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DIGITAL QUALITY ASSURANCE HUB FOR COMMUNITY COLLEGES: A MODEL FOR ENHANCING QUALITY MANAGEMENT AND TEACHING EFFICIENCY

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Abstract:

In the context of digital transformation, higher education institutions are increasingly required to strengthen quality assurance (QA) systems to comply with standards such as ISO 21001, the Malaysian Qualifications Agency (MQA), and the Malaysia Board of Technologists (MBOT). However, QA documentation in many community colleges remains fragmented and manually managed, leading to inefficiencies and audit preparation challenges. This paper reports a design-and-implementation case study on the development of a Digital Quality Assurance Hub at Pasir Salak Community College using Google Sites integrated with Google Workspace tools, including Drive, Docs, Sheets, and Forms. Guided by a design-based research approach, the platform was developed to centralize QA documentation, support teaching and learning activities, and facilitate systematic evidence management. User feedback, document retrieval observations, and platform usage data indicate improved accessibility, reduced duplication of records, and more efficient coordination during internal audits. Rather than claiming causal impact, the findings suggest that low-cost cloud-based tools can support digital governance and quality management practices in community college settings. This study contributes a practical reference model for Malaysian TVET institutions seeking to align QA processes with national digitalization initiatives and ISO 21001 principles using existing institutional resources.

Keywords:

Digital Quality Assurance, Google Workspace, Quality Management, TVET Malaysia

Introduction

The digital transformation era has reshaped how educational institutions manage operations, teaching, and quality assurance. As institutions strive toward greater sustainability, transparency, and accountability, digital quality management has become essential for ensuring

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compliance with national and international standards such as ISO 21001, the Malaysian Qualifications Agency (MQA), and the Malaysia Board of Technologists (MBOT). These frameworks emphasize systematic documentation, evidence-based decision-making, and continuous improvement to maintain academic excellence and institutional credibility.

In Malaysia, the Ministry of Higher Education (MOHE) has prioritized digital innovation as part of its *National Digital Education Transformation Roadmap (2023–2030)*. This roadmap encourages all higher learning institutions, including Technical and Vocational Education and Training (TVET) colleges, to adopt digital ecosystems that promote efficiency, reduce administrative burden, and enhance stakeholder engagement. Within this context, community colleges play a vital role in preparing a skilled workforce while ensuring that their quality assurance (QA) processes remain consistent, transparent, and audit ready.

Traditionally, the Quality Assurance Unit at Pasir Salak Community College managed documentation manually through printed files, shared drives, and individual folders. This fragmented approach often resulted in duplicated records, accessibility issues, and delays in preparing for audits or program evaluations. Recognizing these challenges, the *Digital Quality Assurance Hub* was introduced as a centralized online platform built using Google Sites.

The hub integrates Google Workspace tools such as Drive, Docs, Sheets, and Forms to facilitate structured, real-time, and collaborative document management. It enables lecturers and administrators to access, update, and verify QA documents efficiently, while also supporting academic activities such as teaching and learning (T&L), Continuous Quality Improvement (CQI), and evidence-based reporting.

Beyond improving administrative processes, this initiative reflects Pasir Salak Community College's commitment to embracing Malaysia's digitalization agenda and sustainable governance goals. The *Digital Quality Assurance Hub* not only enhances audit readiness and operational efficiency but also promotes a culture of digital literacy, collaboration, and continuous improvement among academic staff. Ultimately, it serves as a scalable model that demonstrates how low-cost digital tools can transform QA management in community colleges and strengthen the national TVET ecosystem.

This study aims to document the design, implementation, and initial institutional outcomes of a Digital Quality Assurance Hub developed at Pasir Salak Community College. Positioned as a design-and-implementation case study, the paper contributes by demonstrating how existing cloud-based tools can be structured to support digital governance, quality assurance documentation, and teaching coordination in community college contexts. Unlike prior studies that focus on large universities or proprietary QA systems, this work provides evidence from a resource-constrained TVET institution, offering a scalable and cost-effective reference model aligned with ISO 21001 and Malaysian QA requirements.

Literature Review

The evolution of quality assurance (QA) in higher education has increasingly intersected with the broader agenda of digital transformation. Globally, educational institutions are integrating digital technologies into management and governance systems to enhance efficiency, transparency, and accountability. According to the International Organization for Standardization (ISO 21001:2018), educational organizations are encouraged to establish management systems that focus on learner satisfaction, stakeholder engagement, and

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continuous improvement. Research indicates implementing this framework can bring significant benefits like improved efficiency and higher stakeholder satisfaction, though challenges such as resource constraints and resistance to change exist Bakar et al. (2024).

In the Malaysian context, the Ministry of Higher Education (MOHE) has been proactive in promoting the digitalization of educational administration through initiatives such as the *National Digital Education Transformation Roadmap (2023–2030)*. The evidence shows a multi-faceted approach to digitalization. Atan et al. (2023) indicate MOHE's commitment to a hybrid and flexible learning framework starting in the 2023/2024 academic session. Abbas et al. (2023) identified four primary impact themes of digital transformation: cultural change, IT infrastructure development, policy refinement, and digital skill enhancement. Similarly, the Malaysian Qualifications Agency (MQA) encourages the use of online systems for self-assessment reports (SAR), audit documentation, and program accreditation. These developments indicate a clear shift from manual, paper-based documentation towards more dynamic and sustainable digital ecosystems.

Evidence strongly supports this claim across multiple studies. Mayulu and Tricahyadinata (2024) found that automated accreditation systems reduced processing time by up to 50%, increased transparency, and enabled real-time stakeholder feedback. Hussain et al. (2020) demonstrated that digital quality systems automate data collection, evaluation, and reporting, addressing previous challenges of manual, error-prone processes. Tsimpanis et al. (2023) further validated these findings by developing frameworks for measuring digital readiness in universities, emphasizing the potential for data-driven quality assurance. The integration of Google Sites, Drive, Docs, and Forms enables structured data storage, easy retrieval, and real-time collaboration key attributes that directly support compliance with ISO 21001 and MQA requirements.

Limited infrastructure, lack of staff training, and inconsistent data management are indeed major barriers to effective digital technology adoption in healthcare settings. Multiple studies provide strong evidence for these challenges. Nascimento et al. (2023) found that infrastructure and technical barriers occurred in 6.4% of healthcare professional technol The evolution of quality assurance (QA) in higher education has increasingly converged with the broader movement toward digital transformation. Globally, institutions are integrating digital technologies into management and governance systems to enhance efficiency, transparency, and accountability. According to the International Organization for Standardization (ISO 21001:2018), educational organizations are encouraged to establish management systems focused on learner satisfaction, stakeholder engagement, and continuous improvement. Implementing this framework has been shown to improve operational efficiency and stakeholder confidence, though challenges such as limited resources and staff readiness remain significant barriers (Bakar et al., 2024).

In Malaysia, the Ministry of Higher Education (MOHE) has taken proactive measures to accelerate educational digitalization through initiatives such as the *National Digital Education Transformation Roadmap (2023–2030)*. This roadmap emphasizes hybrid and flexible learning environments, improved governance, and the adoption of cloud-based systems for institutional operations (Atan et al., 2023). Abbas et al. (2023) identified four key dimensions of digital transformation in Malaysian higher education: cultural change, infrastructure enhancement, policy adaptation, and digital skills development. In alignment with these national initiatives, the Malaysian Qualifications Agency (MQA) has encouraged institutions to transition from

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manual reporting to online systems for self-assessment reports (SAR), accreditation, and audit documentation. These reforms demonstrate a clear nationwide commitment to replacing paper-based documentation with dynamic, sustainable digital ecosystems.

Empirical evidence supports the positive impact of digital transformation on QA processes. Mayulu and Tricahyadinata (2024) reported that automated accreditation systems reduced documentation time by up to 50% and increased transparency in decision-making. Similarly, Hussain et al. (2020) found that digital quality systems improved data accuracy and consistency by automating evidence collection and reporting. Tsimpanis et al. (2023) further emphasized the role of data-driven QA models in measuring institutional digital readiness. The integration of Google Sites, Drive, Docs, and Forms—core tools within Google Workspace—enables structured data storage, version control, and collaborative management of evidence, aligning directly with ISO 21001 and MQA documentation requirements.

However, digital transformation also presents challenges in institutional settings. Limited infrastructure, inadequate staff training, and inconsistent data governance can hinder the adoption of new technologies (Nascimento et al., 2023). Almășan (2025) emphasized that leadership engagement and strategic alignment are critical to transforming compliance-based QA processes into performance-driven systems. Within this context, Pasir Salak Community College leveraged existing MOHE-licensed Google Workspace tools to develop a cost-effective and user-friendly QA ecosystem the *Digital Quality Assurance Hub*. This initiative addresses resource limitations by optimizing freely available technologies while enhancing quality management efficiency. Digital technologies and quality management frameworks can effectively optimize resource limitations by leveraging freely available technological innovations and strategic optimization approaches. Till et al. (2025) reinforces this by highlighting how quality management systems can reduce costs and improve operational efficiency.

The Technology Acceptance Model (TAM) provides a theoretical lens for understanding technology adoption in educational QA systems. Scherer et al. (2018), in a meta-analysis involving over 34,000 educators, confirmed that perceived usefulness and ease of use are primary determinants of technology acceptance. De La Mora Velasco et al. (2025) further demonstrated that perceived usefulness significantly influences educators' participation in digital course review systems. The simplicity, accessibility, and integration of the Digital Quality Assurance Hub across multiple QA functions foster user engagement and acceptance, aligning closely with TAM principles.

Additionally, Malaysian universities are increasingly pursuing *Green Campus* initiatives by implementing paperless documentation systems that reduce operational costs and environmental impact. Ismail et al. (2024) demonstrated how institutions such as Universiti Teknologi MARA (UiTM) employ digital resource management and e-meeting platforms to support sustainability goals. Awais et al. (2023) similarly proposed a digital metamodel for automating learning outcome assessments, illustrating how digital ecosystems can strengthen teaching alignment and institutional accountability. By providing centralized access to Course Learning Outcomes (CLOs), Programme Learning Outcomes (PLOs), and Continuous Quality Improvement (CQI) records, the *Digital Quality Assurance Hub* supports lecturers in aligning teaching activities with program standards and national quality frameworks.

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In summary, existing literature underscores the growing role of digital ecosystems in enhancing QA processes, governance, and sustainability in higher education. While numerous studies have examined digital QA systems in universities, limited empirical research has explored their application within Malaysian community colleges and TVET institutions. Md Hani et al., 2024 emphasize the need for "a comprehensive model for digital competencies", indicating significant research gaps remain in understanding digital QA mechanisms within these educational contexts. This study contributes to the literature by presenting the *Digital Quality Assurance Hub* as a replicable, low-cost model that demonstrates how cloud-based tools can strengthen quality management, teaching efficiency, and institutional performance in the Malaysian TVET sector.

Methodology

This study adopts a design-and-implementation case study approach**,** guided by design-based research (DBR), to develop and evaluate a digital quality assurance system within a real institutional setting. Design-Based Research (DBR) is a robust methodology well-suited for developing educational technology innovations through iterative, context-sensitive design. The approach is particularly effective for projects like the Digital Quality Assurance Hub, as it allows for continuous refinement and real-world implementation Schellekens et al. (2022). The research process consisted of four key phases: needs analysis, design and development, implementation, and evaluation. Tinoca et al. (2022) confirms DBR's growing significance in educational research, highlighting its potential to develop innovative solutions through cyclical research processes. The methodology's flexibility allows researchers to progressively test and improve educational approaches, making it ideal for technology-driven educational innovations.

Needs Analysis

The first phase focused on identifying the main challenges in existing QA documentation practices. Observations and informal interviews were conducted with QA officers, program coordinators, and lecturers to understand issues related to document duplication, version control, delayed access, and audit preparation. The findings revealed that most QA processes relied heavily on manual filing systems and scattered digital folders stored across individual devices, resulting in inefficiency and inconsistency. This analysis confirmed the need for a centralized, structured, and user-friendly digital platform to manage QA information effectively.

Design and Development

Based on the findings, the *Digital Quality Assurance Hub* was designed and developed using Google Sites, integrated with Google Workspace applications—Drive, Docs, Sheets, and Forms. The design emphasized accessibility, transparency, and systematic document organization. Each QA component (e.g., curriculum, audit reports, and CQI evidence) was assigned to specific folders within Google Drive, linked to corresponding pages on the Google Site. The main menu was structured to include 14 sections: *Home; Mission, Vision, Scope and Organisation Chart; Teaching and Learning Links; Curriculum Documents; Official Document Templates; QA Coordinator Data; Calendar and Schedule; Guidelines; Outcome-Based Education (OBE); Accreditation and Recognition; Programs and Activities; Slides and Videos; References;* and *Student Handbook*.

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The hub was designed to serve multiple functions acting as a repository for QA documents, a reference point for teaching and learning resources, and a digital evidence management system for audits. Each user accessed the platform using their institutional Google account, ensuring security and controlled access.

Implementation

The implementation phase involved introducing the platform to all departments at Pasir Salak Community College. A series of workshops and hands-on sessions were conducted to train lecturers and QA coordinators on how to upload, organize, and retrieve documents. The Quality Assurance Unit (UJK) managed overall system maintenance, while department coordinators were responsible for updating program-specific materials such as CLOs, PLOs, and CQI evidence.

The transition from manual to digital QA was carried out gradually to ensure user adaptation. During the initial three months, both manual and digital systems operated concurrently to ensure data completeness and to build user confidence. Feedback collected during this stage was used to refine the structure and navigation of the platform.

Evaluation

The evaluation phase focused on assessing the effectiveness, usability, and impact of the *Digital Quality Assurance Hub*. Data were collected through user surveys, focus group discussions, and direct observation. Evaluation criteria included:

1. Accessibility – ease of document retrieval and sharing.
2. Efficiency – reduction in time spent on audit preparation and documentation management.
3. Usability – user satisfaction with interface design and navigation.
4. Sustainability – reduction in paper use and alignment with institutional green initiatives.

Preliminary feedback indicated that the new system reduced audit preparation time by more than 60%, minimized redundancy, and enhanced communication between departments. Users reported higher satisfaction with document organization and availability, emphasizing that the platform improved both administrative efficiency and teaching support. In summary, the design-based methodology ensured that the *Digital Quality Assurance Hub* was not only technically functional but also pedagogically relevant and contextually aligned with institutional goals.

Result and Discussion

The implementation of the Digital Quality Assurance Hub at Pasir Salak Community College indicates changes in accessibility, administrative coordination, and quality assurance (QA) practices based on system usage data, observations, and user feedback

Improved Accessibility and Efficiency

The *Digital Quality Assurance Hub* was designed to enhance accessibility and streamline document management through digital integration. Instead of relying on subjective feedback alone, user engagement and platform utilization were evaluated using data obtained from Google Analytics, which was integrated into the system upon deployment.

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Analytics data collected over a six-month period (January–September 2025) revealed consistent user interaction and document retrieval activity. The platform recorded an average of 1,113 monthly page views, with over 104 active users, representing lecturers, QA coordinators, and administrative staff. The average session duration of 1.42 minutes indicated sustained user engagement, while the bounce rate of only 10.7 % suggested that most users navigated through multiple pages per visit.

The most frequently accessed sections were *Accreditation and Recognition*, *References*, and *Teaching and Learning Links)*, confirming the platform's relevance to teaching and QA processes. In comparison with the previous manual system where audit document retrieval could take several hours but the digital platform observations during audit preparation indicated that document retrieval time was substantially reduced.

These analytics suggest that the Digital Quality Assurance Hub supports improved accessibility, user engagement, and coordination of QA-related activities.

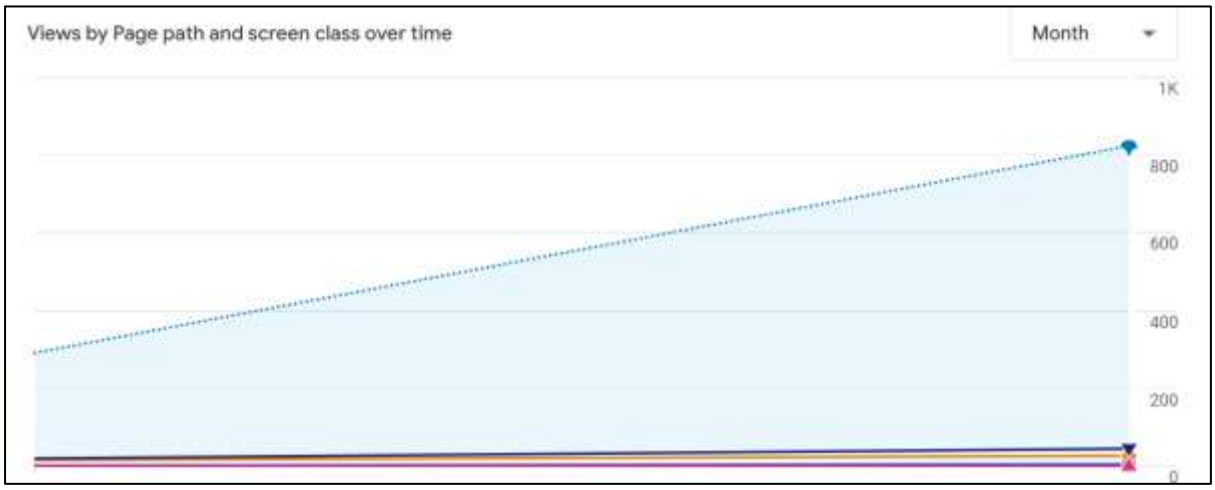

Figure 1: Google Analytics Dashboard Overview (January – September 2025)

Support for Teaching and Learning (T&L)

A major innovation within the *Digital Quality Assurance Hub* is the conversion of the Course Coordinator File from a traditional, paper-based system into a fully digital format using Google Drive. Previously, each coordinator maintained a physical file containing curriculum documents, assessment records, and CQI evidence, which were often stored separately and inconsistently across programmes. This manual process was time-consuming, prone to document loss, and difficult to update collaboratively.

Through the new system, the Course Coordinator File was reconstructed as a centralized digital repository organized by semester, course code, and program. Using Google Drive's structured folder hierarchy, each course folder includes the following standardized components:

i. Course Information: Course Outline, CLOs, and mapping to PLOs.
ii. Teaching Evidence: Lesson plans, lecture materials, and student assessments.
iii. Assessment Data: Marking rubrics, results analysis, and moderation records.
iv. CQI Documentation: Summary reports, improvement actions, and reflection notes.

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All files are linked to the *Digital Quality Assurance Hub* via Google Sites, allowing lecturers and administrators to access and update documents in real time. Coordinators can upload evidence directly, ensuring continuous alignment with the Outcome-Based Education (OBE) framework and institutional quality requirements. The digital Course Coordinator File enhanced teaching transparency, data traceability, and collaborative engagement based on user practices and document usage patterns. Lecturers no longer need to maintain redundant hard copies, and all updates are automatically synchronized across programs. This transformation has also enhanced audit readiness, as all documentation is readily accessible during program reviews.

Preliminary analytics show that the Course Coordinator File pages are among the most frequently accessed sections within the *Digital Quality Assurance Hub*, particularly during course review and semester-end reporting periods. This indicates active academic engagement and sustained adoption among teaching staff.

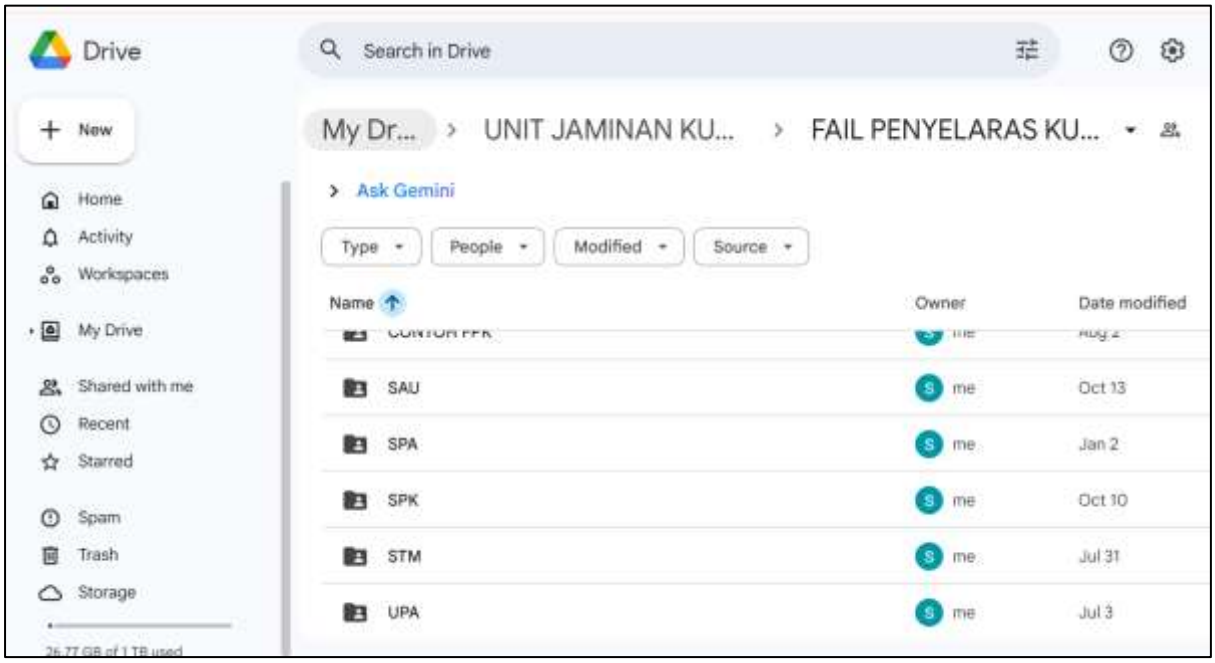

Figure 2: Digital Course Coordinator File Structure in Google Drive

Streamlined Quality Monitoring and Audit Readiness

The digitalization of QA documentation supports audit readiness by enabling systematic storage, version control, and easier retrieval of evidence. The integration of Google Workspace allows real-time tracking of updates, while shared access permissions ensure data integrity and prevent unauthorized modification. Institutional audits and internal reviews are now conducted more efficiently, as auditors can access necessary documents directly from the digital repository.

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Figure 3: QA Document Repository

Promoting a Culture of Quality and Sustainability

The *Digital Quality Assurance Hub* has contributed to a broader cultural shift within Pasir Salak Community College. Feedback from staff and lecturers suggests a growing perception of QA as a continuous improvement process rather than solely a compliance requirement. Regular updates, online accessibility, and shared responsibility have fostered collaboration and ownership among users.

In addition, the platform supports sustainability objectives by minimizing paper usage and aligning with the institution's green initiative. This transition to paperless operations not only reduces costs but also reinforces Malaysia's commitment to the United Nations Sustainable Development Goals (SDG 12 – Responsible Consumption and Production). As Kaur and Lim (2020) observed, paperless management practices are integral to institutional sustainability and operational modernization.

Institutional Impact and Replicability

The implementation of the Digital Quality Assurance Hub illustrates how community colleges may strengthen QA documentation practices using existing, low-cost digital tools. By leveraging MOHE-licensed Google Workspace tools, Pasir Salak Community College developed a sustainable, cost-effective, and scalable solution adaptable to other TVET institutions.

The initiative also strengthens institutional readiness for external accreditation, such as MQA audits and ISO 21001 certification, by ensuring documentation consistency and traceability. As a model of digital innovation, the hub reflects the goals of the *National Digital Education Transformation Roadmap* and can serve as a reference for other Malaysian community colleges pursuing digital transformation in QA and governance.

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Figure 1: Digital Quality Assurance Hub Homepage

Figure 1 illustrates the homepage interface of the Digital Quality Assurance Hub, which serves as the central access point for all quality assurance (QA) documents, program information, and teaching resources. The layout was designed for easy navigation and efficient access to institutional information, supporting both administrative and academic functions.

Conclusion

This study presented a design-and-implementation case study of a Digital Quality Assurance Hub developed at Pasir Salak Community College using Google Workspace tools. The initiative illustrates how community colleges can transition from fragmented, manual QA documentation practices toward a centralized digital system that supports audit readiness, teaching coordination, and evidence-based quality management. Rather than asserting causal effectiveness, the findings indicate that structured use of cloud-based platforms can enhance accessibility, documentation consistency, and institutional preparedness for internal and external quality reviews.

The digitalization of the Course Coordinator File represents a key practical outcome of this initiative, providing a standardized structure for managing curriculum materials, assessment evidence, and Continuous Quality Improvement documentation. This approach aligns with Outcome-Based Education principles and national quality assurance expectations while remaining feasible within resource-limited institutional contexts.

Overall, the Digital Quality Assurance Hub contributes a low-cost, replicable reference model for TVET and community colleges pursuing digital governance and quality assurance modernization. Future work may extend this initiative through advanced analytics and automation features to further support institutional decision-making and continuous improvement.

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