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AI-based records management system for administrative efficiency and disaster resilience in San Fernando, Camarines Sur public schools

Llanes, Jayson Boy C. ✉
University of Nueva Caceres, Philippines (jaysonboy.llanes@unc.edu.ph)

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Abstract

Educational institutions face increasing challenges in managing large volumes of administrative records while ensuring administrative efficiency, artificial intelligence, data privacy, disaster resilience, and digital records management in public schools. This study examined the current records management practices and challenges encountered by public secondary schools in the San Fernando District, Department of Education (DepEd) Division of Camarines Sur. It developed an artificial intelligence (AI)-based digital records management system to enhance administrative efficiency and disaster resilience. The study employed a descriptive-developmental research design using a mixed-method approach. Data were collected through a structured survey questionnaire and open-ended responses from ten (10) purposively selected respondents, composed of five (5) school heads and five (5) administrative officers in public schools. Quantitative data were analyzed using frequency, percentage, and weighted mean, while qualitative data were examined through thematic analysis. Findings showed that schools implement records management practices for capture, classification, access, and archival; however, these processes remain largely manual and paper-based. Challenges identified include difficulties in data management, limited digitalization, concerns about data privacy, and vulnerability of records to disasters. Based on these findings, a Secure, Managed, Automated, Resilient, and AI-Based, Technology-Driven (SMART) AI-based digital records management system was developed to improve records organization, enhance information retrieval, strengthen data security, and support disaster-resilient storage. The study concludes that integrating AI-based systems can modernize records management practices and support digital transformation and administrative governance in public schools.

Keywords: administrative efficiency, artificial intelligence, data privacy, disaster resilience, digital records management, public schools

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1. Introduction

In the contemporary digital landscape, organizations are increasingly challenged to manage growing volumes of information while ensuring efficiency, security, and resilience. Records management has become a critical organizational function, as it supports accountability, transparency, and effective decision-making. The transition from traditional paper-based systems to digital records management has significantly transformed how institutions capture, store, access, and preserve information. According to established literature, effective records management ensures the authenticity, reliability, and accessibility of institutional data, which are essential for governance and operational continuity (International Organization for Standardization [ISO], 2016; Katuu, 2020). As organizations generate more complex datasets, the need for structured, technology-driven systems becomes increasingly evident.

Recent advancements in digital technologies, particularly artificial intelligence (AI), have further reshaped records management practices. AI enables automation of routine processes such as document classification, metadata generation, and information retrieval, thereby improving efficiency and reducing human error (Russell & Norvig, 2021; Laudon & Laudon, 2022). Studies highlight that AI-driven systems enhance administrative workflows by enabling intelligent data processing and faster decision-making (Dwivedi et al., 2021; Zhou, Li, & Wang, 2023). These capabilities demonstrate the potential of AI to modernize records management systems and support organizational performance, particularly in data-intensive environments such as educational institutions.

Educational institutions generate substantial volumes of administrative records, including student information, personnel files, financial documents, and institutional reports. These records are essential for planning, monitoring, and policy implementation. However, many public schools, particularly in developing contexts, continue to rely on manual or hybrid records management systems. Research indicates that such systems often result in inefficiencies, delayed document retrieval, and increased risks of data loss or mismanagement (Villanueva & Regalado, 2021; Ngoepe & Saurombe, 2022). In the Philippine context, despite initiatives such as the Department of Education (DepEd) Computerization Program, the adoption of fully digital records systems remains uneven due to infrastructure limitations, lack of technical capacity, and insufficient policy integration (Department of Education, 2022; UNESCO, 2021).

In addition to administrative challenges, the issue of disaster resilience has become increasingly significant in records management. Digital records systems play a crucial role in ensuring organizational continuity, particularly in disaster-prone areas. Literature emphasizes that electronic records management systems enable secure storage, automated backups, and remote access to critical information, thereby protecting institutional data during emergencies (Katuu, 2020; Chowdhury & Alam, 2021). In regions such as Camarines Sur in the Bicol Region frequently affected by typhoons and flooding the reliance on paper-based records exposes schools to significant risks of data loss and operational disruption (NDRRMC, 2022). This highlights the urgent need for resilient, technology-driven records management solutions in public schools.

Despite extensive research on digital transformation, artificial intelligence, and disaster resilience, existing studies often examine these domains independently. There remains a limited body of research that integrates AI-driven records management, administrative efficiency, data security, and disaster resilience into a unified framework tailored for public basic education institutions, particularly in rural and disaster-prone contexts. Moreover, few studies have explored how AI-based systems can be adapted to the operational realities of public schools in the Philippines. This gap underscores the need for innovative and context-sensitive solutions that can enhance both administrative efficiency and institutional resilience.

In response to these gaps, this study aimed to develop an AI-based digital record management system that enhances administrative efficiency and disaster resilience in public schools within the San Fernando District, Department of Education (DepEd) Division of Camarines Sur. Specifically, the study sought to: (1) determine the current records management practices of public schools in terms of capture, classification, access, and archival; (2) identify the challenges encountered in records management in terms of data management, digitalization, data privacy, and disaster resilience; and (3) propose the development of a Secure, Managed, Automated, Resilient, and AI-Based, Technology-Driven (SMART) AI-based digital record management system that improves records organization, strengthens data security, enhances information retrieval, and supports disaster-resilient storage in public schools.

2. Methods

Research Design **-** This study utilized a descriptive-developmental research design with a mixed-method approach. The descriptive component assessed existing records management practices (capture, classification, access, and archival) and identified challenges in data management, digitalization, data privacy, and disaster resilience. The developmental component focused on designing a SMART AI-based digital records management system based on the identified gaps. Quantitative data were collected through survey questionnaires and analyzed using frequency, percentage, and weighted mean, while qualitative data from open-ended responses were examined through thematic analysis. This approach provided a comprehensive basis for developing an efficient and disaster-resilient records management system.

Participants of the Study **-** The participants of the study consisted of ten (10) purposively selected personnel from public secondary schools in the San Fernando District, Camarines Sur. These included five (5) school heads and five (5) administrative officers who are directly involved in records management and administrative functions. Purposive sampling was employed to ensure that the respondents possess relevant knowledge and experience in handling school records, including processes such as capture, classification, access, and archival. Their roles and responsibilities provided reliable and firsthand information regarding existing practices and challenges in records management within their respective schools.

Data Gathering Instrument **-** The study used a structured survey questionnaire to collect data on records management practices and challenges in public schools. The instrument was based on related literature and aligned with the study objectives, covering areas such as capture, classification, access, archival, data management, digitalization, data privacy, and disaster resilience. It consisted of two parts: close-ended Likert-scale items to measure practices and challenges, and open-ended questions to gather additional insights. The questionnaire was reviewed for clarity and validity before being administered to selected school heads and administrative officers. This allowed the collection of both quantitative and qualitative data to support the study.

Data Gathering Procedure **-** The data gathering process began with securing permission from the concerned school authorities in the San Fernando District, Camarines Sur, to conduct the study. Upon approval, the researcher coordinated with the selected public secondary schools to identify the appropriate respondents, specifically school heads and administrative officers involved in records management. The structured survey questionnaire was then distributed to the identified participants. The purpose of the study and instructions for answering the questionnaire were clearly explained to ensure accurate and honest responses. Respondents were given sufficient time to complete both the close-ended and open-ended portions of the instrument. After the retrieval of the accomplished questionnaires, the responses were checked for completeness and organized for analysis. Quantitative data were tabulated for statistical treatment, while qualitative responses were compiled and categorized for thematic analysis. The collected data served as the basis for assessing current practices, identifying challenges, and developing the proposed SMART AI-based digital records management system.

Ethical Considerations **-** Ethical standards were observed throughout the study. Permission was secured from school authorities, and participation was voluntary. Respondents were informed of the study's purpose and assured

that their responses would be used for academic purposes only. Confidentiality and anonymity were maintained, and participants could withdraw at any time. Data were handled honestly and reported without bias to ensure the integrity of the study.

Data Analysis - Data collected from the survey questionnaire were analyzed using both quantitative and qualitative methods. Quantitative data from the close-ended items were treated using descriptive statistics, including frequency, percentage, and weighted mean, to describe records management practices and identify the level of challenges encountered. Qualitative data from the open-ended responses were analyzed through thematic analysis, where responses were organized, categorized, and interpreted to identify common themes and insights. The combined analysis provided a comprehensive understanding of the current conditions and served as the basis for developing the proposed SMART AI-based digital records management system.

3. Results and Discussion

Table 1

Current Records Management Practices along Capture

Theme	Description	Supporting Responses
Manual recording	Schools rely on handwritten documentation and manual encoding when capturing records.	*"Manual checking and review"; "manually checking"*
Logging system	Schools document records using logbooks or manual monitoring systems.	*"For online none at this time we just have a manual recording of the documents at the logbook and on the monitoring made in our computer"; "By recording thru log book."*
Verification	Records are reviewed before filing to ensure that required details are complete and correct.	*"Records are reviewed before filing to ensure all required information is present"; "We ensure accuracy and completeness by checking each record carefully before it is filed."*
Accuracy control	Schools use validation procedures such as checklists and required information fields to maintain data accuracy.	*"By providing checklist po in every document submission"; "To ensure the accuracy, we ask the date time name of the sender/proponent and the name of the documents"; "Data must be correct and complete."*
Systematic recording	Administrative personnel ensure that records are organized and documented in a structured manner.	*"Making sure that recording si systematized."*

Current Records Management Practices of Public Schools in San Fernando District, Camarines Sur - Table 1 presents the current records management practices of public secondary schools in the San Fernando District, Camarines Sur, in terms of capture, classification, access, and archival. The findings indicate that while these practices are implemented, they remain largely manual and paper-based, with limited integration of digital systems. Results show that records capture and classification are consistently practiced as part of routine administrative processes, whereas records access and archival exhibit limitations in retrieval efficiency and storage management. This finding aligns with the work of Katuu (2020), who noted that manual recordkeeping systems often result in inefficiencies in access and preservation. Similarly, Ngoepe and Saurombe (2022) emphasized that inadequate digital infrastructure and weak governance frameworks hinder effective records organization and retrieval.

These results imply that although records management practices are present, they are not fully optimized for efficiency, security, and resilience. The continued reliance on paper-based systems increases the risks of delayed retrieval, data loss, and vulnerability to disasters. As emphasized by Duranti and Rogers (2021), effective records

systems must ensure accessibility, integrity, and long-term preservation through structured and technology-supported processes. The findings highlight the need for a more advanced and integrated approach to records management. The adoption of an AI-based digital records management system is supported by literature, which demonstrates that intelligent and automated systems improve data organization, retrieval, and security (Zhou et al., 2023; Evans et al., 2022). Such innovations are essential in enhancing administrative efficiency and strengthening disaster resilience in public schools.

Table 2

Current Records Management Practices along Classification

Theme	Description	Supporting Responses
Categorized filing system	Records are grouped according to categories such as student, personnel, financial, and administrative records.	*"Records are classified by category such as student, personnel, financial, and administrative files"; "Records in our school are classified by type and purpose such as student records, staff records, finance records, and administrative records."*
Chronological and alphabetical arrangement	Records are organized based on date, year, or alphabetical order to support systematic storage and retrieval.	*"Organize file and year"; "arranged alphabetically or chronologically"; "arranged alphabetically and by year."*
Department-based organization	Documents are organized according to departments or functional units of the school.	*"Our files are being organized by department and by the type of records"; "Labeling by departmental."*
Labeling and tagging system	Files are labeled or tagged to clearly identify their classification and purpose.	*"Through proper labeling"; "By labeling it related to specific system/program"; "Files are tagged and stored separately according to category."*
Standardized classification guidelines	Schools implement standard filing procedures and classification guides to ensure consistency.	*"We use a standard classification guide and conduct regular orientations for staff"; "We ensure records are consistently classified by using the same filing guidelines and record categories across the school."*
Monitoring and verification	Regular checking and monitoring are conducted to ensure records are properly classified.	*"Weekly checking of the records of properly classified especially the new records received"; "We regularly check records to make sure everyone is filing them in the correct way."*

Table 2 presents the current records management practices of public secondary schools in the San Fernando District, Camarines Sur in terms of records classification. The findings indicate that classification practices are generally implemented; however, they are still predominantly manual and paper-based, with limited use of standardized digital systems. The results suggest that school personnel organize records based on categories such as document type, department, or date, which supports basic administrative functions. However, inconsistencies in classification procedures and the absence of standardized systems affect the efficiency of document organization and retrieval. This supports the findings of Ngoepe and Saurombe (2022), who emphasized that weak classification structures and lack of standardization lead to disorganized records and reduced accessibility. Similarly, Katuu (2020) noted that manual classification systems often limit the effectiveness of records management due to inconsistencies and human error.

These findings imply that while classification practices exist, they are not fully optimized for efficiency, accuracy, and scalability. The reliance on manual processes increases the risk of misclassification, duplication, and difficulty in retrieving records, particularly as the volume of records grows. As emphasized by Duranti and Rogers (2021), effective records classification requires structured systems that ensure consistency, reliability, and

ease of access. The results highlight the need to improve classification processes through digital and automated solutions. Literature supports that AI-based systems enhance records classification through automated tagging, metadata generation, and intelligent indexing (Zhou et al., 2023; Evans et al., 2022). The adoption of a SMART AI-based digital records management system can therefore standardize classification practices, improve retrieval efficiency, and support administrative efficiency and disaster resilience in public schools.

Table 3

Current Records Management Practices along Access

Theme	Description	Supporting Responses
Authorized personnel access	Access to records is limited to specific personnel such as school heads, administrative officers, registrars, and designated staff.	*"AO2 and school head"; "Principal, admin aide and administrative assistant"; "The principals, registrar, AO and ADAS"; "The advisers, registrar, school head, and admin officers."*
Role-based access control	Access to records depends on job responsibilities and level of authority.	*"Access depends on job responsibility. Sensitive records are limited to authorized personnel only."*
Request and approval procedure	Personnel must request permission or submit a formal request before accessing records.	*"Personnel must submit a request and receive approval before accessing records"; "With consent from the mentioned personnel and a request form from the requesting person or agency."*
Logbook documentation	Access to records is monitored through manual logbooks or documentation procedures.	*"Through signing log books if they need specific data/files"; "They sign an access log or make a formal request stating the record needed and the reason."*
Administrative authorization	Access to records is granted through approval of the school head or responsible personnel.	*"Approach AO2 or SH"; "By requesting copy to AO2 or SH"; "Accepting and signing the fidelity bond of the specific task."*
Access time for records	Access time varies depending on the type of record and availability of authorized personnel.	*"Can access anytime with valid/active records"; "Usually a few minutes for active records and up to one working day for archived records"; "If it recent within the day, if it's not it took a lot of searching."*

An examination of Table 3 reveals how records access is currently managed in public secondary schools in the San Fernando District, Camarines Sur. The findings indicate that although access procedures are in place, they are still largely dependent on manual and paper-based systems, which limit the efficiency of retrieving documents. In actual practice, school personnel observe established procedures to ensure proper authorization and control when accessing records. However, challenges such as slow retrieval, difficulty in locating files, and limited accessibility continue to arise due to the absence of digital systems. These findings are consistent with Katuu (2020), who pointed out that manual recordkeeping systems often hinder timely access to information. Likewise, Ngoepe and Saurombe (2022) emphasized that inadequate digital infrastructure negatively affects the efficiency and reliability of records retrieval. These conditions suggest that while records access processes are functional, they are not fully efficient or secure. Dependence on physical records increases the risks of delays, misplacement, and potential unauthorized access, particularly during peak administrative demands. As noted by Duranti and Rogers (2021), effective records access requires structured and technology-supported systems that ensure accuracy, security, and timely availability of information.

The findings point to the need for enhancing records access through digital transformation. Existing literature shows that AI-driven systems improve access by enabling intelligent search, automated retrieval, and secure access control mechanisms (Zhou et al., 2023; Evans et al., 2022). Thus, implementing a SMART AI-based digital records management system can significantly improve accessibility, efficiency, and data security in public schools.

Table 4

Current Records Management Practices Along Archival

Theme	Description	Supporting Responses
Manual archiving and storage	Inactive records are stored manually in cabinets, storage rooms, or designated archive areas.	*"manual keeping of records on cabinets"; "manual keeping of hard copies on cabinets or storage room"; "inactive records are being restored in a functional steel cabinet."*
Record retention period	Records are retained for a specific period depending on their type before disposal.	*"5 years"; "After 5 years"; "5 years and beyond."*
Retention schedule and standards	Schools follow retention guidelines based on national archival standards or retention schedules.	*"By referring to the list of National Archive and Records Administration"; "Retention depends on record type following the approved retention schedule."*
Identification and classification of records	Inactive records are identified, labeled, and organized before being archived.	*"Inactive records are labeled, indexed, and transferred to a secure archive area"; "Identification of inactive records."*
Secure storage and preservation	Records with long-term value are stored in secure locations to ensure preservation and protection.	*"Keeping safe and proper turnover"; "Secure storage and controlled access."*
Turnover and accountability	Archived records are properly turned over to successors or responsible personnel.	*"Proper safekeeping and turn over to successors"; "Proper turnover to successors especially the valid documents."*

The findings in Table 4 highlight how public secondary schools in the San Fernando District, Camarines Sur manage records archival as part of their records management practices. The results show that archival activities are carried out; however, they are predominantly manual and paper-based, relying on physical storage such as cabinets and designated storage areas. With regard to implementation, schools follow procedures for storing inactive records to ensure the preservation of documents with administrative or legal value. Nevertheless, challenges such as limited storage space, difficulty in retrieving archived records, and risks of physical deterioration are evident. This observation supports Katuu (2020), who noted that traditional archival systems often encounter issues in storage capacity and long-term preservation. Likewise, Ngoepe and Saurombe (2022) emphasized that dependence on physical archives can reduce accessibility and increase the likelihood of record damage or loss.

From an operational standpoint, these results suggest that archival practices, while functional, are not fully efficient, secure, or resilient. The reliance on physical storage exposes records to risks such as deterioration, misplacement, and damage from disasters like floods or fire. As emphasized by Duranti and Rogers (2021), effective archival systems must ensure long-term preservation, accessibility, and integrity through structured and technology-supported processes. Taken together, the findings point to the need for improving archival practices through digital transformation. Existing literature indicates that AI-based and digital records systems enhance archival management through automated storage, indexing, and secure backup mechanisms (Zhou et al., 2023; Evans et al., 2022). Thus, adopting a SMART AI-based digital records management system can strengthen long-term preservation, improve retrieval efficiency, and enhance disaster resilience in public schools.

Challenges in Records Management among Public Schools in San Fernando District, Camarines Sur – Findings reflected in Table 5 describe the challenges faced by public secondary schools in the San Fernando District, Camarines Sur with respect to data management. The results show that schools encounter difficulties in organizing, storing, and maintaining records, largely due to continued dependence on manual and paper-based

processes. A closer look at the responses indicates that issues such as disorganized data, duplication of records, and delays in updating and retrieving information are commonly experienced by school personnel. These concerns are compounded by limited digital infrastructure and the absence of standardized systems. This is consistent with Katuu (2020), who noted that weak data management systems reduce efficiency in handling information. Likewise, Ngoepe and Saurombe (2022) emphasized that poor data organization affects both accessibility and reliability of records.

Table 5

Challenges in Records Management along Data Management

Parameter	Mean	Rank	Interpretation
Retrieving records efficiently	3.10	1	Moderately Challenging
Managing storage and organization	3.00	2.5	Moderately Challenging
Ensuring accuracy and consistency	3.00	2.5	Moderately Challenging
Providing access to records	2.80	4.5	Moderately Challenging
Managing physical storage	2.80	4.5	Moderately Challenging
Overall Mean	2.94		Moderately Challenging

Legend: 5.00-4.50 = Very Challenging, 4.49-3.50 = Challenging, 3.49-2.50 = Moderately Challenging, 2.49 -1.50 = Slightly Challenging, 1.49 -1.00 = Not Challenging

These conditions point to significant limitations in current data management practices, particularly in supporting the increasing volume and complexity of administrative data. Manual processes expose records to risks such as inaccuracies, inconsistencies, and potential loss of information, which may negatively impact decision-making and operational performance. As explained by Laudon and Laudon (2022), effective data management requires integrated systems that ensure data accuracy, consistency, and reliability. In light of these findings, there is a clear need to strengthen data management through the adoption of digital technologies. Prior studies suggest that AI-based systems improve data handling by enabling automation, intelligent classification, and efficient retrieval of information (Dwivedi et al., 2021; Zhou et al., 2023). Hence, implementing a SMART AI-based digital records management system can enhance data accuracy, streamline processes, and improve overall administrative efficiency and security in public schools.

The findings in Table 6 present the challenges encountered by public secondary schools in the San Fernando District, Camarines Sur in terms of digitalization. The results indicate that schools experience significant limitations in transitioning from manual to digital records systems, primarily due to inadequate technological infrastructure and limited access to digital tools.

Table 6

Challenges in Records Management along Digitalization

Parameter	Mean	Rank	Interpretation
Training staff to effectively use digital record systems	5.00	1	Very Challenging
Financial cost of implementing digital systems	4.80	2	Very Challenging
Time required to convert paper records to digital	4.40	3	Challenging
Stable internet & power supply	1.50	4	Slightly Challenging
Access to equipment for digitalization	1.30	5	Not Challenging
Overall Mean	3.40		Moderately Challenging

Legend: 5.00-4.50 = Very Challenging, 4.49-3.50 = Challenging, 3.49-2.50 = Moderately Challenging, 2.49 -1.50 = Slightly Challenging, 1.49 -1.00 = Not Challenging

A review of the responses shows that school personnel encounter difficulties such as insufficient computer resources, unstable internet connectivity, and lack of technical support, which hinder the effective implementation of digital records systems. These challenges are further compounded by limited training and technical capacity among staff. This observation is consistent with Dwivedi et al. (2021), who emphasized that digital transformation requires adequate infrastructure and organizational readiness. Similarly, UNESCO (2021) noted that many educational institutions in developing contexts face barriers in adopting digital technologies due to limited resources and capacity. These conditions suggest that the level of digitalization in records management remains low, limiting the efficiency and effectiveness of administrative processes. The continued reliance on manual systems reduces the ability of schools to manage large volumes of data efficiently and restricts opportunities for improving records accessibility and security. As explained by Laudon and Laudon (2022), successful digital transformation requires integration of technology, skilled personnel, and supportive organizational systems.

In view of these findings, there is a clear need to enhance digitalization efforts in public schools. Literature suggests that the adoption of AI-based and digital records systems can improve administrative efficiency by automating processes, enhancing data accessibility, and strengthening information management (Zhou et al., 2023; Evans et al., 2022). Therefore, implementing a SMART AI-based digital records management system can address digitalization challenges and support efficient, secure, and resilient records management in public schools.

Table 7

Challenges in Records Management along Data Privacy

Parameter	Mean	Rank	Interpretation
Preventing data breaches and cyberattacks on digital records	2.60	1	Moderately Challenging
Ensuring consistent implementation of data privacy policies	2.30	2	Slightly Challenging
Protecting sensitive student and personnel data	1.70	3	Slightly Challenging
Securely disposing of obsolete records	1.30	4	Not Challenging
Keeping up with evolving data privacy regulations	1.20	5	Not Challenging
Overall Mean	1.82		Slightly Challenging

Legend: 5.00-4.50 = Very Challenging, 4.49-3.50 = Challenging, 3.49-2.50 = Moderately Challenging, 2.49 -1.50 = Slightly Challenging, 1.49 -1.00 = Not Challenging

The data in Table 7 present the challenges encountered by public secondary schools in the San Fernando District, Camarines Sur in terms of data privacy. The findings indicate that schools face concerns in protecting sensitive information, particularly due to limited security measures and reliance on manual and paper-based systems. An examination of the responses reveals that school personnel encounter issues such as lack of secure storage, inadequate access controls, and risks of unauthorized disclosure of records. These challenges are further intensified by insufficient awareness and implementation of data privacy protocols. This observation is supported by Kshetri (2021), who emphasized that weak security mechanisms increase vulnerability to data breaches. Similarly, Martin, Borah, and Palmatier (2020) highlighted that effective data protection requires strong governance, transparency, and accountability in handling sensitive information.

These findings suggest that existing data privacy practices are not fully adequate to ensure the protection of confidential records. The continued use of manual systems increases the likelihood of unauthorized access, data mishandling, and potential breaches, which may compromise institutional credibility. As emphasized by Laudon and Laudon (2022), effective data privacy management requires integrated technological systems supported by clear policies and security controls.

Given these challenges, there is a strong need to enhance data privacy measures through digital transformation. Literature indicates that AI-based and digital systems improve data protection by enabling secure access controls,

encryption, and automated monitoring of information systems (Dwivedi et al., 2021; Zhou et al., 2023). Therefore, the implementation of a SMART AI-based digital records management system can strengthen data privacy, improve information security, and support responsible records management in public schools.

Table 8

Challenges in Records Management along Disaster Resilience

Parameter	Mean	Rank	Interpretation
Preventing data loss due to natural disasters	4.80	1	Very Challenging
Recovering lost data quickly after disaster	4.60	2	Very Challenging
Ensuring access to records during disasters	4.20	3	Challenging
Maintaining reliable backup systems	3.50	4	Challenging
Overall Mean	4.27		Challenging

Legend: 5.00-4.50 = Very Challenging, 4.49-3.50 = Challenging, 3.49-2.50 = Moderately Challenging, 2.49 -1.50 = Slightly Challenging, 1.49 -1.00 = Not Challenging

The results in Table 8 present the challenges encountered by public secondary schools in the San Fernando District, Camarines Sur in terms of disaster resilience in records management. The findings indicate that schools face significant risks in protecting and preserving records during disasters, largely due to reliance on physical storage and manual systems. A closer examination of the responses shows that records are vulnerable to damage caused by environmental hazards such as flooding, typhoons, and fire. Schools also experience limitations in backup systems, lack of offsite storage, and absence of disaster recovery plans. These challenges are consistent with Katuu (2020), who emphasized that reliance on paper-based records increases vulnerability to loss during disasters. Similarly, Ngoepe and Saurombe (2022) highlighted that inadequate digital infrastructure weakens institutional preparedness and continuity in times of crisis.

These findings suggest that current records management systems are not sufficiently resilient to withstand disaster-related disruptions. The absence of digital backup mechanisms and secure storage increases the likelihood of permanent data loss, which may affect administrative continuity and decision-making. As explained by Chowdhury and Alam (2021), effective disaster-resilient systems require digital storage, cloud-based backup, and secure access to ensure continuity of operations.

In light of these challenges, strengthening disaster resilience through digital transformation becomes essential. Literature indicates that AI-based and cloud-supported systems enhance resilience by enabling automated backups, secure storage, and remote access to critical information (Zhou et al., 2023; Evans et al., 2022). Therefore, implementing a SMART AI-based digital records management system can significantly improve disaster preparedness, protect institutional records, and ensure continuity of administrative operations in public schools.

Propose the development of (SMART) AI-based digital record management system that enhances administrative efficiency and disaster resilience in public schools within the San Fernando District, DepEd Division of Camarines Sur – Table 9 presents the proposed development of a Secure, Managed, Automated, Resilient, and AI-Based, Technology-Driven (SMART) digital records management system for public secondary schools in the San Fernando District, Camarines Sur. The findings highlight the key features and components of the system designed to address existing gaps in records management practices and challenges identified in the study.

The results show that the proposed system integrates essential functions such as secure data storage, automated records processing, intelligent classification, efficient retrieval, and disaster-resilient backup mechanisms. These features aim to improve records organization, enhance accessibility, and strengthen data protection. The integration of artificial intelligence supports automation and reduces manual workload, addressing issues related to

inefficiency and human error. This aligns with Zhou et al. (2023), who emphasized that AI technologies enhance records management through automated classification and intelligent data processing. Similarly, Evans et al. (2022) highlighted that digital transformation improves organizational efficiency and standardizes records management processes.

Table 9

Development of (SMART) AI-based digital record management system

Indicators	Mean	Rank	Interpretation
The system can improve the efficiency of retrieving records through search, indexing, and filtering functions.	1.20	1	Strongly Agree
The system can reduce time and effort in locating documents compared to manual filing systems.	1.25	2	Strongly Agree
The system can automatically classify and organize records using AI-based features.	1.30	3	Strongly Agree
The system provides reliable backup and recovery of records during disasters.	1.28	4	Strongly Agree
The system allows access to records even during emergencies through cloud-based or remote access.	1.32	5	Strongly Agree
The system supports training and ease of use for school personnel in adapting to digital records management.	1.35	6	Strongly Agree
The system ensures secure digital storage and protection of sensitive records.	1.33	7	Strongly Agree
The system provides technical support features (guides/helpdesk) for users.	1.40	8	Strongly Agree
Overall Mean	1.30		Strongly Agree

Legend: 1.00–1.49 = Strongly Agree, 1.50–2.49 = Agree, 2.50–3.49 = Neutral, 3.50–4.49 = Disagree, 4.50–5.00 = Strongly Disagree

These findings suggest that the SMART AI-based system provides a comprehensive solution to the identified challenges in data management, digitalization, data privacy, and disaster resilience. By incorporating secure and automated processes, the system enhances the accuracy, reliability, and accessibility of records while ensuring protection against data loss and unauthorized access. As emphasized by Laudon and Laudon (2022), effective information systems integrate technology, processes, and users to achieve improved performance and decision-making. Overall, the development of the SMART AI-based digital records management system demonstrates a strategic approach to modernizing records management in public schools. The system not only improves administrative efficiency but also strengthens institutional resilience by ensuring secure, accessible, and well-managed records. Thus, the proposed system serves as a sustainable and technology-driven solution to support efficient and disaster-resilient records management practices in public schools.

The study developed a SMART AI-Based Digital Records Management System to enhance administrative efficiency and disaster resilience in public schools in the San Fernando District, DepEd Division of Camarines Sur. The system was based on findings from existing practices and identified challenges, particularly the continued reliance on manual processes and issues in data management, digitalization, data privacy, and disaster vulnerability.

The proposed system integrates Secure, Managed, Automated, Resilient, and AI-Based, Technology-Driven components, enabling digital record organization, automated classification, controlled access, and secure storage. It incorporates features such as searchable databases, metadata tagging, and indexing to improve retrieval

efficiency, while user-friendly design and training support address digitalization challenges. Additionally, the system includes disaster-resilient features such as cloud-based storage, automated backups, and remote access to ensure continuity of operations. Guided by the Input–Process–Output framework, the system was developed using data on current practices and challenges, along with relevant policies on data privacy and records management. The SMART AI-based system provides a practical and technology-driven solution to improve records organization, enhance data security, and strengthen disaster resilience in public schools.

4. Conclusions and Recommendation

This study concludes that public secondary schools in the San Fernando District, Camarines Sur have established records management practices in terms of capture, classification, access, and archival; however, these processes remain largely manual and paper-based, limiting efficiency, accessibility, and security. The findings further reveal that schools encounter moderate to high challenges in data management and digitalization, while issues related to data privacy and disaster resilience highlight vulnerabilities in protecting and preserving records. These conditions indicate that existing systems are functional but not sufficiently efficient, secure, or resilient to meet the increasing demands of administrative operations. Moreover, the study confirms that the development of a SMART AI-based digital records management system provides a viable and strategic solution to address these challenges. The proposed system enhances records organization, improves retrieval efficiency, strengthens data security, and ensures disaster-resilient storage through automation, intelligent classification, and cloud-based technologies. The integration of AI and digital tools supports modernization of records management practices and promotes more efficient and reliable administrative processes in public schools.

In light of these conclusions, it is recommended that public schools adopt the proposed SMART AI-based digital records management system to improve operational efficiency and ensure data protection and resilience. School administrators and the Department of Education (DepEd) should strengthen support for digital transformation by providing adequate ICT infrastructure, funding, and technical assistance. Capacity-building programs and continuous training should also be implemented to enhance the digital competencies of school personnel. Furthermore, schools should establish clear policies and guidelines aligned with national standards on records management, data privacy, and disaster preparedness. Future studies may explore system implementation, usability testing, and long-term impact of AI-based records management systems in broader educational settings. Overall, embracing technology-driven solutions is essential for achieving efficient, secure, and resilient records management in public schools.

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