall reliability of the questionnaire. It is subsequently analysed using Cronbach's Alpha Test, a statistical measure that assesses internal consistency.

2.2 System Design and Features

2.2.1 System Overview

The digital portfolio system was developed in 2023 using the Google Sites platform to meet the specific documentation and accreditation requirements of four academic programmes within the faculty. This innovative system is designed to assist academic staff in systematically organizing, updating, documenting, and archiving evidence of T&L to support QA implementation and institutional reporting requirements. It replaces the previous method of portfolio system, which was tedious, reliant on intranet connectivity, and involved repetitive document uploads. The interface of the system was designed to be user-friendly and accessible via institutional Google accounts, indicating that system access was restricted to authorized users only, ensuring data privacy and the security of confidential academic documentation.

The core functions of the system were designed to address key academic and administrative needs, enhance academic efficiency, and support institutional compliance; these features are summarized in Table 2.

Table 2. Functional Architecture and Key Features of the Digital Portfolio System

Functional Module	Technical Features
Document Management	Enables users to upload, organize, and categorize various type of documents systematically. It supports the comprehensive management of course-related information, including syllabus, teaching materials, a variety of assessments, student work samples, examination results, and student feedback. This structured approach ensures that all documentation is orderly, well-maintained, and easily accessible.
Access Control and User Roles	User access levels are structured according to designated roles, each with specific permissions. Academic staff and resource persons have responsibilities tasked with creating and maintaining course-related documentation. Administrators are granted wider access to oversee and manage both documents and the overall system. Auditors, on the other hand, are provided with view-only access to review documents for compliance and audit purposes. This role-based access ensures that users can perform their tasks efficiently while maintaining data integrity, accuracy, and control.
Submission Tracker	Each submission within the system is automatically time-stamped, allowing users to monitor their submission status in real time, while administrators can assess the timeliness and completeness of the uploaded documents. This feature serves as a critical component in ensuring adherence to deadlines and maintaining a high level of accountability throughout the documentation process.
Automated System Activity Logs	User interactions such as log-in activities, document uploads, and content updates were automatically recorded through an integrated logging feature. These interaction logs provided valuable information for assessing user engagement and identifying usage patterns. The detailed instrumental data served as a critical basis for analyzing user behavioural trends and guiding system improvement.
Internal Audit Support Tools	An integrated structure was developed to facilitate the internal audit process, allowing programme coordinators and internal auditors to review documentation more efficiently. This structured workflow creates a closed-loop system that ensures all uploaded documents, including CFs and TPs, are compliant with academic audit requirements and institutional QA standards. In addition, an automated Internal Audit log is provided to systematically track audit activities.

The home page of the digital portfolio system, as depicted in Fig. 1, presents an overview of all semesters from the date the system was developed up to the most current semester. This user-friendly interface is designed specifically to select a particular semester to upload or view relevant documents. The system operates on a semester-based format, making it important for academic staff to upload in the context of the most recent semester, as the previous semesters have already been fully completed and audited. Another key feature of this system is the ability to access CFs and TPs of earlier semesters, allowing staff to refer to past materials and insights. All components in the system are systematically organized to align with internal quality standards and accreditation requirements.



Fig. 1. Main page of the digital portfolio system

Source: https://sites.google.com/uitm.edu.my/unitkualitippkeuitmcpp/home

Fig. 2 shows the user interface for the March-August 2024 semester, including the submission status of a designated course under the CF category and the selected academic staff under the TP category. The dashboard lists all items related to the course, specific links to upload documents, and percentages of completion for both individual and shared components. Additionally, there are navigation menu tabs located in the top right corner of the interface, including options such as Admin, Auditor, Settings, and others, enabling easy access for academic staff members, auditors, and accreditation panels to manage data input, select roles, and assess documents.



Fig. 2. Sample of user interface (top) Course File (bottom) Teaching Portfolio

Source: https://sites.google.com/uitm.edu.my/unitkualitippkeuitmcpp/home

2.2.2 WhatsApp Notification Feature

A real-time notification system has been integrated into the digital portfolio system to promote timely compliance and facilitate continuous management among academic staff members. As demonstrated in Fig. 3, this notification is generated automatically and disseminated through the WhatsApp application, providing staff with updates on the percentage of completion for their CFs and TPs for the current semester. Notifications will be sent to academic staff until 100% completion is achieved, as part of an administrative initiative to ensure that all T&L-related documents are fully and timely submitted.

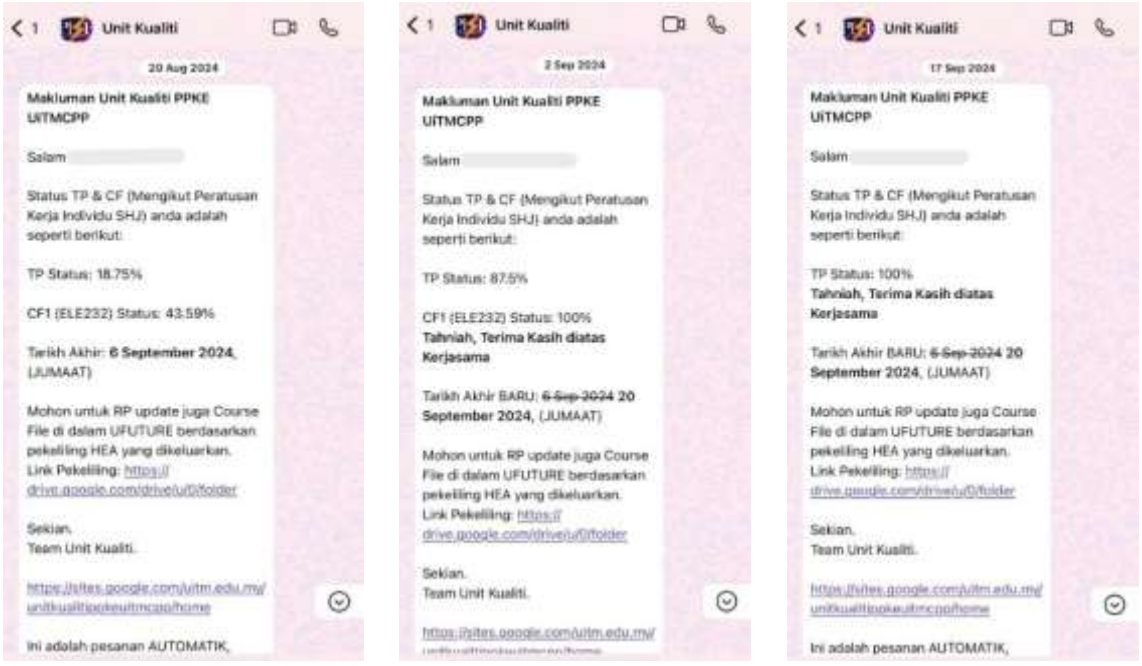


Fig. 3. Sample of real-time WhatsApp notification generated by the digital portfolio system (left) Both teaching portfolio and course file were not completed (centre) only course file has been completed (right) Both teaching portfolio and course file were completed

2.3 Data Collection

The questionnaire participants were academic staff from the Faculty of Electrical Engineering, Universiti Teknologi MARA Cawangan Pulau Pinang, who actively used the digital portfolio system to prepare CFs and TPs during the March to August 2024 semester (20242). The system recorded 94 CFs across diploma, bachelor's, and master's courses and 85 TPs reflecting individual teaching practices.

A total of 81 academic staff were eligible to participate in the questionnaire, of whom 58 voluntarily responded, yielding a response rate of 71.6%. Participation was anonymous to ensure data integrity. The participants were informed about the study's purpose and confidentiality prior to data collection. The questionnaire was distributed via Google Forms through WhatsApp and collected over a two-week period. In addition to the questionnaire, system-generated activity logs were analysed. Automatically captured over six-month period, these logs provide time-stamped records of user actions, enabling objective analysis of usage patterns and system compliance without manual intervention.

2.4 Statistical Data Analysis

The study employed statistical analysis of quantitative data to evaluate the reliability of the research instrument and to compare the completion rates of the two main components in the system: CFs and TPs. Cronbach's alpha test was conducted to assess the internal consistency of the questionnaire items, while a two-sample *t*-test was used to examine differences in completion rates between CFs and TPs at a significance level of $p < 0.05$.

3. RESULT AND DISCUSSION

3.1 System Log Analysis

System logs provided empirical evidence of system usage, user engagement, and consistency in maintaining digital academic portfolios, specifically the TPs and CFs.

3.1.1 Portfolio Update Frequency

A summary of system usage activity related to the updating of academic digital portfolios, as presented in Table 3. A total of 4,233 updates were recorded throughout the six-month monitoring period, representing all logged interactions where academic staff uploaded or updated content in the system. This translates to an average of approximately 705.5 updates per month, indicating consistent system usage and sustained engagement. The pattern suggests meaningful individual involvement in managing and organizing T&L documentation, while also reflecting a manageable workload aligned with regular academic tasks.

With 85 academic staff actively engaged, this corresponds to an average of approximately 8.29 updates per academic staff per month. This further indicates consistent individual involvement in managing and organizing T&L documentation and confirm that the system usage remained balanced and sustainable within normal academic workloads. These figures indicate that the digital portfolio system has been integrated into the academic staff's routine workflow. The level of activity also suggests increased awareness of the importance of institutional compliance with structured documentation requirements, particularly outlined by MQA, EAC, and ETAC standards.

Table 3. Summary of Portfolio Updates

Monitoring Metric	Value Recorded
Total Updates	4,233
Total Duration (Months)	6
Average Updates per Month	705.5
Total Number of Academic Staff	85
Average Update by Academic Staff per Month	8.29

3.1.2 Audit and Monitoring Logs

Table 4 provides a summary of course distribution across four academic programmes and three different programme levels. It highlights both the total number of courses available, and the specific courses actively offered during the monitoring period, offering a clear snapshot of curriculum development within the faculty. At the Diploma level (EE111/EE112), 33 courses were registered, of which 25 were offered during the current monitoring cycle, representing an offering rate of approximately 75.8%. Meanwhile, at the bachelor's level, the data is separated into two programmes. For EE200, there are 47 courses were registered, with 41 courses offered, indicating an offering rate of 87.2%. In contrast, EE211 showed full course utilization, with all 21 courses offered during the period. Similarly, for the master's programme (EE770), all 7 courses listed were offered, reflecting a 100% course deployment rate at the postgraduate level. The course offerings were determined based on student enrolment demands.

Table 4. Summary of Courses by Programme Level

Programme Level	Programme Code	Total Course	Total Course Offered
Diploma	EE111/EE112	33	25
Bachelor's degree	EE200	47	41
	EE211	21	21
Master's degree	EE770	7	7
Total		108	94

Considering the total of 94 courses offered across all programmes, manual monitoring becomes increasingly impractical and inefficient. The system logs provide a comprehensive overview of curriculum implementation. This digital approach not only streamlines the verification process but also enhances transparency and operational efficiency. Moreover, it reinforces the role of administrators and the QA unit in coordinating curriculum implementation in a systematic, consistent, and effective manner.

An internal audit feature was integrated to enhance system functionality. Table 5 summaries the audit activities recorded in the system. Over 21 audit days, 3,923 audit log entries were captured, reflecting active engagement and structured utilisation by the QA team. This demonstrates the system's capability to support transparent and accountable audit processes.

Table 5. Summary of Internal Audit Log Activities

Audit Metric	Value
Total Audit Record Count	3,923
Total Audit Days	21
Number of Auditors Involved	25
Average Audit Records per Auditor	157

Note. The average audit records per auditor were calculated over a 21-day audit period

During this period, 25 internal auditors were involved, reflecting a distributed and collaborative approach to portfolio monitoring. Their participation indicates a well-structured internal auditing system. It also serves as strong evidence of the system's effectiveness in ensuring quality checks across various programmes within the faculty (Manueke & Manopo, 2019). The 3,923 audit log entries correspond to an average of approximately 187 entries per day, or about 157 actions per auditor. These actions include reviewing and verifying teaching and course materials, providing feedback, and updating portfolio verification status. The frequency and distribution of log entries reflect active system engagement. Moreover, the platform facilitates structured, traceable, and audit-ready documentation workflows. The relatively short audit period, combined with high interaction volumes, further demonstrates the system's efficiency in supporting time-sensitive academic reviews (Kanematsu et al., 2024b).

The internal audit system serves as a critical mechanism for maintaining the effectiveness of quality assessments by monitoring educational standards and identifying areas for improvement across the institution and its departments (Simkin, Mozhaeva, & Proskurin, 2019). When integrated with an internal audit system to a digital file management system, the audit process becomes significantly more efficient, particularly in managing documentation and monitoring compliance (Kanematsu et al., 2024a). Embedding internal audit features within the system enables real-time monitoring and strengthens the overall QMS (Manueke & Manopo, 2019). Additionally, internal audits or self-evaluations promote a culture of continuous improvement (Rais et al., 2021) and raise awareness of assessment quality. Consequently, this

approach ensures that the QMS remains aligned with accreditation requirements set by MQA, EAC, and ETAC, especially in supporting evidence-based teaching and outcomes-based practices (Odeh & Odeh, 2019b; Rais et al., 2021).

3.1.3 Submission Compliance

Table 6 presents the completion status of two key components within the digital portfolio system: CFs and TPs. The records are categorised according to three completion levels: 0%, partial completion (1 – 99%), and full completion (100%). These categories provide an overview of the extent to which the required academic documentation was submitted through the system. These components are important for academic documentation, accreditation audits, and supporting reflective teaching practices.

The CF group consisted of 94 courses, while the TP group comprised 85 active academic staff members. The system tracked all updates made, indicating that a majority of users successfully completed their required documentation. Specifically, 64 CFs were fully completed, although 4 were recorded with 0% completion. For TPs, 52 submissions achieved 100% completion, reflecting full compliance with the structured documentation requirements, while 17 portfolios remained incomplete with 0% progress.

Table 6. Completion Status of Course Files and Teaching Portfolio

Completion Category	Course Files (*n*=94)	Teaching Portfolios (*n*=85)
0%	4 (4.26%)	17 (20.0%)
1 – 99%	26 (27.66%)	16 (18.8%)
100%	64 (68.08%)	52 (61.2%)
Total	94 (100%)	85 (100%)

These completion percentages reflect strong adherence to structured academic documentation practices, reinforcing audit readiness and alignment with MQA, EAC, and ETAC standards. The consistently high compliance rates may also indicate a strong degree of intrinsic staff motivation among staff, which fosters greater engagement, commitment, and acceptance of the digital portfolio system. Leadership plays a crucial role in supporting this process. Leaders possess the authority and capacity to implement institutional policies and inspire collaboration, which is an essential component in any effective QMS. According to Etomes et al. (2024), transformational leadership enhances staff motivation by promoting engagement, innovation, and a shared commitment to institutional goals.

Despite the small number of incomplete submissions, these gaps highlight the importance of committed leadership and proactive support mechanisms (Atabik et al., 2024) to ensure full participation among all academic staff. The data collected may also serve as a potential key performance indicator (KPI) for institutional management in fostering accountability and strengthening QA practices. This, in turn, helps to reinforce compliance with the requirements of engineering programme accreditation.

In summary, higher completion rates demonstrate the effectiveness of the digital portfolio system in facilitating structured academic documentation and file management (Kanematsu et al., 2024a). This structured approach significantly contributes to institutional readiness for accreditation and continuous quality improvement (CQI) (Odeh & Odeh, 2019a, 2019b; Rais et al., 2021). The study also analysed the completion rates at the programme level, in alignment with accreditation requirements set by MQA, EAC, and ETAC. Table 7 presents the mean completion rates of CFs across different academic programmes within the faculty.

Table 7. Summary of Courses by Programme Level

Programme Code	Number of CFs (*n*)	Mean Completion (%)	100% Completion	1 – 99% Completion	0% Completion
EE111/EE112	25	95.48	20 (80.0%)	5 (20.0%)	0 (0%)
EE200	41	83.98	25 (61.0%)	13 (31.7%)	3 (7.3%)
EE211	21	87.54	16 (76.2%)	4 (19.0%)	1 (4.8%)
EE770	7	92.40	3 (42.9%)	4 (57.1%)	0 (0%)
Overall	94	88.46	64 (68.1%)	26 (27.7%)	4 (4.3%)

The diploma-level programmes (EE111/EE112) recorded the highest mean completion rate at 95.48%, reflecting strong adherence to structured documentation practices and consistent staff compliance. This indicates that the digital portfolio system was effectively implemented for these programmes, with most required documentation being completed during the study period.

The master's level programme (EE770) showed a mean completion rate at 92.4%, which was also relatively high. The slightly lower rate compared with the diploma-level programmes may reflect differences in programme structure, teaching-team size, or portfolio requirements. However, these factors cannot be confirmed based solely on the completion-rate data.

At the bachelor's degree level, the EE211 programme achieved a mean completion rate of 87.54%, while EE200 followed with a slightly lower rate of 83.98%. These figures indicate variation in Course File completion across the undergraduate programmes and may warrant further examination of programme-specific factors affecting documentation completion.

These completion rates serve as indicators of programme-level compliance with accreditation standards, particularly in relation to academic documentation, T&L QA, and the implementation of Outcome-Based Education (OBE) practices. While all programmes demonstrated generally strong levels of participation, the observed variations in completion rates highlight the need for targeted support, policy reinforcement, or other initiatives in specific areas to ensure consistent alignment with accreditation requirements.

Overall, the data highlights the significance of a digital portfolio system as a transparent and structured monitoring tool (Rais et al., 2021). It reinforces its strategic role in academic governance by enabling continuous monitoring, supporting the effectiveness of QA efforts, and streamlining documentation and reporting processes (Kanematsu et al., 2024b; Odeh & Odeh, 2019b).

3.1.4 Most Frequently Accessed Features

This section presents the results on system usage, focusing on the most frequently accessed features. Table 8 shows user engagement with core features and their usage frequency. The most frequently used feature was Upload File Assessment with 2,432 records (51.73%), indicating that assessment documentation is the main activity among academic staff and aligns with OBE and accreditation requirements (MQA, EAC, and ETAC). This was followed by Upload File CF (29.84%) and Upload File TP (11.32%), which relate to teaching materials and instructional documentation. Together, these three features account for over 92.89% of system usage, showing that the platform is mainly used to store teaching and assessment evidence.

Less frequently used features included Rawscore (3.11%) and LE15 (3.04%). Other functions such as status changes, team lecturer updates, sharing controls, and moderation activities were used less often but still support QA and collaborative processes within the system. In conclusion, the data demonstrated that the quality-focused digital management system effectively supports academic workflows while ensuring compliance with quality standards and promoting CQI (Odeh & Odeh, 2019a; Rais et al., 2021).

Table 8. Frequently Accessed Features in Digital Portfolio System

System Feature	Record Count	Percentage (%)
Upload File Assessment	2432	51.73
Upload File CF	1403	29.84
Upload File TP	532	11.32
Upload File Assessment Rawscore	146	3.11
Upload File Assessment LE15	143	3.04
Vetting Status Change	7	0.15
Assessment Number Change	11	0.23
JSU Status Change	8	0.17
Team Lecturer Involvement Change	6	0.13
Sharing Status Change	12	0.26

3.2 Qualitative Result

The analysis yielded a Cronbach's alpha value of 0.873, indicating high reliability of the structured questionnaire. Participants were also invited to provide suggestions for enhancing the digital portfolio system. A total of 58 respondents provided open-ended comments, which were categorized into six key themes as presented in Table 9. These themes reflect users' experiences with the digital portfolio system.

Collectively, the findings indicate a generally positive response, with comprehensive constructive suggestions highlighting areas for further improvement and development. From the responses, many participants express overall satisfaction with the current digital portfolio system, offering praise as it is, without any changes. However, there are specific areas that were identified for enhancement. Respondents have requested a more intuitive interface to simplify navigation and accessibility, particularly with a suggestion to optimize the layout design. This feedback implies that while the system serves its intended purpose and the staff are satisfied with the usability, a few users may encounter difficulties with its structure or layout, particularly concerning the process of uploading a large volume of files.

Table 9. Summary of the Open-Ended Comments on Enhancing the Digital Portfolio System

Key Idea	Description	Sample Quote
System Usability and Interface	Focused on the feedback on the overall user experience and the system interface design.	"Drag and drop files."
		"Allow users to select a different semester directly without returning to home page."
Document Management and Storage	Focused on the organization, accessibility, and security of documents within the system.	"Improve the limit size of the upload document."
		"Reduce the number of samples needed."
Integration and Automation		"Linking general documents provided by the faculty, such as appointment letters, automatically."

	Focused on the need for integration with other digital tools to streamline workflows.	"Implementing cloud scalability to handle increased traffic and demand"
User Guidance and Support	Focused on the necessity of support resources and guidance to assist users in utilizing the system effectively.	"Proper guidelines and remove redundancy."
		"Providing clearer guidelines and examples for users"
Reminders and Notifications	Focused on the enhancement of reminder and notification features to keep users informed and alert about deadlines and activities.	"Notification messages periodically throughout the semester, not only at the end."
		"By periodically updating the document"
Positive Feedback	Focused on the users' appreciation for current features and functions.	"Already a great system."
		"So far, everything works perfectly fine."

Furthermore, although the system is well-accessible through laptops and desktops, it is recommended to extend access to mobile devices to support user convenience. Another important feedback relates to the uploaded size restrictions. Some staff members are already utilizing multimedia teaching notes to support current teaching technologies. Increasing the maximum file size could accommodate larger documents and improve the system's accessibility.

Finally, the effectiveness of the system was also examined through the questionnaire. While the system effectively stores and organizes T&L records, it relies entirely on academic staff to upload the documents and meet deadlines. The recommendation for frequent reminders highlights the need for a mechanism to encourage regular updates throughout the semester. With other competing obligations, academic staff may occasionally overlook their responsibilities; therefore, reminders or push notifications could assist them in monitoring their completion status. Prior studies have shown that push notifications improve engagement and reduce procrastination in digital education platforms (Wu, 2022), suggesting similar benefits could be extended to academic staff in fulfilling compliance requirements. Implementing this feature can promote consistent engagement, ensure timely updates, and improve audit preparedness. Ultimately this would enhance user experience, usability, and the overall effectiveness of the digital portfolio system.

3.3 Quantitative Result

A two-sample *t*-test, assuming unequal variances, was conducted to compare the performance between the completion rates of CFs and TPs. The mean completion rate was 88.459% for CFs and 84.260% for TPs indicate a generally high level of submission compliance within the digital portfolio system. Although CFs had a higher mean completion rate than TPs, there was no significant difference in the mean performance between the two groups, $t(161) = 0.92$, $p = .36$, as shown in Table 10, suggesting comparable performance levels.

Table 10. Frequently Accessed Features in Digital Portfolio System

	CF	**TP**
Mean	88.459	84.260
Variance	712.960	1110.268
Observations	94	85
Hypothesized Mean Difference	0	
df	161	
t Stat	0.924	

p (T<=t) one-tail	0.178
t Critical one-tail	1.654
p (T<=t) two-tail	0.357
t Critical two-tail	1.975

A possible explanation for the similar performance between the CF and TP groups is the staff's awareness of the importance of documentation in fulfilling accreditation requirements. A clear understanding of quality assessment and its link to accreditation outcomes enhanced motivation and fostered a stronger sense of responsibility (Iqbal et al., 2023). Additionally, digitalization improved accessibility and convenience, thereby increasing staff engagement (Kanematsu et al., 2024b; Rais et al., 2021) and reinforcing a culture of quality within the institution. This increased sense of accountability likely contributed to consistent and diligent efforts across both groups.

In addition to the user awareness factor, the well-designed system also contributed to similar completion rates. The platform offered a user-friendly and consistent interface, streamlined workflows, and automated progress tracking with push notifications. Its efficient and reliable performance reduced the administrative burden associated with documentation tasks, thereby improving usability and sustaining staff engagement. These features facilitated consistent task completion across both CF and TP groups, regardless of task category.

Complementing the quantitative results, the questionnaire identified challenges faced by staff in completing CF and TP documentation. The most common issue was workload management (41/58 = 70.7%), followed by time constraints (33/58 = 56.9%). Only two participants reported technical difficulties, suggesting that the main challenges were related to workload and user practices rather than technical issues. Table 11 summarises the challenges.

Table 11. Challenges in Using Digital Portfolio System

Challenges	Frequency	Percentage (%)
Workload management	41	70.7
Time-consuming	33	56.9
Keeping regular updates	22	37.9
Motivation and commitment	17	29.3
Procrastination / Poor time management	14	24.1
Data organization	14	24.1
Technical difficulties	2	3.4

Participants also evaluated the digital portfolio system’s usability and effectiveness using a 5-star rating scale. The results show high user satisfaction, with most respondents giving 5 stars. The system achieved a mean score of 4.73 (SD = 0.43), indicating consistently positive feedback. In total, 44 participants gave 5 stars and 14 gave 4 stars, with no ratings below 4. These findings indicate strong user acceptance and the effectiveness of the system in supporting documentation processes across the faculty.

4. CONCLUSION

The development and implementation of a centralized digital portfolio system tailored to the needs of engineering programmes marks a significant advancement in addressing the growing demands for structured documentation and accreditation compliance in higher education. This study explored academic staff experiences and perceptions, and findings demonstrated that the system significantly enhanced documentation practices through improved usability, accessibility, and audit readiness.

The system's well-structured and user-centred design contributed to consistently high completion rates across both CF and TP documentation aligned with national and professional accreditation standards, including MQA, EAC, and ETAC. Furthermore, positive feedback from staff, evidenced by the overwhelmingly high satisfaction ratings, confirmed the system's value as a practical and efficient tool that supports CQI and fosters a culture of compliance.

Overall, the findings underscore the value of integrating digital tools into quality assurance practices to enhance work efficiency, ensure audit readiness, and strengthen institutional accountability. Ultimately, the adoption of an integrated digital portfolio system presents a strategic and sustainable move for HEIs committed to excellence, accountability, and compliance in academic governance.

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6. CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial and financial conflicts. There is no conflict of interest associated to this publication.

7. AUTHORS' CONTRIBUTIONS

Norsabrina Sihab: Conceptualisation, research design, formal analysis, writing original draft and supervision. **Adi Izhar Che Ani**: Data collection, data curation, and technical support. **Asmalia Zanal**: Data validation, writing-review and editing. All authors contributed to the discussion, reviewed the final version, and approved the manuscript for submission.

8. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

During the preparation of this work, the authors used ChatGPT solely for grammar checking and language refinement. Following the use of this tool, the authors reviewed and edited the content as necessary and take full responsibility for the content of the publication.

9. DATA AVAILABILITY/SUPPLEMENTARY MATERIALS

The digital portfolio system and supporting documentation developed during the study are hosted at https://sites.google.com/uitm.edu.my/unitkualitippkeuitmcpp/home. Additional datasets or administrative evaluation metrics used during the current study are available from the corresponding author upon reasonable request.

10. ETHICS STATEMENT

This study involved institutional staff through a voluntary and anonymous questionnaire. Participation was voluntary, and informed consent was obtained from all participants prior to participation. No personally identifiable information was collected, and all responses were treated confidentially and reported in aggregate form.

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