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Development and Evaluation of a Digital Knowledge Management System: An Innovation to Enhance the Financial Management of School Heads

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Abstract

This study developed and evaluated a Digital Knowledge Management System (DKMS) designed to support the financial management processes of school heads in Paracale District, Division of Camarines Norte, particularly in budgeting, resource allocation, and reporting. Guided by the Input–Process–Output (IPO) framework, the study employed a quantitative research method using a validated survey questionnaire with a five-point Likert scale. The findings from 23 school heads showed that all respondents used Google Sheets and Google Forms for financial-related activities but continued to encounter inconsistencies in reports, inefficient budget preparation, and delays in report submission. In response to these challenges, the DKMS was developed to integrate financial information and processes within a centralized digital system. The system obtained an overall weighted mean of 4.82, interpreted as Strongly Agree, indicating high acceptability among respondents. Budgeting received the highest weighted mean of 4.91, followed by reporting at 4.83 and resource allocation at 4.72. The study concluded that the developed DKMS was highly acceptable to school heads as a digital system for supporting financial management processes. Adoption of the system, appropriate training and technical support, improved technological infrastructure, continued system enhancement, and further research involving larger populations and different educational settings were recommended. The study supports SDG 4 (Quality Education), SDG 9 (Industry, Innovation and Infrastructure), and SDG 16 (Peace, Justice and Strong Institutions) through improved resource management, digital innovation, and emphasis on financial transparency and accountability. Its sustainability significance lies in supporting organized financial information, efficient resource management, accountable reporting, and more sustainable school administration.

Keywords: Budgeting, Digital Knowledge Management System, Financial Management, Reporting, Resource Allocation, School Heads

1. Introduction

Effective financial management is essential to school administration because school heads are responsible for budgeting, resource allocation, expenditure monitoring, and financial reporting. These responsibilities require accurate information, transparency, accountability, and efficient decision-making. Digital knowledge management systems (DKMS) can support these functions by organizing financial information and improving access to data needed for school financial management. This study therefore focuses on developing and evaluating a DKMS for school heads in Paracale District, particularly for budgeting, resource allocation, and reporting.

Philippine school heads are accountable for the proper management of school funds and resources under Republic Act No. 9155 (Republic of the Philippines, 2001), while DepEd Order No. 71, s. 2010 emphasizes transparency and accountability in the utilization of Maintenance and Other Operating Expenses (MOOE) (Department of Education [DepEd], 2010). International literature similarly emphasizes the importance of financial competencies. Amos et al. (2021) identified budgeting, monitoring, evaluation, auditing, and fund mobilization as important school management skills, while Zaini (2025) emphasized financial planning, allocation, accountability, and digital financial systems. Ejom, Sussan Ikana et al. (2025) further associated financial planning and expenditure control with school effectiveness.

Digital information systems can improve administrative efficiency, resource management, and data-informed decision-making (Sunario et al., 2024; Means et al., 2009). Automated technologies can also improve accuracy, transparency, and real-time assessment (Nweke and Bakare, 2025). In financial management, digital systems support planning, control, resource allocation, and decision-making while reducing administrative burden (Li, 2023; Isma et al., 2024). Evidence also demonstrates their value in budgeting and reporting. Khairani Khairani and Tamba (2025) found that e-RKAS improved budget realization accuracy, reduced budget deviations, and accelerated financial reporting. Philippine studies similarly indicate that digital platforms can strengthen school planning, management, and reporting (Lopez and Lorejo, 2023; Chatto, 2025). Automated reporting can further improve timeliness, accuracy, monitoring, and access to institutional information (Flour, 2025; Chupilko et al., 2023).

Effective school financial management requires transparency, stakeholder engagement, proper resource allocation, and alignment of budgets with institutional plans (Espela et al., 2025). Financial and supervisory competencies of school heads also contribute to effective school operations (Jardinero and Eslabon, 2025; Bautista, 2025). More specifically, Rose (2025) demonstrated that a Budget and Financial Management Information System integrating budget planning, MOOE allocation, expenditure tracking, and reporting can improve forecasting, accountability, and financial decision-making. These findings support the potential application of an integrated digital system to the financial responsibilities of school heads.

The study adopts an Input–Process–Output (IPO) framework. Inputs consist of school heads' existing knowledge management practices and challenges in budgeting, resource allocation, and financial reporting. The process includes data collection, system design and development, testing, and validation. The output is the developed DKMS, which is evaluated according to its acceptability and contribution to budgeting, resource allocation, and reporting.

Existing studies demonstrate that digital systems can improve educational administration, data-informed decision-making, financial transparency, and reporting (Sunario et al., 2024; Means et al., 2009; Li, 2023; Isma et al., 2024). Philippine research likewise supports digitalization in school management and financial processes (Lopez and Lorejo, 2023; Chatto, 2025; Rose, 2025). However, the reviewed literature provides limited evidence on a DKMS specifically developed around the financial knowledge management needs of school heads in Paracale District. This gap supports the development of a system integrating budgeting, resource allocation, and reporting based on the practices and challenges of its intended users.

The study aligns with SDG 4 – Quality Education by supporting more effective management of resources for educational programs and services. It also relates to SDG 9 – Industry, Innovation and Infrastructure through the application of digital technology to school financial processes and SDG 16 – Peace, Justice and Strong Institutions through its emphasis on financial transparency, accountability, and responsible resource management.

The DKMS contributes to educational, technological, institutional, and governance sustainability by supporting organized financial information, efficient budgeting and resource allocation, and accountable reporting. By integrating these functions within a digital platform, the study seeks to strengthen school heads' financial management and support more efficient, transparent, and sustainable school administration in Paracale District.

2. Material and methods

2.1 Research Design

The study used a quantitative research method utilizing numerical data gathered through survey questionnaires. The approach was used to determine school heads' existing knowledge management practices in budgeting, resource allocation, and reporting, identify challenges encountered in financial management, and assess the acceptability of the developed DKMS in these areas.

2.2 Locale of the Study

The study was conducted in Paracale District, Division of Camarines Norte, covering twenty-nine (29) public schools. These schools provided the setting for examining the financial knowledge management practices of school heads and evaluating the developed DKMS.

2.3 Respondents of the Study

The respondents were school heads from public schools in Paracale District who were directly involved in school data management and financial administration. Their responsibilities made them appropriate respondents for assessing existing financial management practices, challenges, and the acceptability of the developed system.

2.4 Sample and Sampling Procedure
The manuscript identified purposive sampling in selecting school heads because of their direct involvement in school data management and financial administration. It also specified total enumeration sampling, in which all individuals belonging to the identified target population were intended to participate in the study.

2.5 Research Instrument
A survey questionnaire using a five-point Likert scale was employed to collect the required data. Responses were interpreted as 5 for Strongly Agree, 4 for Agree, 3 for Moderately Agree, 2 for Disagree, and 1 for Strongly Disagree. The instrument underwent expert review and content validation by a panel of experts to establish its validity and ensure that its items appropriately measured the intended constructs.

2.6 Data Gathering Procedure
Permission to conduct the study was secured from the district office before data collection. The questionnaires were distributed to the school heads and retrieved upon completion. The responses were subsequently compiled, organized, and prepared for statistical analysis.

2.7 Data Analysis Techniques
The collected data were analyzed using frequency and mean. Frequency was used to summarize responses regarding existing knowledge management practices and financial management challenges, while mean was used to determine the respondents' assessment of the developed DKMS.

2.8 Ethical Considerations
Informed consent was obtained after participants were provided with information regarding the study's purpose, procedures, duration, researcher contact details, and possible risks or benefits. Participation was voluntary, and respondents could withdraw without penalty. Confidentiality was maintained by using codes or pseudonyms, restricting access to stored data, and using the information solely for research purposes. Participation or withdrawal did not affect the respondents' employment or school status.

3. Results and Discussion

3.1 Digital Knowledge Management Practices and Financial Management Challenges

3.1.1 Existing Digital Knowledge Management Practices

All 23 respondents reported using Google Sheets and Google Forms for financial-related activities. These applications were used for data collection, computation, recording, financial monitoring, report submission, and information gathering. The findings indicate that school heads already use digital platforms in performing financial management functions. Despite this digital adoption, the use of separate applications may limit data integration, centralized storage, and streamlined reporting. The finding supports previous research showing that digitalization can improve school financial operations, budget accuracy, and reporting efficiency. Khairani and Tamba (2025) found that the e-RKAS system improved budget accuracy, reduced financial deviations, and accelerated reporting processes. Li (2023) and Isma et al. (2024) similarly stressed that financial information systems enhance decision-making, reduce administrative burdens, and improve financial transparency in educational institutions.

3.1.2 Challenges in School Financial Management

All 23 respondents identified inconsistencies in reports, inefficient budget preparation, and delays in report submission as financial management challenges. The uniform responses indicate persistent difficulties in preparing, organizing, and submitting financial information despite the use of existing digital tools. These challenges indicate limitations in fragmented financial management processes and support the need for a more integrated system. Studies by Flour (2025) and Chupilko et al. (2023) emphasized the role of automation in enhancing data management, reporting accuracy, and operational efficiency. Niar Farah Dhiba et al. (2024) and Secreto and Tabo (2025) also noted that technology adoption and data-driven leadership improve collaboration, efficiency, and evidence-based management practices in schools.

3.2 Proposed Digital Knowledge Management System

3.2.1 System Structure and Financial Management Process

The proposed Automated Data Management System provides school heads and authorized personnel with secure access to financial modules covering Fund Sources, Annual Implementation Plans (AIP), Work and Financial Plans (WFP), and Annual Procurement Plans (APP). Users input school data, which undergo validation before being stored in a centralized database. The system then automatically processes and consolidates records to generate reports on the status of Programs, Projects, and Activities (PPAs), providing feedback to support financial management. The proposed process responds directly to the identified need for integrated financial information management. By centralizing data validation, storage, processing, and reporting, the system is designed to address fragmented records, reporting inconsistencies, and administrative delays. This is consistent with the literature emphasizing that integrated digital systems can improve administrative productivity, transparency, financial accountability, and decision-making.

3.3 Acceptability of the Developed DKMS

3.3.1 Acceptability in Terms of Budgeting

The DKMS obtained a weighted mean of 4.91 for all four budgeting indicators and a grand mean of 4.91, interpreted as Strongly Agree. Respondents strongly agreed that the system made budget planning easier, facilitated alignment with the School Improvement Plan (SIP) and Annual Implementation Plan (AIP), decreased errors and inconsistencies, and improved the efficiency of budget preparation. The results indicate high acceptance of the DKMS for budgeting and suggest that the system addressed the school heads' need for a more organized and accessible budgeting process. This finding supports Khairani and Tamba (2025), who found that digital financial management improved budget accuracy, reduced financial deviations, and accelerated reporting. The result also supports Li (2023) and Isma et al. (2024), who emphasized the contribution of financial information systems to decision-making, efficiency, and transparency.

3.3.2 Acceptability in Terms of Resource Allocation

The DKMS obtained an overall weighted mean of 4.72 for resource allocation, interpreted as Strongly Agree. Efficiency of resource allocation received a mean of 4.70, while transparency in allocation decisions, flexibility in reallocating resources, and efficient tracking of resource utilization each obtained 4.73. These consistently high ratings indicate that respondents perceived the resource allocation component as efficient, transparent, flexible, and useful for monitoring resources. The findings demonstrate the potential of an integrated digital platform to support more organized resource management and strengthen financial accountability.

3.3.3 Acceptability in Terms of Reporting

Reporting obtained an overall weighted mean of 4.83, interpreted as Strongly Agree. All indicators received the same weighted mean of 4.83, covering on-time report submission, timely decision-making, monitoring of fund liquidation, and efficient monitoring and evaluation of PPAs. The uniform ratings indicate that reporting was highly accepted by respondents and perceived as useful for improving timeliness, monitoring, and decision-making. This finding is consistent with Flour (2025) and Chupilko et al. (2023), who emphasized that automated systems can improve reporting accuracy, real-time monitoring, operational efficiency, and decision-making.

3.3.4 Overall Acceptability of the DKMS

The developed DKMS obtained an overall weighted mean of 4.82, interpreted as Strongly Agree. Budgeting received the highest mean of 4.91, followed by reporting at 4.83 and resource allocation at 4.72. All three areas were therefore highly accepted by the respondents. The consistently high ratings demonstrate that the DKMS was perceived as useful and responsive to school heads' financial management needs. Its strong acceptability supports previous findings that accessible digital systems can improve administrative productivity and financial accountability. Overall, the results indicate that integrating budgeting, resource allocation, and reporting into a centralized digital system can support more efficient and organized school financial management.

3.4 Implications of the Findings

The findings demonstrate the potential contribution of a DKMS to educational financial management by addressing inefficiencies in budgeting, reporting, and organization of financial information. The system may support greater transparency, accountability, accuracy, and efficiency by integrating financial functions that were previously managed through separate digital applications. The findings also contribute to digital transformation in educational administration by emphasizing the application of knowledge management systems beyond instructional activities. For school administrators and policymakers, the results indicate the potential value of integrated digital systems in strengthening financial governance, administrative performance, and evidence-based decision-making.

3.5 Limitations and Future Research

The study was limited to school heads in Paracale District and focused primarily on the acceptability of the DKMS in budgeting, resource allocation, and reporting. It did not extensively examine long-term system performance, sustainability, security, scalability, or compatibility with other financial systems. The findings were also based on respondents' perceptions and self-reported data, which may be influenced by individual experiences. Future research may involve larger populations and other districts or regions to validate the findings. Further studies may examine the long-term effectiveness of the DKMS and explore automated analytics, cloud integration, mobile accessibility, real-time monitoring, and comparisons between manual and integrated digital financial management systems.

4. Conclusion & Recommendations

The study concluded that school heads in Paracale District use Google Sheets and Google Forms in managing financial information but continue to encounter inconsistencies in reports, inefficient budget preparation, and delays in report submission. In response to these identified practices and challenges, the Digital Knowledge Management System (DKMS) was developed to support budgeting, resource allocation, and reporting. The system received high acceptability ratings in all three areas, with budgeting receiving the highest assessment. These findings indicate that the developed DKMS is highly acceptable to school heads as a digital system for supporting their financial management processes.

Schools in Paracale District may adopt the developed DKMS to improve budgeting, resource allocation, and financial reporting, supported by appropriate training, technical assistance, internet connectivity, computer resources, and institutional policies and monitoring mechanisms. The system may also be continuously improved through automated reporting, cloud-based storage, data analytics, and mobile accessibility. Future studies may involve larger populations and different educational settings and examine the long-term effectiveness, sustainability, and impact of digital knowledge management systems on school performance and financial accountability.

The study was limited to school heads in Paracale District and focused primarily on the acceptability of the DKMS in budgeting, resource allocation, and reporting. It did not extensively examine the system's long-term performance, sustainability, security, scalability, or compatibility with other financial systems. The findings were also based on respondents' perceptions and self-reported data, which may have been influenced by their individual experiences.

5. Compliance with ethical standards

The author declares no conflict of interest, and this study received no external funding. The author acknowledges the school heads and the schools in Paracale District for their participation and institutional support. Participation was voluntary, informed consent was obtained, and data were collected using non-invasive methods while maintaining confidentiality and ensuring that no identifying information was disclosed.

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