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Intelligence-Track: A real-time automated college document tracking system

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Abstract

Aim: This study aimed to design, develop, and evaluate *Intelligence-Track*, a real-time automated college document tracking system intended to improve the efficiency, accuracy, and reliability of faculty-related document processing at Samar State University. The system performance was assessed in terms of functionality, reliability, accuracy, efficiency, maintainability, and security.

Methodology: The study employed a quantitative developmental research design using the Agile Software Development Model, which included planning, design, development, testing, deployment, and review phases. A total of 138 respondents participated in the system evaluation, comprising 133 faculty members selected through stratified sampling and five Unit Document Controllers selected purposively. Data were gathered using a validated five-point Likert scale questionnaire and analyzed using mean and standard deviation.

Results: Findings revealed that the developed system demonstrated a high level of performance and user acceptability across all software quality criteria, with mean ratings ranging from 4.35 to 4.60. The system improved document processing efficiency, minimized document misplacement, enabled real-time monitoring, and strengthened data security through centralized digital workflows and role-based access control.

Conclusion: The study concludes that *Intelligence-Track* is an effective and reliable digital solution for managing faculty-related documents. The system enhances transparency, administrative efficiency, and document traceability, supporting institutional adoption and digital transformation initiatives in higher education.

Keywords: *document tracking system, faculty document management, real-time monitoring, software quality evaluation, web-based system*

INTRODUCTION

Efficient document tracking and records management are essential for ensuring transparency, accountability, and operational efficiency in higher education institutions. Globally, universities are undergoing rapid digital transformation to modernize administrative processes and improve institutional service delivery. As higher education institutions expand in enrollment, academic programs, and regulatory requirements, manual and paper-based document processes increasingly create administrative bottlenecks, delays, and risks of document misplacement. Recent studies indicate that web-based document management systems significantly improve administrative efficiency, increase document accessibility, and enhance user satisfaction by centralizing workflows, automating routine tasks, and enabling real-time monitoring of in-process documents (Vega-Quintana et al., 2024). These developments reflect a broader shift toward digital governance and data-driven management in academic institutions.

In the Philippine context, digital transformation in public institutions has been reinforced by national policies that promote efficient public service delivery. Republic Act No. 11032, also known as the Ease of Doing Business and Efficient Government Service Delivery Act, encourages government agencies and public institutions to streamline administrative procedures and adopt technology-driven systems. In higher education institutions, the adoption of electronic administrative systems is increasingly viewed as an important strategy for improving operational efficiency, transparency, and accountability in institutional processes (Aliazas et al., 2024). These initiatives highlight the growing recognition of digital technologies as tools for strengthening administrative governance and institutional performance.

Despite advancements in digital solutions, several Philippine higher education institutions continue to rely on manual tracking and paper-based systems for managing faculty-related documents. Such practices often lead to

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delayed approvals, misplaced records, limited audit trails, and a lack of real-time visibility over document status. Faculty members frequently encounter repeated follow-ups and uncertainty regarding document progress, which can reduce administrative efficiency and divert time from teaching, research, and community engagement. Studies have shown that purpose-built electronic document tracking systems can address these challenges by improving usability, reliability, security, and workflow management (Lingaya, 2019), yet limited research has examined faculty-centered document workflow systems within Philippine universities and colleges.

Furthermore, many existing studies emphasize system architecture or technical deployment without conducting comprehensive evaluations of software quality attributes, including functionality, reliability, usability, efficiency, maintainability, and security. Few studies integrate internationally recognized software quality standards, such as the International Organization for Standardization (ISO) models ISO 9126 and ISO/IEC 25010, into the evaluation of document tracking systems within academic institutions. This reveals a research gap in the development of context-specific, quality-driven, and user-validated document tracking systems tailored to the operational needs of state universities.

Addressing this gap, the present study developed and evaluated Intelligence-Track, a web-based, real-time college document tracking system designed to modernize faculty-related document processing in a state university in the region. The system integrates structured submission workflows, automated notifications, role-based access control, metadata-based document classification, digital archiving, and audit trail mechanisms. Unlike previous studies that focused primarily on general electronic document management systems or technical deployment, the present study introduces a localized faculty-centered document tracking system evaluated using internationally recognized software quality standards and user acceptability measures. By integrating system development, software quality evaluation, and institutional workflow automation, the study contributes a context-specific model for improving administrative document management in Philippine higher education institutions.

Ultimately, this research contributes to the growing body of literature on digital transformation in higher education administration by presenting a practical digital solution that strengthens transparency, efficiency, and institutional governance. By replacing manual processes with a centralized and automated platform, Intelligence-Track supports institutional quality assurance initiatives, enhances administrative responsiveness, and promotes technology-driven academic operations.

Review of Related Literature and Studies

Digital transformation has become a central strategy in improving governance and operational efficiency in higher education institutions. Globally, universities are increasingly integrating information systems to modernize administrative processes, reduce bureaucratic inefficiencies, and enhance institutional service delivery. Digital governance platforms enable institutions to automate routine tasks, minimize human error, and provide real-time access to institutional information (Alenezi, 2023). As higher education institutions continue to expand in scale and operational complexity, traditional paper-based document processes often result in delays, a lack of traceability, and inefficiencies in administrative workflow management. Zeng (2024) observed that the absence of an integrated document management system often results in inefficient document handling, delays in processing, and difficulty in tracking institutional records, thereby affecting overall productivity and administrative efficiency.

Within this broader context of digital transformation, Electronic Document Management Systems (EDMS) have emerged as effective tools for institutional record management. EDMS platforms enable document digitization, centralized storage, controlled access, and systematic document tracking. Aliazas et al. (2024) reported that implementing an electronic document management system in a Philippine higher education institution significantly improved document retrieval time and reduced dependence on physical storage systems. Similarly, Georgiev and Antonova (2024) found that enhanced document management systems improved knowledge accessibility and streamlined information retrieval, reducing inefficiencies in organizational knowledge sharing. While these systems improve document storage and accessibility, many implementations focus primarily on document archiving rather than workflow automation tailored to faculty-related transactions requiring multi-level approvals and monitoring.

Beyond document storage, workflow automation and real-time tracking mechanisms play a significant role in strengthening administrative efficiency. Bhat (2023) demonstrated that automated workflow systems in higher education institutions resulted in measurable reductions in manual processing time and improvements in document accuracy and student service response. Chennamsetty (2024) found that event-driven real-time notifications enhanced transparency by providing stakeholders with immediate updates, reducing repeated inquiries and communication delays.

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Additionally, the implementation of Role-Based Access Control (RBAC) ensures that only authorized users are granted access to specific academic data based on predefined roles, thereby enhancing data confidentiality and integrity while minimizing the risk of unauthorized access or manipulation (Dada et al., 2024). Audit trail functionality further enhances accountability by recording system activities and user actions, allowing institutions to monitor document movement and ensure compliance with administrative regulations.

The evaluation of information systems also requires alignment with recognized software quality standards. The ISO/IEC 25010 software quality model identifies critical system characteristics, including functional suitability, reliability, usability, performance efficiency, security, maintainability, and compatibility. These quality attributes provide a structured framework for assessing system effectiveness and user satisfaction. Mhlongo and Mnkandla (2022) emphasized that usability and reliability significantly influence user acceptance of institutional information systems. Similarly, Al-Samarraie et al. (2021) reported that perceived system functionality and accuracy strongly affect continued system adoption among users. Despite the availability of these frameworks, several institutional system development studies focus primarily on technical implementation without integrating comprehensive software quality evaluation alongside user acceptability assessment.

In the Philippine policy environment, administrative modernization is reinforced through national regulations aimed at improving public service delivery. Republic Act No. 11032 mandates government agencies, including public universities, to streamline administrative procedures and enhance transparency in service provision. Additionally, accreditation standards of the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP) require institutions to maintain organized documentation, traceability, and systematic records management. Automated document tracking systems directly support these institutional requirements by providing centralized archiving, structured document routing, and efficient monitoring of administrative transactions.

Overall, the reviewed literature demonstrates that digital transformation, electronic document management systems, and workflow automation significantly improve efficiency, transparency, and accountability in higher education institutions. Real-time tracking mechanisms, security controls, and system quality evaluation frameworks further enhance system reliability and user trust. However, a contextual gap remains in the development and evaluation of faculty-centered document tracking systems specifically designed for Philippine state universities. Most existing studies emphasize general document management systems or technical deployment without integrating localized workflow automation, comprehensive software quality assessment, and user acceptability evaluation within an academic administrative environment. This gap highlights the need for a context-specific automated document tracking system designed to improve faculty-related document management processes.

Conceptual Framework

The conceptual framework of the study was grounded in the Input–Process–Output (IPO) model, a systems-based framework commonly used in information systems research to explain how resources are transformed into outputs through a series of processes. The IPO model provides a structured representation of system development by illustrating how inputs are processed to generate functional outputs that address specific organizational needs (Laplante, 2017). In the context of system development, this framework helps explain how user requirements and technical resources are translated into an operational information system.

In this study, the Input phase consisted of the essential resources and requirements needed for system development. These inputs included user requirements, hardware and software specifications, and compliance with data privacy and security standards. Additionally, user-generated data such as login credentials, uploaded documents, document descriptions, remarks or comments, tracking status updates, and search queries served as system inputs. These inputs formed the foundation for designing system features that address the document processing needs of faculty members and document controllers.

The Process phase involved the development and implementation of the system using the Agile software development methodology. Agile emphasizes iterative development, continuous testing, and incremental system improvement to ensure that the developed system remains responsive to user feedback and evolving institutional requirements (Pressman & Maxim, 2020). The process included system planning, interface design, coding, testing, deployment, and continuous evaluation. Core system functionalities implemented during development included user authentication and role management, document submission and tracking, status monitoring, notification features, search and filtering functions, audit trail recording, and dashboard analytics. Surveys and evaluation instruments were also administered to gather user feedback and assess system performance.

The Output phase of the framework was the Intelligence-Track System, a real-time automated college document tracking platform designed to improve the efficiency, transparency, and accessibility of faculty-related document processing at Samar State University. A feedback mechanism linking the output to the input stage allows

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continuous system improvement based on user evaluation and institutional requirements, ensuring that the system remains responsive to organizational needs.

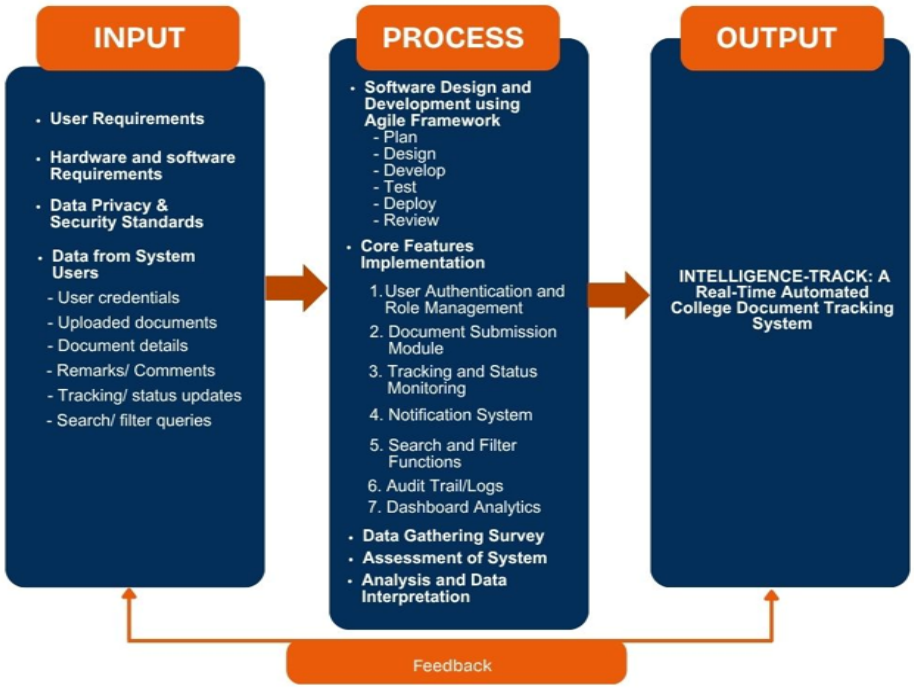

Figure 1. Visual Diagram

Statement of the Problem

Faculty-related document processing in higher education institutions, including a university in Samar, continues to rely heavily on manual logbooks and paper-based tracking systems. Such practices often lead to delayed approvals, misplaced documents, and limited transparency in monitoring document status. These inefficiencies increase the administrative workload of faculty and staff, hinder the timely completion of accreditation and reporting requirements, and reduce institutional accountability. The absence of a centralized and automated document tracking system further complicates the monitoring, retrieval, and auditing of academic records, resulting in errors and inconsistencies in document management. Despite the increasing adoption of digital systems in higher education, many regional state universities still lack localized document tracking platforms that are systematically developed and evaluated using recognized software quality standards. This situation highlights the need to develop a real-time automated document tracking system that can streamline document workflows, enhance efficiency, ensure data accuracy and security, and improve accessibility. Addressing this problem is essential to strengthening faculty document management, improving administrative processes, and supporting institutional governance and digital transformation initiatives.

Research Objectives

General Objective

To develop and evaluate a real-time automated college document tracking system.

Specific Objectives

1. To design and develop a real-time automated college document tracking system.

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2. To evaluate the developed system in terms of:
   2.1 functionality
   2.2 reliability
   2.3 accuracy
   2.4 efficiency
   2.5 maintainability
   2.6 security
3. To propose recommendations for the effective implementation of the developed real-time automated college document tracking system.

Research Questions

1. How is the real-time automated college document tracking system designed and developed?
2. How is the developed system evaluated in terms of functionality, reliability, accuracy, efficiency, maintainability, and security?
3. What recommendations can be proposed for the effective implementation of the developed real-time automated college document tracking system?

METHODS

Research Design

This study employed a quantitative research approach using a developmental research design to design, develop, and evaluate a real-time automated college document tracking system. Developmental research design refers to the systematic process of designing, developing, testing, and evaluating technological products or systems intended to solve practical problems in real-world environments. This approach was appropriate for the present study because the primary objective was to create a functional web-based platform while simultaneously assessing its performance and usability among intended users.

The developmental component focused on creating a web-based system, Intelligence-Track, to streamline faculty-related document management processes, including submission, routing, tracking, archiving, and notification. The evaluative component involved assessing the system's performance, usability, and user acceptability based on selected software quality criteria.

The development of the system followed the Agile Software Development Model, an iterative and incremental approach that emphasizes flexibility, continuous user feedback, and progressive system improvement (Pressman & Maxim, 2020). Agile was selected because it allows developers to adapt to evolving user requirements and incorporate improvements during successive development cycles. Through iterative development phases, the system was gradually refined based on feedback from potential users and system testing results. This approach ensured that the final system aligned with the actual workflow and operational requirements of the institution.

The evaluation of the developed system focused on six software quality criteria: functionality, reliability, accuracy, efficiency, maintainability, and security. These criteria were derived from internationally recognized software quality standards established by the International Organization for Standardization (ISO), particularly ISO 9126 and ISO/IEC 25010.

Population and Sampling

The study involved a total of 138 respondents from Samar State University Main Campus. These respondents consisted of 133 faculty members and 5 administrative staff members serving as unit document controllers.

The total population of faculty members at the time of the study was 203. Using a 5 percent margin of error at a 95 percent confidence level, the required sample size was computed to be 133 faculty respondents. Faculty participants were selected using stratified sampling, wherein the faculty population was grouped according to their respective colleges within the university. Proportional representation from each college was ensured to obtain diverse perspectives regarding the system's usability and functionality.

In addition, five-unit document controllers were selected using purposive sampling because of their direct involvement in document submission, routing, monitoring, and approval processes within the university. Their inclusion was essential in evaluating the operational effectiveness of the system in actual document processing tasks.

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Instruments

Data were collected using a researcher-made structured questionnaire designed to evaluate the performance and usability of the developed system. The questionnaire was developed based on software quality standards established by the International Organization for Standardization (ISO), particularly ISO 9126 and ISO/IEC 25010, which provide recognized frameworks for assessing software quality attributes.

The instrument consisted of 30 evaluation items, with five items assigned to each of the six software quality criteria: functionality, reliability, accuracy, efficiency, maintainability, and security. Each item was formulated to measure specific aspects of system performance, user interaction, and operational effectiveness of the developed platform.

A five-point Likert scale was used to measure the respondents' level of agreement with each statement, where 1 indicated Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree, and 5 Strongly Agree. This scaling method allowed the respondents to express their perceptions regarding the usability, effectiveness, and reliability of the system.

The questionnaire underwent content validation by five experts with professional backgrounds in information technology, software engineering, and educational administration. The validators included university faculty members and professionals with experience in system development and information systems management. The validation process involved an expert review of questionnaire items to ensure clarity, relevance, and alignment with the objectives of the study. Suggestions provided by the validators were incorporated into the final version of the instrument before data collection.

Data Collection

Data collection was conducted during the second semester of Academic Year 2025–2026 after the deployment of the Intelligence-Track system within the main campus of Samar State University.

Before the evaluation, respondents were provided with a brief orientation regarding the purpose and basic functions of the system. Faculty members and unit document controllers were then allowed to interact with the platform and perform actual document transactions, including document submission, routing, status tracking, archiving, and notification monitoring.

After using the system, respondents were asked to complete the structured evaluation questionnaire to assess their experience with the platform. The questionnaires were administered immediately after system use to ensure that responses reflected the respondents' actual interaction with the system.

Some respondents were initially unavailable due to teaching schedules and administrative duties. Follow-up visits were conducted to retrieve complete questionnaires and ensure adequate participation. Data collection was conducted on-site across all colleges within the main campus of Samar State University to ensure that responses were obtained within the actual working environment.

Treatment of Data

The data collected from the respondents were organized, tabulated, and analyzed using descriptive statistical methods, particularly the mean and standard deviation. The mean was used to determine the overall evaluation of the developed system based on each software quality criterion, while the standard deviation was used to measure the variability or consistency of the respondents' responses.

To interpret the computed mean scores, an interpretation scale was established. A mean score ranging from 4.21 to 5.00 was interpreted as Highly Functional or Highly Acceptable, 3.41 to 4.20 as Functional or Acceptable, 2.61 to 3.40 as Moderately Functional, 1.81 to 2.60 as Less Functional, and 1.00 to 1.80 as Not Functional. This interpretation scale provided a standardized basis for describing the level of performance and user acceptability of the developed document tracking system.

The results obtained from the statistical analysis served as the basis for determining the overall effectiveness of the system and identifying areas that may require further enhancement or improvement.

Ethical Considerations

Ethical approval for the study was obtained from the University Ethics Review Board under Ethics Clearance Code 2025-0092-G. All respondents were informed about the purpose of the study and were asked to provide informed consent before participating in the evaluation.

Participation in the study was voluntary, and respondents were informed that they had the right to withdraw from the study at any time without any negative consequences. Confidentiality and anonymity of participants were strictly maintained throughout the research process.

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All collected data were coded and securely stored and were used solely for research purposes. The study adhered to the institutional ethical guidelines governing research involving human participants.

RESULTS and DISCUSSIONS

This section presents the findings of the study through a systematic presentation, analysis, and interpretation of data obtained from the evaluation of the Intelligence-Track real-time automated college document tracking system.

Design and Development of a Document Tracking System

The study successfully designed and developed a real-time automated document tracking system, Intelligence-Track, to streamline faculty-related document management. The system features user authentication, role-based access control, document submission and routing, real-time status tracking, automated notifications, archiving, and report generation. The modular design ensured that each function could be independently developed, tested, and integrated, enhancing system reliability and maintainability.

This design aligns with studies emphasizing the effectiveness of system-driven workflow automation in higher education, which enhances operational efficiency, improves data accuracy, and supports intelligent decision-making in administrative processes (Bhat, 2023; Mishra & Purohit, 2025). By integrating real-time monitoring and notifications, the system addresses delays and errors commonly found in manual processes.

Evaluation of the Developed System

The evaluation of Intelligence-Track, a real-time automated college document tracking system, was conducted using established software quality standards, specifically the ISO 9126 and ISO/IEC 25010 frameworks. These models assess software performance across six essential attributes: functionality, reliability, accuracy, efficiency, maintainability, and security. These criteria were applied to determine the overall quality and operational effectiveness of the system in supporting document processing and tracking within the institutional environment.

Functionality. The findings revealed that the Intelligence-Track system was rated highly functional by both faculty members and Unit Document Controllers (UDC). The results indicate that the system successfully delivers the required features necessary for efficient document processing, including document submission, routing, tracking, notifications, and report generation. Respondents consistently agreed that these functions operate as intended and allow smooth completion of document-related tasks.

Table 1. *Functionality of the Intelligence-Track system*

Functionality	Faculty			UDC		
	Mean	SD		Mean	SD	
1. The system provides all the necessary features needed for processing faculty documents.	4.62	0.50	HF	4.75	0.50	HF
2. The functions of the system work as intended.	4.60	0.53	HF	5.00	0.00	HF
3. The system supports the tasks required in the document workflow.	4.65	0.50	HF	4.75	0.50	HF
4. Errors in functions rarely occur.	4.09	0.84	F	4.25	0.96	HF
5. The system allows smooth completion of document-related tasks.	4.66	0.54	HF	4.75	0.50	HF
Mean/SD	**4.52**	**0.24**	**HF**	**4.70**	**0.27**	**HF**

Legend:

4.21 - 5.00	*Highly Functional*	*(HF)*
3.41 - 4.20	*Functional*	*(F)*
2.61 - 3.40	*Moderately Functional*	*(MF)*
1.81 - 2.60	*Less Functional*	*(LF)*
1.00 - 1.80	*Not Functional*	*(NF)*

The high functionality rating suggests that the system effectively supports the operational requirements of academic document management. By integrating essential workflow features into a centralized platform, the system reduces the need for manual follow-ups and minimizes delays commonly associated with traditional paper-based

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document handling. This demonstrates that automated document tracking solutions can significantly enhance administrative coordination and transparency in higher education institutions.

These findings support the study of Mishra and Purohit (2025), which emphasized that ICT-enabled information management systems improve institutional efficiency by streamlining data processes, enhancing coordination, and supporting real-time, data-driven decision-making in educational organizations.

Reliability. The results further showed that the Intelligence-Track system achieved a high reliability rating from both respondent groups. The system consistently performed its intended functions without unexpected interruptions and maintained stability during prolonged use. Respondents also indicated that the system processes data correctly and is capable of recovering from minor errors without affecting overall performance.

Table 2. *Reliability of the Intelligence-Track system*

Reliability	Faculty			UDC		
	Mean	**SD**		**Mean**	**SD**	
1. The system works consistently without unexpected interruptions.	4.44	0.56	HR	4.25	0.50	HR
2. System features perform reliably each time I use them.	4.60	0.57	HR	4.50	0.58	HR
3. Data is processed correctly and without failure.	4.51	0.56	HR	4.75	0.50	HR
4. The system recovers properly from minor errors.	4.45	0.58	HR	4.75	0.50	HR
5. The system remains stable during prolonged use.	4.46	0.53	HR	4.50	0.58	HR
Mean/SD	**4.49**	**0.07**	**HR**	**4.55**	**0.21**	**HR**

Legend:

4.21 - 5.00	*Highly Reliable*	*(HR)*
3.41 - 4.20	*Reliable*	*(R)*
2.61 - 3.40	*Moderately Reliable*	*(MR)*
1.81 - 2.60	*Less Reliable*	*(LR)*
1.00 - 1.80	*Not Reliable*	*(NR)*

The high reliability rating indicates that the system can sustain continuous operation in an institutional environment where document processing occurs regularly. Reliable system performance is essential for maintaining user confidence, particularly in academic institutions where the timely processing of documents directly affects faculty transactions and administrative decision-making. A stable digital platform ensures that users can depend on the system for accurate and uninterrupted document monitoring.

These results support Laplante (2017), who highlighted that reliability is a critical attribute of information systems because dependable system performance minimizes operational disruptions and strengthens user trust in technology-supported processes.

Accuracy. The evaluation results confirmed that the Intelligence-Track system obtained a highly accurate rating. Respondents agreed that the system correctly records document details, accurately displays document status updates, and provides precise notifications regarding document progress. In addition, the system effectively minimizes tracking errors and prevents the dissemination of misleading information.

Table 3. *Accuracy of the Intelligence-Track system*

Accuracy	Faculty			UDC		
	Mean	**SD**		**Mean**	**SD**	
1. The system displays accurate document status information.	4.59	0.49	HA	4.50	0.58	HA
2. The system correctly records and updates document details.	4.52	0.55	HA	4.50	0.58	HA
3. The system minimizes errors in document tracking.	4.56	0.53	HA	4.75	0.50	HA
4. Notifications and status updates are precise.	4.56	0.53	HA	4.50	0.58	HA

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5. The system reduces the possibility of misleading information.	4.61	0.49	HA	5.00	0.00	HA
Mean/SD	**4.57**	**0.03**	**HA**	**4.65**	**0.22**	**HA**

Legend:

4.21 - 5.00	*Highly Accurate*	*(HA)*
3.41 - 4.20	*Accurate*	*(A)*
2.61 - 3.40	*Moderately Accurate*	*(MA)*
1.81 - 2.60	*Less Accurate*	*(LA)*
1.00 - 1.80	*Not Accurate*	*(NA)*

The high accuracy rating demonstrates that the system maintains reliable data integrity throughout the document workflow. Accurate tracking of document status is essential in institutional environments where administrative decisions depend on reliable information. By maintaining precise records and automated updates, the system enhances transparency and ensures that users receive consistent and trustworthy information regarding document transactions.

The low variability of responses further indicates that both faculty members and Unit Document Controllers share similar perceptions regarding the accuracy of the system's outputs. These results align with Pressman (2018), who emphasized that accurate information processing is fundamental in software systems because it directly influences decision-making and operational efficiency within organizations.

Efficiency. The results indicated that the Intelligence-Track system was rated highly efficient by the respondents. The system demonstrated the ability to accelerate document processing, respond quickly to user commands, simplify system navigation, and reduce the time required for manual document handling. Respondents also noted that the system significantly improves task completion efficiency within the document workflow.

Table 4. *Efficiency of the Intelligence-Track system*

Efficiency	Faculty			UDC		
	Mean	**SD**		**Mean**	**SD**	
1. The system speeds up document processing.	4.53	0.55	HE	4.50	0.58	HE
2. The system responds quickly to user commands.	4.65	0.48	HE	4.50	0.58	HE
3. Navigation through the system is fast and simple.	4.60	0.51	HE	4.50	0.58	HE
4. The system reduces time spent on manual processing.	4.62	0.50	HE	4.75	0.50	HE
5. The system helps users complete tasks more efficiently.	4.68	0.50	HE	4.50	0.58	HE
Mean/SD	**4.62**	**0.06**	**HE**	**4.55**	**0.11**	**HE**

Legend:

4.21 - 5.00	*Highly Efficient*	*(HE)*
3.41 - 4.20	*Efficient*	*(E)*
2.61 - 3.40	*Moderately Efficient*	*(ME)*
1.81 - 2.60	*Less Efficient*	*(LE)*
1.00 - 1.80	*Not Efficient*	*(NE)*

The high efficiency rating suggests that the implementation of an automated document tracking system substantially reduces administrative delays associated with traditional paper-based procedures. By digitizing document submission and tracking processes, the system allows users to retrieve information quickly and monitor document status in real time. This capability contributes to faster institutional operations and more responsive administrative services.

These findings reinforce the importance of adopting digital solutions in academic administration. Efficient information systems enable institutions to optimize resource utilization, reduce processing time, and improve productivity among faculty and administrative staff. These results support Pressman (2018), who noted that efficient software systems play a critical role in improving organizational performance by reducing operational overhead and enhancing workflow management.

Maintainability. The evaluation results showed that the Intelligence-Track system achieved a high maintainability rating. Respondents indicated that the system structure allows easy updates, supports future improvements, and

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enables system issues to be resolved without significant difficulty. The system's design also supports long-term usage while requiring minimal maintenance effort.

Table 5. *Maintainability of the Intelligence-Track system*

Maintainability	Faculty			UDC		
	Mean	SD		Mean	SD	
1. The system is easy to update when needed.	4.53	0.53	HM	4.75	0.50	HM
2. The system structure allows future improvements.	4.60	0.55	HM	4.50	0.58	HM
3. System issues can be addressed without difficulty.	4.55	0.64	HM	4.50	0.58	HM
4. The system design supports long-term use.	4.66	0.47	HM	4.75	0.50	HM
5. System maintenance requires minimal effort.	4.54	0.50	HM	4.50	0.50	HM
Mean/SD	**4.58**	**0.05**	**HM**	**4.60**	**0.14**	**HM**

Legend:

4.21 - 5.00	*High Maintainability*	*(HM)*
3.41 - 4.20	*Maintainability*	*(M)*
2.61 - 3.40	*Moderate Maintainability*	*(MM)*
1.81 - 2.60	*Less Maintainability*	*(LM)*
1.00 - 1.80	*Not Maintainability*	*(NM)*

The high maintainability rating reflects the effectiveness of the system's modular design and structured development approach. Systems that are easier to maintain allow developers to introduce enhancements, address technical issues, and adapt to changing institutional requirements without disrupting system operations. This is particularly important in academic institutions where policies, procedures, and administrative workflows may evolve.

The findings suggest that the Intelligence-Track system is capable of sustaining long-term institutional use while remaining adaptable to future technological improvements. These results are consistent with the findings of Syed-Mohamad et al. (2025), who emphasized that maintainability is a vital aspect of modern software systems, as it enables continuous adaptation to changing requirements while supporting efficient system evolution in Agile and DevOps environments.

Security. The findings also revealed that the Intelligence-Track system received a high security rating from both faculty members and Unit Document Controllers. Respondents expressed strong confidence that the system effectively protects user information, prevents unauthorized access, and ensures secure login authentication. The system also incorporates mechanisms designed to minimize potential data breaches and maintain the confidentiality of sensitive institutional documents.

Table 6. *Security of the Intelligence-Track system*

Security	Faculty			UDC		
	Mean	SD		Mean	SD	
1. The system keeps user information protected.	4.41	0.58	HS	4.75	0.50	HS
2. Document data is secure from unauthorized access.	4.55	0.60	HS	4.50	0.58	HS
3. The login process ensures data protection.	4.48	0.52	HS	4.75	0.50	HS
4. The system has measures to prevent data breaches.	4.51	0.50	HS	4.75	0.50	HS
5. The system always maintains confidentiality.	4.52	0.59	HS	4.75	0.50	HS
Mean/SD	**4.49**	**0.05**	**HS**	**4.70**	**0.11**	**HS**

Legend:

4.21 - 5.00	*Highly Secured*	*(HS)*
3.41 - 4.20	*Secured*	*(S)*
2.61 - 3.40	*Moderately Secured*	*(MS)*
1.81 - 2.60	*Less Secured*	*(LS)*
1.00 - 1.80	*Not Secured*	*(NS)*

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The high security rating indicates that the system successfully incorporates appropriate safeguards for protecting digital records within an academic environment. As institutions increasingly rely on digital platforms for administrative operations, ensuring the confidentiality, integrity, and availability of information becomes essential. Secure systems not only protect sensitive data but also promote user trust in technology-based processes.

The consistent responses among respondents further demonstrate confidence in the system's ability to safeguard institutional information. These findings support the study of Das et al. (2023), which emphasized that robust security, privacy, and trust mechanisms are essential in digital systems as they protect sensitive information, enhance user confidence, and ensure the reliability of information systems.

Conclusions

The study developed and evaluated a real-time automated college document tracking system known as Intelligence-Track to address inefficiencies associated with manual document processing in higher education institutions. The system provided structured document submission, real-time monitoring, role-based access control, and audit trail functionality, enabling more transparent and efficient document management.

Evaluation results indicated that the system demonstrated high levels of functionality, reliability, accuracy, efficiency, maintainability, and security. These findings suggest that the Intelligence-Track system effectively supports faculty-related document workflows and improves administrative coordination within the institutional environment.

Overall, the developed system represents a viable digital solution for enhancing document management practices in higher education institutions. Its implementation may contribute to improved transparency, operational efficiency, and institutional accountability while supporting broader digital transformation initiatives.

Recommendations

Based on the findings of the study, the developed real-time automated college document tracking system is recommended for implementation within the college to support academic document management and processing. The system demonstrated satisfactory performance in terms of functionality, reliability, accuracy, efficiency, maintainability, and security, indicating its suitability for adoption in an academic environment.

The implementation of the system can replace manual follow-ups and paper-based transactions, thereby reducing the occurrence of lost documents and shortening document processing time. Through real-time document status tracking and automated notifications, faculty members and administrative personnel will be able to monitor the progress of submitted documents more effectively, thereby enhancing transparency and accountability across departments. Furthermore, the use of a centralized digital platform can help standardize academic document workflows and improve coordination among faculty, staff, and administrative units.

To facilitate effective implementation, institutions are encouraged to conduct orientation sessions and hands-on training for users to ensure smooth system adoption. The designation of system administrators and document controllers at the departmental level is also recommended to maintain proper system operation, ensure data accuracy, and support the timely processing of academic records. Continuous technical support and periodic system maintenance should also be provided to sustain optimal system performance.

In addition, the following recommendations are proposed:

1. Future researchers may explore integrating the system with other academic platforms, such as Learning Management Systems (LMS), to improve interoperability and streamline institutional document workflows.
2. The system may incorporate an electronic signature feature to enable authorized personnel to digitally approve documents, thereby reducing processing time and strengthening document authentication.
3. Future studies may consider integrating Short Message Service (SMS) notifications to inform users of important document updates and facilitate timely responses to document requests.
4. Developers may integrate chatbot or virtual assistant functionalities to assist users in navigating the system and addressing common inquiries regarding document submission and tracking.
5. The developed system may be pilot tested in selected colleges or departments to identify operational improvements and evaluate its effectiveness before wider institutional implementation.
6. Institutions may enhance system security by incorporating multi-factor authentication, data encryption, and activity logging mechanisms to strengthen the protection of sensitive records.
7. The notification mechanism may be enhanced to ensure that all approvers are informed when documents undergo revisions at any approval stage, thereby improving transparency and document monitoring.

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