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Leveraging DepEd Bicol's Program Management Information System (PMIS) for Data-Informed Insights: Basis for the Development of Action Plan

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ABSTRACT

This study examined the utilization, implementation practices, and challenges of the Program Management Information System (PMIS) in DepEd Bicol to enhance public administration and operational efficiency. Employing a mixed-methods convergent parallel design, the research utilized universal sampling to gather data from Regional and Division program owners, along with school heads from pilot Implementing Units. Quantitative data were processed using Python (Pandas, NumPy, SciPy, Statsmodels) to ensure a cost-effective, robust statistical analysis. Results indicate that the PMIS is significantly utilized ($\bar{x}$=3.018), demonstrating its functional integration into daily administrative workflows, particularly in data management. While demographic factors showed negligible impact, professional tenure and specialized training emerged as primary drivers of system engagement. Findings revealed that while PMIS practices are "largely implemented," they remain operational rather than strategic, characterized by a reliance on traditional judgment and inconsistent stakeholder engagement. Training and capacity building were identified as the weakest domains ($\bar{x}$=2.753), with significant disparities noted across DepEd levels of governance. The study identified a critical "resource-access gap"—unstable connectivity and hardware shortages—and a "commitment-action gap" where clear policies lack rigorous leadership enforcement. These bottlenecks result in inefficient "workarounds," data inaccuracy, and user burnout. To transition PMIS from a "digital filing cabinet" to a strategic engine, the study proposes a data-driven action plan prioritizing technical modernization (cloud-native frameworks and offline-first apps), mandated MOOE allocations for ICT infrastructure, and the institutionalization of permanent Focal Persons. By embedding PMIS into daily workflows and fostering a culture of "PMIS Champions," DepEd Bicol can ensure long-term sustainability, transparency, and evidence-based governance.

Keywords: *PMIS, Data-Informed Enhancement, Public Administration, Operational Efficiency Digital Governance, Educational Management, Data-Driven Decision-Making, Resource Optimization, DepEd Bicol*

INTRODUCTION

Information systems (IS) are widely recognized as a cornerstone of modern studies, empowering organizations to compete efficiency and effectively and leverage novel technologies (Hassan, (2018). These systems have proven to be an integral part of an organization's lifecycle. Database technology is a structured

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collection of information that serves as the foundational element, allowing to be efficiently searched and manipulated by computers (Roy, Daniel, & Agrawal, 2023).

Given this foundational understanding, the adoption of IS has become the global strategy, particularly in enhancing the efficiency and effectiveness of public administration and management. It serves as a comprehensive tool that integrate various program and project management processes, that facilitate seamless gathering, integration, and dissemination of data and information.

The implementation of IS particularly in the education system, will empower educational managers and decision-makers to make data-driven decisions geared towards optimizing resource allocation and improving overall program/project outcomes. The integration of IS in educational settings has proven instrumental in streamlining administrative tasks, allowing educators to focus more on instructional quality and student engagement rather than administrative concerns (Grepon et al., 2021a).

This global trend of integrating IS into public administration and operational efficiency in the basic education sector underscores the importance of functional IS for monitoring and evaluating programs activities and projects (PAPs) effectively, that aims to enhance efficiency and transparency.

Countries around the world acknowledge the capacity of these systems to facilitate data-driven decision-making, enabling policymakers to allocate resources more efficiently and improve educational outcomes. Likewise, the implementation of Education Management Information Systems (EMIS) in various countries and in the Philippine Department of Education (DepEd) has demonstrated significant improvements in timely data collection, accuracy and accessibility, leading to better policy formulation and execution (Asio et al., 2022a).

In particular, the Philippines legal framework for implementing IS has already well-established. Presidential Decree No. 1445, also known as the Government Auditing Code of the Philippines, (Commission on Audit, n.d.) mandates the establishment of internal control systems in government agencies to ensure the proper use of resources (DBM, 2012).

In addition, Republic Act No. 11315 (Government of the Philippines, 2018) emphasizes the need for accurate and timely data collection to inform policy decisions, further supporting the integration of systems in government operations (Philippine Statistical Authority, n.d.).

The Philippine Government further established its legal framework to support the implementation of IS. For instance, Republic Act No. 9155, specifically mandates the DepEd to manage and maintain a database and management IS for the region (Department of Education, 2021). This policy underscores the government's commitment to utilizing information systems to enhance educational governance and accountability. In addition, the Data Privacy Act of 2012 further strengthens this framework by mandating the protection of personal information within information and communications systems (Government of the Philippines, 2012); Department of Education, n.d.).

Effective public administration and operational efficiency are crucial for ensuring quality education and sustainable development. In recent years, IS have emerged as essential tools in enhancing educational governance by streamlining administrative tasks, improving data management, and facilitating informed decision-making.

Globally, education systems have adopted IS to strengthen policy implementation, optimize resource allocation, and enhance transparency in institutional operations. It was observed that countries with well-developed IS frameworks have demonstrated improved efficiency in managing educational programs, monitoring performance indicators, and ensuring accountability within their education systems.

DepEd on its part enhances educational management through the utilization of Program Management Information System (PMIS) in the DepEd Region V or DepEd Bicol. Ongoing efforts to leverage technology for improving the efficiency and transparency of educational governance and public administration have been undertaken for the last 10 years now. PMIS in the educational context is an emerging area of research, with recent studies focusing on its implementation, associated challenges, and strategies necessary for maximizing its potential (Grepon et al., 2021). In the DepEd Region V, where

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educational challenges are more pronounced due to geographical and socio-economic factors, the integration of PMIS is crucial for improving the quality of education and governance at various management levels (Asio et al., 2022).

PMIS enables the efficient gathering, analysis, and dissemination of data to support decision-making processes in educational institutions (Grepon et al., 2021). This shift towards data-driven management aligns with global trends, where countries have adopted such systems to improve resource allocation and enhance accountability within educational governance (Asio et al., 2022). Recent studies indicate that while PMIS has the potential to streamline administrative tasks and provide real-time data for decision-making, significant barriers to full-scale implementation persist, particularly in rural and underdeveloped regions like Bicol (DepEd SDO1 Pangasinan, 2024a).

The adoption of PMIS has proven beneficial in other parts of the Philippines, where similar initiatives have led to improvements in data accuracy and accessibility (Asio et al., 2022). However, the Bicol Region faces unique challenges in implementing such systems. Limited access to technological infrastructure, coupled with inconsistent training programs for educational personnel, hampers the full utilization of PMIS (DepEd RO8, 2024). Tailored strategies are critically needed to address these specific challenges and ensure PMIS effectiveness in the region (DepEd Dasmariñas, 2023).

Moreover, the effectiveness of PMIS in improving educational management relies heavily on the active participation of all stakeholders. Educational leaders, teachers, and policymakers must be adequately trained and supported in PMIS use to ensure its successful integration into daily operations (Grepon et al., 2021). Research suggests that regions providing comprehensive training and capacity-building initiatives for their personnel have experienced higher PMIS adoption rates (Asio et al., 2022).

Recent studies emphasize the importance of a robust legal framework in supporting PMIS implementation in educational settings. They play a crucial role in ensuring the protection of personal data within these systems. These legal frameworks are vital for fostering trust and ensuring the effective and secure implementation of PMIS.

One significant challenge in PMIS implementation is ensuring the accuracy and reliability of collected data and information. Research highlights that data inconsistencies and errors are common in regions with limited technological infrastructure (DepEd SDO1 Pangasinan, 2024b). Inaccurate data can lead to poor decision-making, ultimately affecting education quality and resource allocation. Therefore, ensuring that PMIS is properly calibrated to collect and analyze data accurately is a critical area of focus (DepEd RO8, 2024).

Despite the benefits of the PMIS, traditional governance models still face challenges that hinder efficiency and transparency. These structures often rely on manual, paper-based processes, leading to inefficiencies, delays, and high operational costs. Furthermore, bureaucratic red tape and centralized decision-making slow down service delivery and limit the participation of DepEd personnel. Additionally, the various levels of management lack mechanisms to track and evaluate the effectiveness of policies in real-time, which ultimately hinders the successful implementation of the PMIS.

Furthermore, corruption remains a significant issue in public administration, particularly in developing countries where weak institutional frameworks allow for unethical practices. A lack of transparency and the use of easily manipulated data often lead to erroneous or tampered information, resulting in the mismanagement of public resources. E-governance presents a viable solution by enabling open data policies, reducing human intervention, and improving regulatory oversight.

The DepEd as one of the biggest government organizations has been actively promoting the operationalization and sustainability of the Program Management Information System (PMIS) to improve administrative processes and standards, thereby enhancing data-driven decision-making. The PMIS in the context of DepEd Bicol is a specialized information system to monitor and evaluated all the PAPs across the country. It was developed with funding assistance from the Australian Aid now Department of Foreign Affairs and Trade (DFAT) which is designed to manage and monitor the progress of its diverse PAPs. Its

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role extends across all governance levels, from the central office to regional and division offices, down to individual schools.

The PMIS is one of the single, web-based information system implemented by the Department across 17 regions to collect, store, and organize all data related to PAPs. The data stored and collected include budget allocations, tracking of physical target and accomplishments, financial targets and utilization, work plans, and procurement details. This centralization process eliminates the fragmentation of data ensuring consistency and easy access to data/information. Moreover, the PMIS provides quality, relevant, and timely data/information that is crucial for effective planning and budgeting processes and decision making within DepEd [Department of Education, 2021).

It allows for the systematic encoding of work and financial plans and/or operational plans from all operating units across all levels of governance, enabling the generation of comprehensive summaries of physical and financial targets and accomplishments. This thus facilitates strategic allocation of limited resources, ensuring that funds are directed to areas of greatest need and impact based on the identified priority needs in their respective plans and targets [Department of Education, n.d.).

This researcher believed that automating data collection, reporting, and certain administrative tasks within the PMIS for big ticket PAPs will reduces manual effort and streamlines workflows. This can significantly cut down on bureaucratic processes, allowing personnel to focus more on core teaching and learning activities rather than administrative functions [Department of Education, (n.d.)].

Furthermore, real-time reporting on project status and outputs of programs/projects fosters greater transparency and accountability which is the core tenets of Public Administration. By providing a continuous data stream, this mechanism enables education stakeholders and oversight agencies—such as the DBM, NEDA, and various development partners—to rigorously monitor the disbursement of funds. Specifically, it ensures oversight of Program Support Funds (PSF) downloaded to Regional and Schools Division Offices (SDOs), ensuring that fiscal allocations are utilized efficiently and remain aligned with national development goals. Likewise, these comprehensive data and information provided by the PMIS offers valuable insights into the effectiveness of different programs and interventions. Thus assist the top management and program owner in formulating new policies, refining existing curricula, and making strategic decisions to improve educational outcomes across the country [Department of Education, 2021).

The operationalization of the PMIS aims to address the perennial challenges in data reporting and the monitoring and evaluation of various PAPs across all regions in the country. Given the complexity of implementing numerous initiatives, the PMIS provides a centralized platform to track progress, identify bottlenecks, and ensure that interventions effectively address the needs of learners (DepEd SDO1 Pangasinan, 2024b). This systematized approach enables more informed decision-making and resource allocation at all levels of governance.

Despite these advancements, challenges persist in the effective utilization of the PMIS within DepEd, particularly in regions such as the DepEd Bicol. Issues related to system accessibility, technical capacity, data accuracy, and user adaptability hinder the full realization of PMIS benefits in educational governance.

PMIS users in some regions, such as DepEd Regional Office 8 (2024), have specifically identified concerns regarding user training, data accuracy, and system accessibility. These challenges highlight the critical need for targeted strategies to address regional disparities and ensure that all stakeholders can effectively engage with the system.

The success of the PMIS heavily relies on the active participation and collaboration of various education stakeholders, including school personnel, administrators, and policymakers. Therefore, ensuring that these stakeholders are adequately trained and equipped to use the system is crucial for its effectiveness. However, inconsistencies in training programs and resource availability have led to varying levels of system adoption and proficiency across different regions (DepEd Dasmariñas, 2023). This inconsistency necessitates a more cohesive and comprehensive approach to capacity building and system implementation.

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Recognizing these challenges, the Department has made significant strides in adopting PMIS to enhance management of operations. The PMIS was specifically developed to support DepEd's planning and budgeting strategy, serving as the official source of data on programs, projects, and activities from planning to implementation (Department of Education, 2021).

This initiative aligns with global practices, aiming to increase transparency and efficiency in managing educational PAPs. DepEd is committed to operationalizing the PMIS, as evidenced by substantial annual funding allocated and the issuance of policy guidelines and directives to ensure its effective utilization and operationalization. Specifically, DepEd Order No. 11, s. 2021, outlines the processes, timelines, and accountabilities for using the PMIS within the Department, aiming to support effective and efficient management of plans and programs, increase transparency, and aid in policy formulation and decision-making (Department of Education, 2021).

Given the significant role of the PMIS in modern public administration, serving as a cornerstone for operational efficiency and effective governance across the government sector, this study aims to explore the existing strategies and best practices employed within DepEd Bicol. This is particularly vital in the education sector, where the strategic deployment of resources directly impacts national development and the future of its citizens. A well-utilized PMIS is not just about tracking tasks; it is about ensuring transparency, accountability, and the judicious use of public funds, all of which are primordial benchmarks for management productivity and performance.

By examining the current implementation processes, existing challenges, and notable successes, this research seeks to provide actionable insights to enhance the effectiveness of the PMIS in the DepEd Region V or otherwise known as DepEd Bicol. Through a comprehensive analysis of the PMIS's operationalization, the study will identify best practices and areas for improvement. It will also assess the impact of relevant legal frameworks and guidelines on the system's implementation, offering a holistic understanding of the factors influencing the PMIS's success.

The empirical findings of this study will serve as a valuable reference for other regions facing similar challenges, promoting a more unified and effective approach to educational management across the Philippines. Ultimately, these findings will be used to inform PMIS adjustments including policy adjustments and capacity-building initiatives, contributing to improved educational outcomes.

Understanding how school administrators, educators, and other stakeholders integrate and maximize the PMIS can provide valuable insights into improving data management, decision-making processes, and overall institutional efficiency. Identifying challenges encountered during PMIS implementation will lead to recommendations for enhancing system usability, ensuring data security, and strengthening capacity-building initiatives for educational leaders and personnel.

Specifically, this study will delve into analyzing the current strategies and practices employed in utilizing the PMIS within DepEd Bicol's educational management framework. The findings of this study will guide policymakers, school administrators, and other education stakeholders in optimizing the use of PMIS to improve governance, accountability, and service delivery in the education sector.

As DepEd Bicol continues to adapt to digital transformations in education, it is crucial to identify and implement strategic approaches that will enhance the efficiency and effectiveness of PMIS. Through this research, the study seeks to provide evidence-based recommendations that will strengthen the role of PMIS in promoting quality education and better educational management in the region which serves as the basis for crafting action plan to further enhance the systems and processes.

The current state of public administration is rapidly evolving, heavily influenced by digital innovation, data-driven decision-making, and a shift toward citizen-centric governance (Mancosa, 2025). Public administration in government organizations worldwide is now embracing digital solutions to enhance efficiency, transparency, and accessibility. Among the emerging technologies are Artificial intelligence (AI) and Machine Learning (ML), among others. According to Number Analytics (2025), AI

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and ML are increasingly used to automate routine tasks, improve decision-making, and enhance citizen services and to predict citizen behavior.

Based on the Sharmin & Chowdhury (2025) research, e-governance, also utilizing technologies aside from AI like blockchain, big data, and cloud computing, is revolutionizing public administration. This facilitates digital interactions between governments, citizens, businesses, and employees, aiming to reduce bureaucratic inefficiencies and promote accountability. Moreover, the current state of research in the field employs so-called Internet of Things (IoT) applications in public administration such as intelligent transportation systems, smart energy management, and waste management (Number Analytics, 2025) to enable the development of "smart cities," where infrastructure, services, and citizens are interconnected.

Moreover, these technologies are now shifting to interoperability and data-sharing ecosystems, which is move beyond centralized data hubs to more secure data spaces that facilitate collaboration across agencies and even national borders (Capgemini, 2025).

Specifically, DepEd Bicol faces challenges related to digital infrastructure, which is essential for effective PMIS functioning. Limited internet connectivity, especially in remote areas, poses a significant barrier to accessing and utilizing the system (DepEd Dasmariñas, 2023b). As technology becomes increasingly integral to education, overcoming these infrastructural challenges is imperative for successful PMIS implementation in the region.

Considering these challenges, recent studies suggest that a more localized and region-specific approach is needed for successful PMIS adoption. Tailored strategies that consider the unique socio-economic and technological contexts of the Bicol Region are essential (Grepon et al., 2021b). These strategies might include strengthening internet infrastructure, provide localized training, and enhance collaboration between regional education offices and local governments to ensure seamless PMIS integration.

Furthermore, PMIS effectiveness also depends on the level of support it receives from key policymakers and education stakeholders. Research indicates that political will and institutional support are critical for the successful integration of technology into educational management (Asio et al., 2022). Policymakers and Program Owners in the Bicol Region must prioritize PMIS adoption as part of their broader educational reform agenda to improve efficiency and accountability.

Likewise, the role of school leadership in driving PMIS adoption cannot be overstated. School leaders must not only advocate for PMIS use but also ensure that their staff is properly trained and motivated to use the system effectively (DepEd SDO1 Pangasinan, 2024). Studies show that when school administrators are actively involved in the implementation process, PMIS adoption rates are higher, and the overall impact on educational management is more significant (DepEd RO8, 2024).

Some research also underscores the importance of a systematic approach to monitoring and evaluating PMIS implementation. Continuous assessment of system usage at different educational levels can help identify gaps and areas for improvement (DepEd Dasmariñas, 2023b). In the DepEd Region V, where challenges related to system accessibility and data accuracy are prevalent, regular evaluation will be key to identifying potential issues and taking corrective actions.

The integration of PMIS in the DepEd Bicol is not just a technical challenge but also a cultural one. Successful PMIS adoption requires a shift in how educational managers and staff view and approach data-driven decision-making (Grepon et al., 2021b). Encouraging a culture that values data use for informed decisions can significantly enhance PMIS's impact on educational governance.

Moreover, studies have highlighted the importance of collaboration between educational institutions, government agencies, and external stakeholders such as NGOs and tech companies to ensure successful PMIS implementation (Asio et al., 2022b). Such collaboration can provide the necessary resources, expertise, and support to overcome challenges faced in the DepEd Region V and help create a more sustainable and scalable system for educational management.

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Research suggests that the long-term success of PMIS in the DepEd Region V will depend on its ability to adapt to emerging educational needs and technological advancements. Continuous updates and improvements to the system are necessary to keep pace with the evolving demands of the education sector (Grepon et al., 2021b). As new challenges arise, PMIS must remain flexible and responsive to ensure it continues to support educational management effectively.

Finally, while the DepEd Region V faces numerous challenges in implementing and utilizing PMIS, ongoing research suggests that strategic approaches, robust training programs, infrastructural improvements, and strong legal frameworks can significantly enhance PMIS effectiveness in improving educational management. As the region continues to embrace digital transformation in education, PMIS holds the potential to revolutionize educational governance by improving data management, decision-making, and resource allocation.

Literature Review

Globally, the public sector is undergoing a profound transformation, driven by technological advancements, evolving citizen expectations, and increasingly complex societal challenges. This shift and new trend in the field of public administration moves away from traditional bureaucratic models to more agile, responsive, transparent, and citizen-centric forms of governance (Mancosa, 2025; Number Analytics, 2025; Regenesys, 2023; and Sharmin & Chowdhury 2025).

In a 2024 research conference paper, Jerab reported that digital transformation has revolutionized the way public services are delivered, transforming traditional bureaucratic systems into agile, citizen-centric operations. Through digitization, it can help enhance efficiency, improve accessibility, and foster greater citizen engagement. He stressed that in this contemporary era; digital transformation is emerging as a pivotal force reshaping the landscape of public services (Jerab, 2024). This is because as technology continues to advance, its influence on governance and citizen experience is becoming increasingly profound. This transformation, driven by innovations is revolutionizing how governments deliver services, interact with citizens, and make policy decisions. Thus, investment in digital infrastructure and skills development is deemed important for driving effective public sector transformation (Jerab, 2024). However, according to the OECD (2024) Report, many countries still lack key underlying digital public infrastructure to enable good governance.

Mancosa (2025) elaborated that Public Administration is rapidly evolving, significantly influenced by digital innovation, data-driven decision-making, and a shift toward citizen-centric governance. Public administrations are embracing digital solutions to enhance efficiency, transparency, and accessibility. These digital innovations include:

Digital Transformation in Government

Governments are now embracing digital solutions to improve efficiency, transparency, and accessibility. Digital transformation in making governance are said to be more responsive and inclusive and this now reshaping how public services are delivered through E-governance, Artificial Intelligence (AI), and big data analytics. Number Analytics (2025) in their Technology in Public Administration: Trends blog has reported that Artificial Intelligence (AI) and Machine Learning (ML) are being increasingly used in public administration particularly in the automation of routine tasks, improve decision-making, and enhance citizen services. For instance, AI-powered chatbots are being used to provide 24/7 citizen support, while ML algorithms are being utilized to analyze large datasets and predict citizen behavior (Number Analytics, 2025).

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Data-Driven Decision-Making

Governments are using real-time data to track social issues, optimize public spending, and predict future challenges as data analytics is revolutionizing public administration. Thus, the ability to interpret and apply data-driven insights is becoming a crucial skill for public administrators.

From Bureaucracy to Citizen-Centric and Collaborative Governance

Mancosa (2025) reported that modern public administration is shifting from a rigid bureaucratic model to a citizen-first approach that fosters trust and accountability through participatory governance. Therefore, policies under citizen-centric governance are now designed with public participation, ensuring that communities have authority in the decision-making processes Network governance theories emphasize collaboration among the various education stakeholders to address complex societal issues (Regenesys, 2023), leveraging private sector expertise and resources for improved service delivery (Mancosa, 2025).

Sustainability and Climate Change Policies

With the recent concern of climate change, which is now at the forefront of global discussions, public administrators play a pivotal role in shaping environmental policies and mitigation measures. The Philippine government is heavily investing in sustainable urban planning and development, green and renewable energy initiatives, as well as disaster preparedness, mitigation, and adaptation measures to minimize climate risks.

Emphasis on Transparency, Accountability, and Ethics

Corruption and a lack of accountability remain significant challenges particularly in the education sector. Therefore, the future of public administration requires stronger ethical standards, transparency mechanisms, and independent regulatory bodies to ensure integrity in governance. Information technology, like PMIS, is now actively utilized to enhance transparency and accountability (Number Analytics, 2025; Sharmin & Chowdhury 2025).

Open data initiatives, blockchain-based systems, and citizen engagement platforms make government data accessible, reduce corruption, and strengthen public trust. With this, the future of public administration demands stronger ethical standards and transparency mechanisms to ensure integrity in governance, especially with increased digitalization (Mancosa, 2025).

Along the same vein, Sharmin and Chowdhury (2025) conducted a study on the impact of systems on e-governance, specifically regarding public administration efficiency and transparency. In their study, they emphasized the role e-governance plays in enhancing transparency, while also identifying the various challenges and risks associated with its adoption.

They employed a mixed-methods approach, combining qualitative content analysis of policy documents and quantitative survey data from policymakers and public administrators. Findings revealed that e-governance significantly improves administrative efficiency by automating workflows, reducing costs, and facilitating citizen engagement.

Empirical findings also revealed that digital transparency initiatives, such as blockchain-based procurement systems and open data policies, contribute to reducing corruption and strengthening public trust.

AI, big data, and blockchain were also reported in the study as technologies that will shape the future of digital governance, but legal and ethical frameworks must be strengthened to ensure secure, inclusive, and citizen-centric governance models. However, several challenges were presented, among them the digital divide, cybersecurity risks, and bureaucratic resistance, which hinder full-scale adoption.

Evolving Landscape of Public Sector Management Through Technology

The integration of technology in public sector management has gained significant attention in recent years, with many countries recognizing the potential of information systems to improve governance, enhance transparency, and optimize resource allocation. A central component of this technological transformation is the

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PMIS, a tool designed to streamline administrative processes, facilitate data-driven decision-making, and improve program outcomes.

In the Philippines, the adoption of PMIS has been increasingly emphasized as a way to address inefficiencies in educational management, especially in regions such as Bicol, where various challenges are related to PAPs implementation.

Barriers in PMIS Utilization

Despite the widespread benefits, the implementation of PMIS faces several issues and challenges. In developing countries, including the Philippines, limited access to technology, insufficient training, and resistance to change have hindered the effective adoption of PMIS (Alvarez, 2023).

DepEd Bicol is characterized by a unique set of educational challenges, including disparities in access to resources, basic inputs, limited infrastructure, and lower educational outcomes in some areas. These challenges are compounded by the region's geographical isolation, which makes it difficult to ensure consistent delivery of educational programs. Tan & Garcia (2022) recommended that DepEd Bicol maximize the PMIS, as it serves as a vital tool for managing and tracking limited resources to improve outcomes.

A major factor affecting the successful implementation of PMIS in the Bicol Region is the region's technological infrastructure. Limited access to reliable internet and modern computing devices in rural areas presents significant barriers to the effective use of PMIS (Salazar, 2024). Studies (e.g.., Luna et al., 2024) show that regions with weak infrastructure face difficulties in adopting digital tools for educational management, which ultimately limits the success of PMIS.

In DepEd Bicol specific issues and challenges such as unreliable internet infrastructure and inadequate technical support exacerbate these issues, preventing the system from achieving its full potential (Rosales et al., 2023).

Foundational Role and Global Application of PMIS

PMIS play an essential role in managing educational programs/projects by providing a centralized platform for tracking, analyzing, and reporting on educational data. These systems integrate various administrative functions, enabling educational leaders to make informed decisions based on real-time data. Manalo et al. (2021a) assert that PMIS contributes to improved resource allocation, better monitoring of program outcomes, and enhanced transparency in educational institutions.

Globally, the integration of PMIS in educational institutions has become a trend that aims to enhance educational governance. Countries such as the United States, Canada, and the United Kingdom have successfully implemented PMIS in their educational systems, yielding improvements in program monitoring, student performance tracking, and resource management (Dela Cruz et al., 2023). Research highlights that these systems foster a data-driven culture within educational institutions, leading to more informed decision-making processes (Bañares, 2022a).

Key Drivers for Successful E-Governance Implementation through PMIS

One of the critical factors for the successful adoption of PMIS is the training and capacity-building of PMIS users. Gonzales (2023) emphasizes that without proper training, school administrators and teachers may struggle to effectively utilize PMIS, hindering its potential to improve educational management. A recent study by Bañares (2022b) highlights the importance of providing ongoing professional development to ensure that educational personnel can navigate and fully leverage the capabilities of PMIS.

With the integration of digital tools in educational management, data privacy and security become significant concerns. The Data Privacy Act of 2012 mandates that educational institutions take measures to protect sensitive information. Research by Dela Cruz et al. (2023) emphasizes that ensuring the privacy and security of student and faculty data within PMIS is essential for fostering trust among stakeholders and ensuring the system’s long-term viability.

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The successful implementation of PMIS requires the active engagement of various stakeholders, including school administrators, teachers, parents, and government officials. A study by Rosales et al. (2023) highlights that when stakeholders are involved in the planning and implementation phases, PMIS is more likely to be accepted and utilized effectively. Stakeholders buy-in is critical for overcoming resistance to change and ensuring that the system meets the needs of all parties involved.

Cultural Adaptation and Organizational Change Management. Cultural attitudes towards technology and innovation play a significant role in the adoption of PMIS in the Bicol Region. Tan & Garcia (2022) suggest that a culture of data-driven decision-making must be cultivated for PMIS to be fully effective. In regions where traditional practices dominate, it may take time for stakeholders to embrace the changes that PMIS brings. A shift in mindset towards the value of technology in education is necessary for the system's success.

Successful PMIS implementation requires adequate financial resources. Research by Salazar (2024) highlights that financial constraints often limit the ability of schools to invest in the necessary infrastructure and training. Increased financial support from both government and non-government sources is crucial for ensuring that PMIS is effectively adopted in regions like Bicol.

The Role and Benefits of PMIS

The PMIS are increasingly recognized as essential tools for enhancing operational efficiency. Recent research by Grepon et al. (2021) and Manalo et al. (2021a) reported how PMIS enables the efficient gathering, analysis, and dissemination of data to support decision-making processes in educational institutions. PMIS leverages technology to improve the efficiency and transparency of public administration, maximizing its operational potential (Grepon et al., 2021).

With the growing popularity of data-driven decision-making, the shift toward data-driven management is now aligning with international trends (Mancosa, 2025). Countries like the United States, Canada, and the United Kingdom have successfully implemented PMIS to improve resource allocation, enhance accountability, and strengthen policy implementation (Asio et al., 2022). This is due to the fact that PMIS provides a centralized platform for tracking, analyzing, and reporting on educational data, facilitating better monitoring of program outcomes and increased transparency in educational institutions (Manalo et al., 2021a). Its ability to provide real-time access to data on students' performance, resource allocation, and program implementation allows educational leaders to make informed decisions, leading to improved program outcomes (Manalo et al., 2021b).

The implementation of PMIS has proven beneficial to the entire DepEd regions in the Philippines, where similar initiatives have led to improvements in data accuracy and accessibility (Asio et al., 2022). However, the effectiveness of PMIS in improving educational management relies heavily on the active participation of all stakeholders. Educational leaders, teachers, and policymakers must be adequately trained and supported in the use of PMIS to ensure its successful integration into daily operations (Grepon et al., 2021). Research suggests that regions that have provided comprehensive training and capacity-building initiatives for their personnel have experienced more successful adoption rates of PMIS (Asio et al., 2022).

DepEd Bicol, just like other regions implementing PMIS, also faces unique challenges in the implementation of such systems. ResearchGate (2024), reported that lack of digital literacy among some personnel, limited access to technological infrastructure, coupled with inconsistent training programs for personnel, hampers the full utilization of PMIS (DepEd RO8, 2024). The need for tailored strategies to address these specific challenges is critical for ensuring the effectiveness of PMIS in this region (DepEd Dasmariñas, 2023).

Therefore, to ensure effective implementation and sustainability, a strong legal framework supporting the implementation of PMIS in educational management is deemed necessary. For instance, the Philippine government has enacted several laws, such as the Governance of Basic Education Act, which mandates the creation of a management information system for educational institutions (Government of the Philippines, 2001). Furthermore, the Data Privacy Act of 2012 plays a crucial role in ensuring the protection

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of personal data within these systems (Government of the Philippines, 2012). These legal frameworks are vital for fostering trust and ensuring the effective and secure implementation of PMIS.

Impact and Benefits of PMIS

PMIS helped enhancing data-driven policy and decision-making as PMIS is designed to improve decision-making in education by providing real-time access to data on student performance, resource allocation, and program implementation. Studies by Manalo et al., (2021b) have shown that educational leaders who use PMIS are better equipped to make informed decisions, leading to improved program outcomes. In the Bicol Region, where data-driven decision-making has been traditionally limited, the introduction and implementation of the PMIS could play a transformative role in improving the quality of education.

Manalo et al., (2021b), stressed that data-driven decision-making has become an essential component of modern educational management. PMIS provides educational leaders with the tools they need to make informed decisions based on real-time data. Research suggests that regions that have embraced data-driven decision-making have experienced improvements in educational outcomes and resource management (Manalo et al., 2021b).

Likewise, program monitoring and evaluation (M&E) are essential components of PMIS, as they allow educational managers to track the progress of programs and make necessary adjustments. Dela Cruz et al. (2023) explained that PMIS enables educational leaders to monitor key performance indicators (KPIs), assess the effectiveness of educational programs, and make real-time adjustments to improve outcomes. In the DepEd Bicol, where educational programs often face delays and inefficiencies, PMIS can facilitate timely interventions and ensure that programs remain on track.

The effectiveness of the PMIS in improving educational outcomes relies on the implementation of robust monitoring and evaluation (M&E) mechanisms. Research by Tan and Garcia (2022) highlights that continuous evaluation of the system's effectiveness is crucial for identifying areas for improvement. Regular M&E activities help ensure that the system effectively tracks and monitors whether the region's targeted educational goals and objectives are being met.

Therefore, resource allocation is a crucial aspect of educational management, particularly in regions with limited resources like Bicol. PMIS can help educational leaders optimize the use of available resources by providing real-time data on student enrollment, teacher distribution, and material availability (Bañares, 2022). In regions such as Bicol, where resource constraints are common, PMIS can contribute to more efficient allocation and ensure that resources are directed where they are most needed.

PMIS enhance public sector transparency and accountability: One of the most significant benefits of PMIS is its ability to enhance transparency in educational governance. Studies show that the system allows stakeholders to access real-time data on program progress, resource allocation, and performance metrics (Manalo et al., 2021b). For the DepEd Region V, where transparency in educational management has historically been a challenge, PMIS could provide the necessary tools to improve accountability and ensure that educational resources are used effectively.

PMIS helped informed public policy formulation and planning: PMIS can be a powerful tool for policy formulation and planning in education. By providing access to comprehensive data, PMIS helps policymakers make informed decisions about program design, resource allocation, and curriculum development (Manalo et al., 2021b). In the Bicol Region, where policy decisions often lack sufficient data support, PMIS can improve the accuracy and effectiveness of planning processes.

PMIS promotes educational equity in public service delivery. It has the ability and potential to promote educational equity by ensuring that resources and support are distributed based on data-driven insights. In the Bicol Region, where educational disparities exist, PMIS can help identify areas of need and direct resources more effectively to underserved communities (Manalo et al., 2021b).

Several studies have shown that the effective use of PMIS can lead to improved student outcomes. Gonzales, (2023) opined that by providing real-time data on student performance, PMIS helps educators identify struggling students early and implement targeted interventions In the Bicol Region, where student outcomes have historically been lower in some areas, PMIS could play a crucial role in improving educational achievement.

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The Role of PMIS for Data Informed Insights

A PMIS in the context of DepEd is a specialized information system designed to manage and monitor the progress of its diverse programs and projects. Its role extends across all governance levels, from the central office to regional and division offices, down to individual schools. Key roles include:

Served as centralized repository for educational PAPs serving as a single, web-based platform to collect, store, and organize all data related to DepEd's programs, projects, and activities. This includes physical accomplishments, financial expenditures, work plans, and procurement details [DepEd PMIS, n.d]. This centralization eliminates the fragmentation of data often found in large bureaucracies, ensuring consistency and easy access to information.

Enhanced planning and budgeting by providing quality, relevant, and timely information that is crucial for effective planning and budgeting processes within DepEd. It allows for the systematic entry of operational plans from all operating units, enabling the generation of comprehensive summaries of physical and financial accomplishments. This facilitates strategic allocation of resources, ensuring that funds are directed to areas of greatest need and impact [DepEd PMIS, n.d].

Utilized as a progress monitoring and evaluation as it facilitates real-time progress monitoring of various PPAs. It allows for tracking monthly accomplishments, identifying deviations from planned schedules, and assessing financial performance. This continuous monitoring enables DepEd officials to make informed decisions about program adjustments, resource reallocation, and policy formulation to keep projects on track [DepEd PMIS, n.d; DepEd Masbate City, Department of Education, 2022].

Helped ensure transparency and accountability: Given that educational projects often involve significant public funds, transparency and accountability are paramount. The PMIS provides a platform and an official source of data for all PPAs, increasing transparency in plans and programs. It aids in policy formulation and decision-making, ensuring a more diligent and systematic preparation of plans and budgets, and enforcing planning and implementation standards [Department of Education, 2022]. This helps to demonstrate responsible use of taxpayer money.

Served as resource management for basic education inputs as it helps manage the allocation of crucial resources to schools and community learning centers for the delivery of basic education. This includes tracking procurement and contract monitoring, ensuring that essential materials and facilities reach their intended beneficiaries efficiently [Department of Education, 2022].

Facilitated data-driven decision making by providing real-time, consolidated data on project performance, the PMIS empowers DepEd officials at all levels (from school heads to central office leadership) to make evidence-based decisions. This supports operational planning, program review, impact evaluation, and policy decisions, ultimately leading to more effective educational outcomes [DepEd PMIS, n.d; Division of City Schools, City of Masbate, (n..d.)].

Standardized its processes as it involves strict compliance with established guidelines and processes for accessing the system, preparing plans and budgets, executing and implementing plans, and monitoring progress. This standardization ensures consistency in project management practices across the entire department [Department of Education, 2022].

Provided capacity building and training is it often provided orientation and training programs for its primary users, including school heads, public schools district supervisors, and education program supervisors. These trainings introduce the PMIS as a monitoring tool and clarify specific roles and responsibilities in its implementation [Division of City Schools, City of Masbate, (n..d.); DepEd CALABARZON Regional Memorandum].

Benefits of PMIS in DepEd

The implementation of a PMIS brings substantial benefits to the DepEd, significantly enhancing its operational efficiency and effectiveness in delivering educational services:

- *Improved project success for educational initiatives* as it systematizes planning, monitoring, and control, the PMIS drastically increases the likelihood of educational projects—such as school construction,

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curriculum rollouts, or feeding programs—being completed on time, within budget, and achieving their educational objectives. This directly impacts the quality of education delivered.

- *Enhanced financial prudence and accountability* as it helps DepEd manage its substantial budget more effectively. It minimizes waste, identifies potential cost overruns early, and ensures that funds allocated for specific programs are utilized as intended, fostering greater financial accountability [DepEd PMIS, n.d].
- *Better resource utilization* as it aids in optimizing the allocation of human, material, and financial resources across various educational projects. This includes tracking the deployment of teachers, distribution of learning materials, and utilization of school facilities, ensuring that resources are maximized for educational benefit.
- *Streamlined operations and reduced bureaucracy* as it automates the data collection, reporting, and certain administrative tasks within the PMIS reduces manual effort and streamlines workflows. This can significantly cut down on bureaucratic processes, allowing educational personnel to focus more on core teaching and learning activities rather than administrative overhead.
- *Increased transparency and public trust:* Real-time reporting on the status and impact of educational projects fosters greater transparency. This allows the public and oversight bodies to monitor how educational funds are being used and the progress of initiatives, building greater trust in the Department's management of public resources [DepEd, PMIS (n,d)].
- *Informed policy and curriculum development:* The comprehensive data provided by the PMIS offers valuable insights into the effectiveness of different educational programs and interventions. This evidence base supports DepEd leadership in formulating new policies, refining existing curricula, and making strategic decisions to improve educational outcomes across the country [DepEd PMIS, n.d; Division of City Schools, City of Masbate, (n..d.)].
- *Proactive risk management:* Educational projects are susceptible to various risks, including natural disasters affecting school infrastructure, delays in material procurement, or challenges in teacher deployment. A PMIS helps identify, assess, and track these risks, enabling DepEd to develop and implement timely mitigation strategies, thus ensuring continuity of education.
- *Facilitates organizational learning and best practices* through archiving project data, including lessons learned, challenges encountered, and successful strategies, the PMIS becomes a valuable knowledge repository. This information can be leveraged for future project planning, continuous improvement, and the dissemination of best practices across different DepEd units.

In essence, for an organization as vast and critical as the DepEd, a PMIS is not merely a tool for project management; it is a strategic asset that underpins efficient operations, transparent governance, and ultimately, the effective delivery of quality education to millions of learners.

Factors Influencing PMIS Success and Utilization

The effective utilization of PMIS relies on several critical factors, including robust technological infrastructure, comprehensive training and capacity building, active stakeholder engagement, strong legal frameworks, and a data-driven culture.

- *Technological Infrastructure:* DepEd Bicol, faces challenges regarding digital infrastructure, with limited internet connectivity, especially in remote areas or geographically isolated areas (GIDA), posing a significant barrier to accessing and utilizing the system (DepEd Dasmariñas, 2023; Luna et al., 2024; Salazar, 2024b). Addressing these infrastructural limitations is crucial for successful PMIS implementation.
- *Training and Capacity Building:* Effective capacity building is the key to the effective implementation and sustainability of the system. Without proper hands-on training, school administrators and teachers may struggle to effectively utilize PMIS, hindering its potential (Gonzales, 2023). Likewise, inconsistent training programs and resource availability have led to varying levels of system adoption and proficiency (DepEd Dasmariñas, 2023). Therefore, continuous professional development is vital to ensure

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educational personnel can fully leverage PMIS capabilities (Bañares, 2022). Regions with higher levels of digital literacy are also more likely to implement PMIS successfully (Gonzales, 2023).

- *Stakeholder Engagement and Leadership:* The effectiveness of PMIS heavily relies on the active participation of all stakeholders, such as educational leaders, teachers, and policymakers (Grepon et al., 2021). When stakeholders are involved in the planning and implementation phases, PMIS is more likely to be accepted and utilized effectively (Rosales et al., 2023). School leaders, in particular, play a crucial role in advocating for PMIS use and ensuring staff are trained and motivated (DepEd RO8, 2024; DepEd SDO1 Pangasinan, 2024b).
- *Legal Frameworks and Data Privacy:* The Philippine government has established a supportive legal framework for technology integration in education, including the Governance of Basic Education Act (Republic Act No. 9155, 2001), which mandates the creation of management information systems, and the Data Privacy Act of 2012 (Republic Act No. 10173), which ensures data protection (Republic of the Philippines, 2001; Republic of the Philippines, 2012; Dela Cruz et al., 2023). These legal frameworks foster trust and ensure secure PMIS implementation.
- *Data Accuracy and Management:* A significant challenge is ensuring the accuracy and reliability of collected data, as inconsistencies can lead to poor decision-making (DepEd RO8, 2024; DepEd SDO1 Pangasinan, 2024b). Proper data collection and calibration are critical.
- *Cultural Shift and Transparency:* The successful adoption of the PMIS requires a cultural shift from the traditional approaches to data-driven decision-making strategies among program decision makers, program owners and PMIS users [Grepon et al., (2021a); Tan & Garcia, (2022)]. By embracing this shift, utilizing the PMIS can significantly improve accountability and transparency in public administration and governance. This is achieved by providing real-time data on program and project progress, as well as resource allocation and utilization (Manalo et al., 2021b).

Strategies for Effective PMIS Implementation and Research Outputs

To overcome the challenges associated with PMIS implementation, targeted strategies must be developed and effectively implemented. This statement was corroborated by the research conducted by Salazar (2024), which reported that regions like Bicol need to have a tailored approach that takes into account local conditions, including infrastructure limitations and cultural factors. The researcher suggested however that strategies need to include strengthening internet connectivity, offer localized training programs, and establishing strong support networks for educators.

The DepEd Bicol faces several barriers to the adoption of PMIS, including resistance to change, lack of technical expertise, and insufficient infrastructure. Rosales et al. (2023) emphasizes that overcoming these barriers requires targeted efforts, including increased awareness, advocacy, and the development of local solutions to infrastructural challenges. Likewise, the PMIS play a crucial role of Public Sector Leadership particularly the school leaders. To ensure the successful adoption of PMIS. Rosales et al. (2023) stress that school leaders must not only advocate for the use of the system but also actively participate in training programs and ensure that their staff is adequately prepared to use PMIS. Strong leadership is essential for overcoming resistance and ensuring that PMIS becomes an integral part of the school's management processes.

Collaboration between various agencies is essential for the successful implementation of PMIS in the DepEd Bicol. According to research by Bañares (2022), inter-agency collaboration can provide the resources, expertise, and political support needed to overcome implementation challenges. Partnerships between local government units, educational institutions, and private sector stakeholders can create a more sustainable and effective system. Collaboration among various stakeholders, including local government units, educational institutions, and civil society organizations, is key to the success of PMIS in DepEd Bicol. Salazar (2024) emphasizes that partnerships between these groups can provide the necessary support and resources for the successful implementation of PAPs.

Teachers play a central role in the success of PMIS, as they are the primary users of the system. Dela Cruz et al. (2023) suggest that teachers must be well-trained in using PMIS to ensure that they can effectively input data,

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track student progress, and access relevant resources. Teachers' involvement in the implementation process is essential for the system's acceptance and success. Studies conducted in the Philippines have demonstrated mixed results regarding the effectiveness of PMIS. While some regions have seen improvements in educational governance, others have faced challenges in fully implementing the system due to logistical, cultural, and infrastructural barriers (Dela Cruz et al., 2023). The evaluation of PMIS implementation in the Bicol Region will be critical for understanding how these challenges can be addressed.

Future research on PMIS in the Bicol Region should focus on understanding the specific challenges faced by local educational institutions and developing tailored solutions to address these issues. Additionally, research should explore the long-term impact of PMIS on educational outcomes and governance in the region (Tan & Garcia, 2022).

Challenges in PMIS Implementation

Despite the widespread benefits, the implementation of PMIS faces several challenges, particularly in developing contexts like the Philippines. Common barriers include limited access to technology, insufficient training, and resistance to change (Alvarez, 2023). In DepEd Bicol, these challenges are compounded by unique geographical and socio-economic factors, including disparities in resource access, limited infrastructure, and typically lower educational outcomes in some areas (Tan & Garcia, 2022). Unreliable internet infrastructure and inadequate technical support exacerbate these issues, hindering the system from reaching its full potential (Rosales et al., 2023). Studies indicate that while PMIS has the potential to streamline administrative tasks and provide real-time data, significant barriers to full-scale implementation persist in rural and underdeveloped regions (DepEd SDO1 Pangasinan, 2024b).

In sum, while the adoption of PMIS in the DepEd Bicol faces numerous challenges, it also presents significant opportunities for enhancing educational management. Through targeted strategies, improved infrastructure, and stakeholder collaboration, PMIS can transform the way educational programs are managed and implemented in the in the region, ultimately leading to improved educational outcomes and greater transparency.

Theoretical and Conceptual Framework

DepEd developed PMIS to modernize education management, improve service delivery, and support the planning, implementation, monitoring, and evaluation of programs, activities, and projects. The system promotes transparency, accountability, systematic budgeting, decision-making, and implementation standards. This study is anchored on the Technology Acceptance Model and Systems Theory to examine PMIS utilization, challenges, and best practices in DepEd Bicol. Using a mixed-methods approach, it assesses PMIS use in planning, monitoring, data management, and resource allocation, as well as practices related to training, data-driven decision-making, stakeholder engagement, and sustainability.

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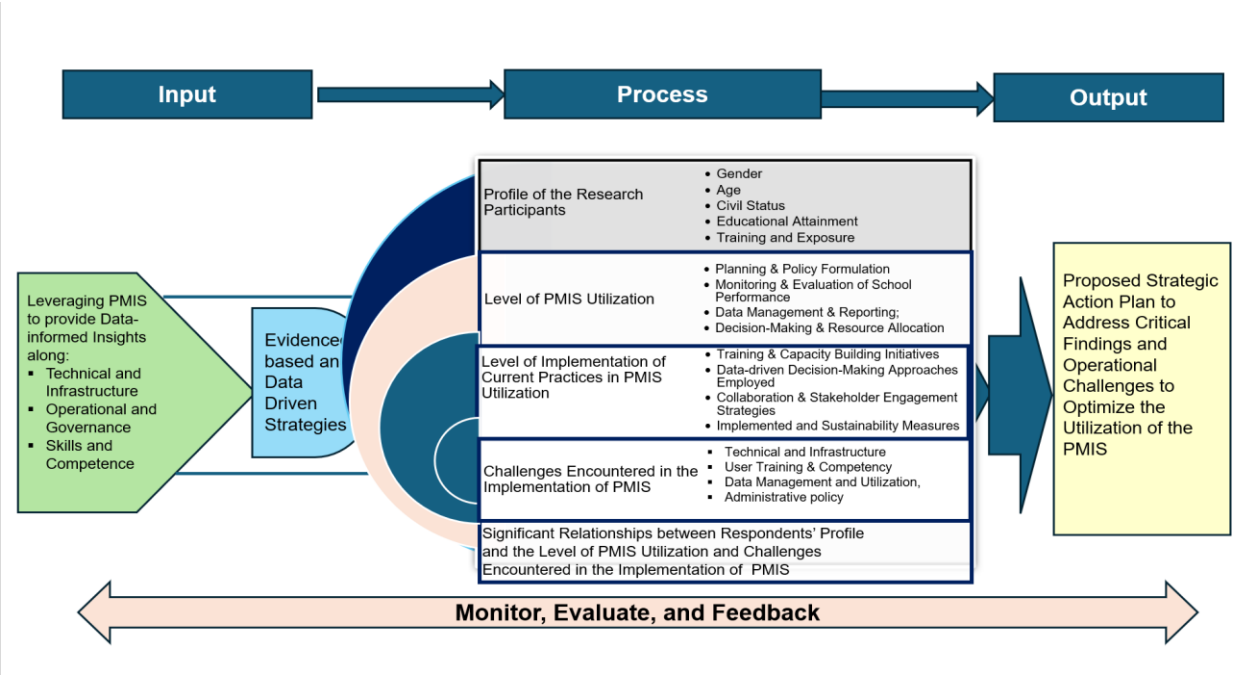

Figure 1. *Theoretical and Conceptual Framework*

Moreover, beyond identifying the respondent profile and the level of PMIS utilization, the challenges encountered by users during PMIS implementation in DepEd Bicol will be investigated. These challenges are categorized along: a) Technical and Infrastructure Limitations; b) User Training and Competency Issues; c) Data Management and Utilization Gaps; and d) Administrative and Policy Constraints. These variables are included in the framework's process, alongside the determination of significant relationships associated with the respondents' profiles and the abovementioned variables.

The anticipated output of this research is a data-driven and evidence-based strategic action plan. This plan aims to improve PMIS access, enhance the quality of service, facilitate improved planning and data-driven decision-making, and ultimately boost the operational capacities and efficiencies of DepEd employees in the Bicol Region. This comprehensive output will provide actionable recommendations for optimizing PMIS implementation and addressing existing barriers.

Objectives of the Study

This study aims to examine how the DepEd Bicol's PMIS can be leveraged to provide data-informed insights, which serve as the basis for crafting the action plan. Specifically, it aims to:

1. determine the profile of the respondents.
2. ascertain the level of PMIS utilization in DepEd Bicol in terms of:
    - Planning and Policy Formulation;
    - Monitoring and Evaluation of School Performance;
    - Data Management and Reporting; and
    - Decision-Making and Resource Allocation.
3. determine the level of implementation of current practices in PMIS utilization along:
    - Training and capacity building initiatives;
    - Data-driven decision-making approaches employed;
    - Collaboration and stakeholder engagement strategies implemented; and
    - Sustainability measures for PMIS optimization used.

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4. explore the challenges encountered in the implementation of PMIS along:
    - Technical and infrastructure;
    - User training and competency;
    - Data management and utilization; and
    - Administrative policy.
5. determine the significant relationships between respondents' profile and the level of utilization, as well as the challenges encountered in the implementation of PMIS.
6. formulate a strategic action plan addressing critical findings and operational challenges to optimize the utilization of the PMIS within DepEd Region V.

METHODS

Research Design

This study examined how PMIS can improve data collection, transparency, accountability, and decision-making in DepEd Bicol. Using a mixed-methods convergent parallel design, the study combined quantitative data on PMIS utilization levels, system features, and efficiency gaps with qualitative data from interviews, FGDs, and desk reviews. The findings identified patterns in PMIS use and explained challenges such as technical issues, poor internet connectivity, limited training, user competency gaps, administrative concerns, and resistance to change. Through triangulation, the study produced a comprehensive basis for an actionable enhancement plan focused on infrastructure improvement, specialized training, better data management, stakeholder collaboration, and long-term system sustainability.

Population and Sampling

This study used universal or total population sampling, which includes all individuals who meet the study criteria. The respondents were approximately 67 DepEd Region V personnel from the 13 SDOs who were officially designated and given PMIS access. They included regional and SDO program owners, planning and budget officers, administrative staff, ICT coordinators, school heads, and designated teachers involved in WFP preparation, quarterly accomplishment reporting, and uploading of Sub-AROs. This approach ensured full representation of the target population and reduced sampling bias.

Research Participants

The online survey was completed by 64 authorized program owners and PMIS users, yielding a 96% retrieval rate. Participants were responsible for PMIS-related tasks such as uploading SARO, preparing WFP, and reporting quarterly physical and financial accomplishments. The largest group was composed of 29 designated teachers and PMIS users from pilot IUs in selected secondary schools, while 9 principals or school heads also participated, both groups achieving a 100% retrieval rate.

Table 1: Research Participants

Research Participants	Target Participants of the Survey	Participated in the Survey	
		Number	Percent
Schools Division Office Program Owners	16	14	21.88%
Principals/School Heads	9	9	14.06%
Regional Office V Program Owners	13	12	18.75%
Teachers	29	29	45.31%
Total	**67**	**64**	**100.00%**

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The groups with the lowest retrieval rates were the SDO program owners and PMIS users with 14 respondents (21.88%), followed by the regional program owners with 12 respondents (18.75%). Participants answered a researcher-made questionnaire measuring frequency, ease of use, and perceived effectiveness. The data were analyzed using descriptive and inferential statistics, with Python and its libraries, such as Pandas, NumPy, SciPy, and Statsmodels, used to process, visualize, and interpret the results as a free alternative to SPSS. Python also supported the mixed-method design by enabling both statistical analysis and Natural Language Processing (NLP) for qualitative data.

Likert scale ranges were used to interpret survey results for PMIS utilization, implementation of current practices, and challenges. Key Informant Interviews (KIIs) were conducted with selected DepEd Region V program owners and PMIS users to gather deeper insights on technical barriers, training needs, resource limitations, sustainability concerns, and other issues not fully captured by the survey. Focus Group Discussions (FGDs) were also conducted to validate survey findings, explore shared concerns, and generate collaborative strategies for the proposed action plan.

Data Analysis

Quantitative Analysis. The quantitative survey data were analyzed using descriptive and inferential statistics. Descriptive analysis included frequencies, percentages, weighted means, and standard deviations. Inferential analysis used ANOVA with Eta-squared (η^2) to determine significant differences and measure effect size. ANOVA examined whether demographic variables, such as age, gender, civil status, and educational attainment, influenced PMIS performance outcomes across the four domains, while η^2 helped indicate the practical importance of these differences for policy and resource allocation. Qualitative Analysis. Qualitative data from the KIIs and FGDs were analyzed through thematic analysis. Responses were transcribed, coded, and grouped into emerging themes related to PMIS utilization, current practices, and implementation challenges. Themes included training initiatives, data-driven decision-making, collaboration, sustainability strategies, technical limitations, training gaps, and administrative constraints. The final themes, supported by participant quotations, were integrated with the quantitative findings to strengthen and substantiate the discussion.

Data Integration and Triangulation

The data integration and triangulation were conducted in phases. Initially, the quantitative data were analyzed to summarize overall trends. Subsequent analysis involved correlation or regression techniques to examine relationships between utilization levels and identified practices. The qualitative data were transcribed and coded to uncover similar and recurring themes, which were then integrated with the survey results. This was to provide a clearer picture of the interrelationships between PMIS utilization, challenges, and the practices employed to improve its functionality and usability.

To ensure the reliability and validity of the findings, triangulation was employed by cross-referencing quantitative and qualitative results. Statistical trends were compared with qualitative insights to confirm consistency and strengthen interpretations. Additionally, member checking and peer debriefing were conducted to enhance credibility. Member checking involved sharing initial interpretations with selected participants for validation, while peer debriefing engaged experts in educational management and information systems to assess the rigor of the analysis. Ultimately, this approach provided a comprehensive, evidence-based understanding of PMIS utilization in the DepEd Bicol.

Research Instruments

To achieve the objectives of the study, the researcher developed a researcher-made questionnaire based on the four research questions. The instrument consisted of five parts. Part I gathered the demographic profile of the respondents. Part II assessed the level of utilization and leveraging of the PMIS for data-informed enhancement, particularly in planning, policy formulation, performance tracking, data handling, report generation, decision-making, and resource allocation. Part III examined current practices in PMIS

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utilization, including training and capacity building, integration of PMIS data in decision-making, collaboration among program owners and users, and measures for long-term effectiveness. Part IV identified challenges in PMIS implementation and utilization, such as technical and infrastructure limitations, user competency issues, data management gaps, and administrative and policy constraints. The findings from this section served as inputs for the proposed action plan. Finally, Part V contained the interview guide questions used for the FGDs and KIIs.

Pilot Testing of Instruments

Prior to the actual data gathering, the researcher-made instrument was pre-tested with selected PMIS users at the RO and selected schools. Pre-testing the research instrument is a critical quality-control step that should be undertaken before full-scale data collection. It ensures that by the time the instrument reaches the actual respondents via the online platform, it has been polished; consequently, the researcher is confident that technical barriers are minimized and the integrity of the findings is secured.

Reliability Analysis

Reliability analysis is a term used to determine the trustworthiness and consistency of a dataset. It is measured by the dataset's ability to produce the same results under the same conditions. Atlan (2023) reported that reliability analysis is a cornerstone of quantitative research because it ensures whether the data derived from the instruments used in the study - such as surveys, tests - are consistent. Reliable data is the bedrock of sound decision-making (Atlan, 2023). Public organizations like DepEd rely heavily on online and offline data to guide plans, strategies, interventions, allocate resources, and improve educational performance. This concept is crucial as public administration increasingly depends on data for strategic decision-making and operational efficiency.

Cronbach's alpha coefficient measures the internal consistency, or reliability, of a set of survey items. This study utilized this statistic to determine whether the carefully formulated evaluation items indicated in the various identified domains for PMIS utilization and practice inquiries consistently measured the same characteristic. Statistics By Jim (n.d.) explained that Cronbach's alpha quantifies the level of agreement on a standardized 0 to 1 scale; whereas higher values indicate higher agreement between items; Table 2 presents the Reliability Analysis of the PMIS Utilization and Practice Scales

Table 2. *Reliability Analysis of the PMIS Utilization and Practice Scales*

Domain	No. of Items	Cronbach's Alpha	Interpretation
A. Planning and Policy Formulation	5	0.958	Excellent
B. Monitoring and Evaluation of School Performance	5	0.919	Excellent
C. Data Management and Reporting	5	0.926	Excellent
D. Decision-Making and Resource Allocation	5	0.974	Excellent
E. Training and Capacity Building	5	0.986	Excellent
F. Data-Driven Decision-Making	5	0.976	Excellent
G. Collaboration and Stakeholder Engagement	4	0.354	Poor
H. Sustainability Measures for PMIS Optimization	4	0.966	Excellent
Overall Instrument	38	0.964	Excellent

As shown in Table 2, the overall Cronbach's alpha of 0.964 indicated excellent internal consistency for the entire researcher -made instrument, confirming that the survey reliably measured PMIS utilization and related organizational practices as a coherent construct.

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Based on the reliability test, data revealed that all PMIS utilization domains (Q1–Q20) demonstrated excellent reliability ($\alpha > 0.90$), supporting their use as stable outcome measures for descriptive and inferential analyses. Most practice-related domains (Q21–Q38) also exhibited very high internal consistency, reinforcing the robustness of the instrument particularly in capturing organizational, managerial, and sustainability dimensions of PMIS implementation. Statistics By Jim, (n.d.), stressed that high Cronbach's alpha values indicate that response values for each research participant - who responded to the online survey across a set of questions - were consistent. This consistency implied the research instruments were indeed reliable and that the items truly measured the same characteristic.

However, in terms of Collaboration and Stakeholder Engagement, this domain remained the sole construct with low internal consistency ($\alpha = 0.354$). This suggested that collaboration-related practices may have been experienced unevenly across level of bureaucracy (region, SDO, school), reflecting structural and contextual diversity rather than random measurement error. Low values indicated the set of items under this domain implied that it did not reliably measure the same construct. High responses for one question did not suggest that participants rated the other items highly. Consequently, the questions were unlikely to measure the same property because the measurements lacked internal cohesion.

Ethical Consideration

Ethical considerations were observed to ensure the integrity of the study and the protection of the participants. Before data gathering, participants were informed of the study's purpose, scope, and procedures. Participation was voluntary, and respondents were allowed to withdraw at any time without negative consequences. Informed consent was secured before they participated. Confidentiality and data privacy were also maintained. Providing names was optional, responses were coded, and personal information from the KIIs and FGDs was securely stored and accessed only by the researcher and panel members, in compliance with the Data Privacy Act of 2012. The researcher also upheld respect for persons by allowing participants to ask questions and seek clarifications. The study complied with institutional ethical guidelines, and objectivity was maintained throughout data collection and reporting.

RESULTS AND FINDINGS

This section presents the empirical data and analytical outcomes derived from the survey and various quantitative and qualitative methods described in Chapter 2. It contains a summary and a detailed discussion of the gathered data, which is presented primarily through tables and figures based on statistical measures, without interpretation. These quantitative and qualitative findings serve as the direct evidence and used to address the statement of the problem and the research objectives identified in the previous chapters.

Profile Research Participants

The profile of the 64 research participants who responded to the online survey revealed a female-dominated PMIS user base, with females comprising 37 (58%) of the total respondents who participated in the survey, compared to 27 (42%) males. This profile suggested that the operational execution and management of the PMIS were largely carried out by female personnel across the regional office, 13 SDOs and selected Implementing Units (IU) schools. Table 3 presents the profile of research participants.

In terms of age, the majority of the research participants were characterized by an older demographic, indicating that PMIS utilization is largely situated within the senior and highly experienced workforce. Among the 64 program owners and PMIS users who participated in the survey, 34 respondents (53.13%) were aged 50 and above, followed by 17 employees (26.56%) within the 40–49 age bracket. The

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younger participants represented a smaller fraction of the population: 12 participants (18.75%) fell within the 30–39 range, while only a single respondent (1.56%) was identified in the 30 and below age group.

Table 3: *Profile of Research Participants*

Profile	Number	%
Gender		
Male	27	42.19%
Female	37	57.81%
Total	**64**	**100.00%**
Age		
50 Years Old and Above	34	53.13%
40-49 Years Old	12	18.75%
30-39 Years Old	17	26.56%
Below 30 Years Old	1	1.56%
Total	**64**	**100.00%**
Civil Status		
Single	14	21.88%
Married	44	68.75%
Widowed	5	7.81%
Separated	1	1.56%
Total	**64**	**100.00%**
Educational Attainment		
Doctoral Degree	19	29.69%
Masters Degree	24	37.50%
Complete Academic Requirement	**3**	4.69%
Bachelors Degree	18	28.13%
Total	**64**	**100.00%**
Training and Exposusre to PMIS		
Attended Extensive Training (More that 4 training sessios)	9	14.06%
Attended Moderate Training (More than 3-4 training sessios)	17	26.56%
Limited Training (1-2 training sessios)	34	53.13%
No Trainings Attended	4	6.25%
Total	**64**	**100.00%**

In terms of civil status, a significant majority of the research participants (68.75%) are married, while 21.88% are single, and the rest are widowed or separated, reflecting the broader gender composition of the education sector, particularly in teaching and school-based leadership roles.

As to the participants' educational profiles, the profile reveals a highly professional workforce as signified by their high academic achievement. A large majority—43 (67.19%)—of the program owners and PMIS users possess advanced postgraduate degrees, comprising 24 (37.50%) Master's degree holders and 19 (29.69%) Doctoral graduates. The remaining number, accounting for 3 (4.69%) who have completed their respective academic requirements (CAR) for a Master's degree, and only 18 (28.13%) of these participants are holders of a Bachelor's degree.

This finding clearly emphasizes a DepEd Bicol workforce with very strong formal academic preparation and potential readiness for data-driven administrative practices. The advanced academic qualifications signify a high level of human capital in the workforce and indicate specialized cognitive proficiency among PMIS users and program owners in charge of managing the system.

This finding also implies that the PMIS users indeed possess the prerequisite analytical skills and intellectual capabilities needed to effectively prepare the WFP and accomplishment reports while simultaneously navigating complex data information systems like the PMIS.

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In terms of experience, the table presents the findings. As shown in Table 3 findings, a clear majority reported more than ten years of experience in educational management (59.39%), underscoring the relevance of PMIS as a system used by long-serving personnel rather than employees with shorter tenure in the government or newly appointed staff.

Significant and interesting findings are revealed in the participants' profile on training and exposure to PMIS. Despite their high educational attainment and extensive experience, their PMIS training and exposure indicate a competency and skills gap that may affect effective system utilization among DepEd Bicol PMIS users. As shown in Table 3, a combined 59.38% of respondents—comprised of those with limited training (34 or 53.13%) and those with no training at all (4 or 6.25%)—lack the foundational skills and expertise required for mastery of the system's functionality.

In contrast, the data show that only a small portion of participants who responded to the survey have achieved high levels of training and exposure to PMIS operations of functionalities, with 9 (14.06%) having attended 3–4 sessions and 17 (26.56%) having attended more than four (see Table 3). These findings underscore a critical need for well-structured and competency-based capacity-building programs and tailored technical assistance. If DepEd Bicol wants to optimize the operationalization of the PMIS across all SDOs and schools, it must transition from regular PMIS functionality orientations to a more comprehensive, competency-based PMIS training.

Level of PMIS Utilization in DepEd Bicol in terms of: Planning & Policy Formulation; Monitoring & Evaluation of School Performance; Data Management & Reporting; and Decision-Making & Resource Allocation

The quantitative results revealed that the PMIS was significantly utilized within DepEd Bicol. This high level of utilization was evidenced by an overall weighted mean ($\bar{x}$) of 3.018 and standard deviation (SD) of 0.696, which fell within the "utilized" range. Table 4 reflects these overall findings.

Table 4: *Level of PMIS Utilization in DepEd Bicol*

PMIS Level of Utilization and Leveraging for Data-Informed Insights	% of Responses N=64				Total	Weighted Mean	Standard Deviation	Interpretation
	Highly Utilized	Utilized	Slightly Utilized	Not Utilized				
1. Planning and Policy Formulation	28.62%	51.59%	13.50%	6.29%	100.00%	2.994	0.800	Utilized
2. Monitoring and Evaluation of School	25.63%	50.94%	16.88%	6.56%	100.00%	3.000	0.831	Utilized
3. Data Management and Reporting	27.50%	51.25%	13.13%	8.13%	100.00%	3.047	0.850	Utilized
4. Decision Making and Resource Allocation	27.50%	53.13%	12.19%	7.19%	100.00%	3.025	0.821	Utilized
PMIS Uitlization (Overall)	**27.31%**	**51.73%**	**13.92%**	**7.04%**	**100.00%**	**3.080**	**0.696**	Utilized

Legend:

Range	Verbal Interpretation	Range	Verbal Interpretation
3.500 - 4.000	*Higly Utilized*	1.500 - 2.449	*Slightly Utilized*
2.500- 3.449	*Utilized*	Below 1.449	*Not Utilized*

As shown in Table 4, across all 20 items (Q1–Q20) used to assess the PMIS level of utilization, the weighted means of the four domains - planning and policy formulation (Q1–Q5), monitoring and Evaluation of school performance (Q6–Q10), data management & reporting (Q11–Q15), and decision-making & resource allocation (Q16–Q20)- consistently fell within the "utilized" range. This finding implied that the PMIS was functionally embedded in day-to-day administrative and operational processes within DepEd Bicol, albeit not yet maximized across all dimensions for PMIS utilization assessment. These empirical findings confirmed that the PMIS was highly effective in driving operational efficiency. It served as a catalyst for data-informed enhancement across four key domains.

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Specifically, data management and reporting ($\bar{x}$=3.047; SD=0.850), ranked highest among the PMIS utilization domains, with 33 (51.25%) of participants reporting that they "utilized" it and 18 (27.50%) reporting it as "highly utilized". This was followed closely by decision-making and resource allocation ($\bar{x}$=3.031; SD=0.737) with 34 participants (53.13%) reported "utilized" and 18 (27.50%) reporting "high utilized." Monitoring and evaluation of school performance ($\bar{x}$=3.000; SD=0.723) followed, with 33 respondents (50.94%) reporting "utilized" and 16 respondents 25.63% reporting "highly or full utilized." (Please see Appendix 3 for detail findings per domain).

Although planning and policy formulation had the lowest weighted mean ($\bar{x}$) ($\bar{x}$=2.994; SD=0.800) among the domains, it was also the second highest in terms of participants' percentage: 33 participants (51.59%) reported utilizing the PMIS to access critical data, such as WFP and budget allocations, while 18 respondents (28.62%) reported it was "highly utilized."

In addition, items related to planning, monitoring, data management, and decision-making assessment (Q1–Q5) exhibited stable and moderately high mean scores, suggesting that PMIS is routinely used for compliance-oriented and performance-tracking functions, such as accessing program data, monitoring PAPs progress, and generating accomplishment reports. Moreover, the relatively tight clustering of weighted means (≈2.90–3.10) across utilization items implies a uniform level of adoption across offices and roles, reflecting institutional familiarity with PMIS rather than isolated or role-specific usage.

Level of Implementation of Current Practices in PMIS Utilization along: Training & Capacity Building Initiatives, Data-driven Decision-Making Approaches Employed, Collaboration & Stakeholder Engagement Strategies Implemented, and Sustainability Measures for PMIS Optimization Used

Table 5 exhibits empirical findings regarding the current Level of implementation of current practices in PMIS utilization. Among the four identified domains for PMIS practice, items associated with training and capacity building (Q21–Q25) yielded the lowest mean ($\bar{x}$=2.753; SD=0.841). Despite receiving the lowest assessment ratings, these practices were consistently rated as "largely implemented but in actual practice it is not fully institutionalized according to the FGDs.

Among the 64 participants who responded to the survey, 26 (40.31%) reported that they "largely implemented" training and capacity building initiatives; 14 (22.50%) opined that they "fully implemented," 19 (29.38%) reported them as "slightly implemented," and only 5 (7.81%) shared that they had "not implemented" these training and capacity building initiatives from the CO and RO.

This implied a gap in the PMIS practices domain, thereby reinforcing earlier demographic findings that most respondents had only limited exposure to formal PMIS training, despite having many years of professional experience in navigating the system.

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Table 5: *Level of Implementation of Current Practices in PMIS Utilization*

Current Practices Being Implemented in Utilizing the PMIS	% of Responses N=64				Total	Weighted Mean	Standard Deviation	Interpretation
	Fully Impleme	Largely Implemen	Slightly Implemente	Not Impleme				
1.Training and Capacity Building Initiatives	22.50%	40.31%	29.38%	7.81%	100.00%	2.947	0.846	Largely Implemented
2. Data-Driven Decision-Making Approaches	28.44%	42.19%	20.31%	9.06%	100.00%	2.963	0.8344	Largely Implemented
3. Collaboration and Stakeholder Engagement Strategies	21.88%	31.56%	20.63%	5.94%	80.00%	2.434	0.662	Largely Implemented
4. Sustainability Measures for PMIS	22.50%	28.75%	22.19%	6.56%	80.00%	2.362	0.676	Largely Implemented
PMIS Practices (Overall)	**23.83%**	**35.70%**	**23.13%**	**7.34%**	**90.00%**	**2.890**	**0.820**	**Largely Implemented**

Legend:

Range	Verbal Interpretation	Range	Verbal Interpretation
3.500 - 4.000	*Fully Implemen*	1.500 - 2.449	*Slightly Implemented*
2.500- 3.449	*Largely Implem*	Below 1.449	*Not Implemented*

Statements under data-driven decision-making practices (Q26–Q30) showed moderate mean values ($\bar{x}$=2.912; SD=0.885), suggesting that while PMIS data is recognized as an important input, decision-making processes may still rely on a mix of empirical evidence and traditional administrative judgment.

Items related to collaboration and stakeholder engagement (Q31–Q34) displayed a relatively high mean ($\bar{x}$=3.027) but also it has the largest variability as reflected in their responses with the SD of 1.136. This pattern indicates would indicate that collaborative PMIS practices are experienced unevenly across levels of governance, particularly between schools, divisions, and the regional office.

This finding was supported by the responses of program owners and PMIS users, wherein 25 participants (39.45%) reported the practice as "largely implemented"; 17 (27.34%) as "fully implemented," 16 (25.78%) as "slightly implemented," and only 5 (7.42%) reported it was "not implemented. A notable finding was observed particularly on Q31—which concerns regular platforms for sharing insights—which was the only item rated as "Fully Implemented" ($\bar{x}$=3.266 and SD=0.746). These finding highlights that formalized coordination mechanisms (e.g., meetings, reviews, and workshops) are comparatively stronger than other system-supported practices. Moreover, this finding indicates that collaborative PMIS practices are unevenly institutionalized across functional divisions and support units/sections and levels of bureaucracy (Central, Region, SDOs, and schools).

Finally, sustainability-related items (Q35–Q38) were rated as "largely implemented" as reflected in the $\bar{x}$=2.895 and SD=0.888. This suggests the presence of baseline technical and financial arrangements yet also points to the need for long-term strategic planning and system integration to ensure PMIS resilience and scalability. The absence of "highly implemented" ratings implies that these mechanisms may be operational rather than strategic in nature.

This reinforces the earlier demographic findings indicated in Table 3 that capacity development remains a key bottleneck variable. Despite the low overall weighted mean, this PMIS practices domain reflected the second-highest rating in terms of their assessment: 26 (40.31%) of respondents reported having "largely implemented" this practice, while 14 (22.50%) reported having "fully implemented" as a tool for data-driven enhancements.

Similarly, data-driven decision-making practices ($\bar{x}$=2.912; SD=0885) were rated as "largely implemented". Specifically, 42.19% of the program owners and PMIS users reported having "largely implemented" this practice, while 28.44% reported they were "fully implemented" this identified practice. This suggests an emerging culture of evidence use. However, the absence of higher ratings implies that

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traditional administrative judgment continues to coexist with data-informed approaches across 13 SDOs within DepEd Bicol.

Challenges Encountered in the Implementation of PMIS along: Technical and Infrastructure, User Training & Competency, Data Management and Utilization, and Administrative Policy

The next research questions were to identify challenges encountered in the implementation of PMIS in terms of: technical and infrastructure, user training & competency, data management and utilization, and administrative policy. Each challenge was grouped into either a major challenge, significant challenge, minor challenge or not a challenge. This categorization was intended to guide the researchers in terms of prioritizing the strategies and interventions in the proposed strategic action plan. **Table 6** contains the results from the survey revealed the following challenges encountered in the implementation and utilization of the PMIS in DepEd Bicol:

A. Technical and Infrastructure

As shown in Table 6 on the following page, the top challenge "*Insufficient and unstable internet connectivity continues to hinder personnel from consistently accessing and utilizing the PMIS, resulting in disrupted workflows and data entry delays"* with an overall weighted mean of 3.016, interpreted as "Significant Challenge".

Ranked second among the challenges was "*Inadequate hardware resources—specifically a shortage of desktop computers and laptops, and other devises —limit the ability of employees to fully utilize the system's capabilities* ($\bar{x}$=2.719), which also fell under the category of "significant challenge." This was followed by two items tied for third place: "*the lack of a designated technical support staff at the Regional and SDO levels leads to significant delays in troubleshooting, leaving users without timely assistance for recurring system issues* ($\bar{x}$=2.641) and "*the high cost of maintenance, data element updates, and infrastructure upgrades remains a critical concern,*" ($\bar{x}$=2.641).

Table 6: *Challenges Encountered in the Implementation and Utilization of PMIS Regarding Technical Infrastructure*

Challenges Encountered along Technical and Infrastructure Limitations	Weighted Mean	Interpretation	Rank
1. Insufficient and unstable internet connectivity continues to hinder personnel from consistently accessing and utilizing the PMIS, resulting in disrupted workflows and data entry delays	3.016	Significant Challenge	1
2. Inadequate hardware resources—specifically a shortage of desktop computers and laptops, and other devises —limit the ability of employees to fully utilize the system's capabilities.	2.719	Significant Challenge	2
3. The existing IT infrastructure within SDOs and schools is not currently optimized for PMIS technical requirements, creating a gap that prevents effective and seamless implementation	2.438	Minor Challenge	5
4. A lack of designated technical support staff at the Regional and SDO levels leads to significant delays in troubleshooting, leaving users without timely assistance for recurring system issues.	2.641	Significant Challenge	3.5
5.The high cost of maintenance, data element updates, and infrastructure upgrades remains a critical concern, as these requirements demand substantial budgetary allocations for programming and systems development	2.641	Significant Challenge	3.5
Overall	2.691	Significant Challenge	

Legend:

3.500-4.00 = Major Challenge
2.500- 3.449 = Significant Challenge
1.500-2.449 = Minor Challenge
Below 1.449 = Not a Challenge

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Among the identified challenges, "*the existing IT infrastructure within SDOs and schools is not currently optimized for PMIS technical requirements*," was rated as the least significant challenge, as reflected in the overall weighted mean of 2.438.

B. User Training and Competency

The next challenge identified by the participants related to user training and competency, which earned an overall weighted mean of 2.089 interpreted as a "Significant Challenge." Leading this category was "*Insufficient time allocated for hands-on PMIS training results in the incorrect formulation of the Expenditure Matrix, PPMP, and APP-CSE*" ($\bar{x}$=2.891). This finding was supported by 45 participants (73.44%)—including program owners and PMIS users—who identified this as a major or significant challenge, while 14 (21.88%) and 3 (4.69%) categorized it as a minor challenge or not a challenge at all, respectively.

The "*The lack of continuous support and refresher training hinders the data competence of SDO and school employees, particularly in planning, budgeting, results monitoring, and evidence-based policy decisions across governance levels*" was ranked second, with an overall mean of 2.875. This finding was supported by the assessment of 45 participants (70.31%), who rated it as a major or significant challenge, while the remaining 19 participants (29.69%) reported it as a minor challenge or not a challenge at all.

Table 7: *Challenges Encountered in the Implementation and Utilization of PMIS Regarding User Training and Competence*

Challenges Encountered along User Training and Competence	Weighted Mean	Interpretation	Rank
1. Insufficient hands-on training for SDO and school personnel on utilizing and navigating PMIS features contributes to delays in preparing the Expenditure Matrix, PPMP, and APP-CSE.	2.844	Significant Challenge	3
2. A lack of digital literacy training among some SDO and school personnel binders the effective adoption of the PMIS for progress monitoring.	2.750	Significant Challenge	4
3. Due to the rigorous processes and accountabilities required by the PMIS, some SDO and school personnel are resistant to adopting this technology in their workflow.	2.688	Minor Challenge	5
4. Insufficient time allocated for hands-on PMIS training results in the incorrect formulation of the Expenditure Matrix, PPMP, and APP-CSE	2.891	Significant Challenge	1
5. The lack of continuous support and refresher training hinders the data competence of SDO and school employees, particularly in planning, budgeting, results monitoring, and evidence-based policy decisions across governance levels	2.875	Significant Challenge	2
Overall	2.809	Significant Challenge	

Legend:

3.500-4.00 = Major Challenge
2.500- 3.449 = Significant Challenge
1.500-2.449 = Minor Challenge
Below 1.449 = Not a Challenge

This was followed by "*Insufficient hands-on training for SDO and school personnel on utilizing and navigating PMIS features contributes to delays in preparing the Expenditure Matrix, PPMP, and APP-CS (*$\bar{x}$=2.844) and "*lack of digital literacy training among some SDO and school personnel hinders the effective adoption of the PMIS for progress monitoring*" ($\bar{x}$=2.750).

The challenge related to "*Due to the rigorous processes and accountabilities required by the PMIS, some SDO and school personnel are resistant to adopting this technology in their workflow*" ($\bar{x}$=2.688) was identified by the respondents as the least significant challenge within the User Training and Competence

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domain. This finding was supported by 37 (57.81%) who rated it as a major or significant challenge, while 27 participants (42.19%) reported it as a minor challenge or not a challenge at all.

C. Data Management and Utilization

The third challenge encountered in the implementation and utilization of PMIS pertained to data management and utilization gaps which was supported by a weighted mean 2.697 interpreted as a "Significant Challenge." Among the challenges under this domain were: *" Inconsistent or incomplete data entry in the PMIS often results in inaccurate reports regarding the physical and financial accomplishments of programs and projects,"* ($\bar{x}$=2.781) and "*Data accuracy and reliability issues arise when personnel upload or download non-quality-assured Expenditure Matrices, PPMPs, and APP-CSEs into the system*" ($\bar{x}$=2.781). These two items tied for first place within this domain.

Other challenges were related to "*Data sharing and collaboration between SDOs and schools via the PMIS are not effectively implemented*" ($\bar{x}$=2.656), '*SDOs and schools lack a clear understanding of how to interpret and leverage PMIS data for strategic decision-making*," ($\bar{x}$=2.641) and "*the data analysis and report generation features of the PMIS—intended for regular monitoring, Program Implementation Reviews (PIR), and plan adjustments—are not fully utilized by SDOs and schools"* ($\bar{x}$=2.625).

Table 8: *Challenges Encountered in the Implementation and Utilization of PMIS Regarding Data Management and Utilization*

Challenges Encountered along Data Management and Utilization	Weighted Mean	Interpretation	Rank
1.Inconsistent or incomplete data entry in the PMIS often results in inaccurate reports regarding the physical and financial accomplishments of programs and projects..	2.781	Significant Challenge	1.5
2. Data accuracy and reliability issues arise when personnel upload or download non-quality-assured Expenditure Matrices, PPMPs, and APP-CSEs into the system.	2.781	Significant Challenge	1.5
3. The data analysis and report generation features of the PMIS—intended for regular monitoring, Program Implementation Reviews (PIR), and plan adjustments—are not fully utilized by SDOs and schools	2.625	Minor Challenge	5
4. SDOs and schools lack a clear understanding of how to interpret and leverage PMIS data for strategic decision-	2.641	Significant Challenge	4
5. Data sharing and collaboration between SDOs and schools via the PMIS are not effectively implemented.	2.656	Significant Challenge	3
Overall	2.697	Significant Challenge	

Legend:

3.500-4.00 = Major Challenge
2.500- 3.449 = Significant Challenge
1.500-2.449 = Minor Challenge
Below 1.449 = Not a Challenge

D. Administrative Policy

The last challenge encountered in the implementation and utilization of PMIS pertained to administrative policy. This was reported by the respondents as one of the major challenges, as indicated by the overall weighted mean of 2.522, which fell under the category of "Significant Challenge." **Table 9** exhibits this empirical finding.

As shown in the table above, the top challenges consisted of two items tied for first rank: "*Insufficient management and administrative support within SDOs and schools hinders the effective rollout and operation of the PMIS"* ($\bar{x}$*=2.578) and "the effective adoption of the PMIS is hindered by resistance from some technical and administrative support staff in the administration and implementation of the system,"* ($\bar{x}$=2.578).

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Table 9: *Challenges Encountered in the Implementation and Utilization of PMIS Regarding Administrative Policy*

Challenges Encountered along Administrative Policy	Weighted Mean	Interpretation	Rank
1. Despite the issuance of clear policies and guidelines for PMIS implementation, SDOs and schools have not fully executed them, posing a significant challenge to the system's operationalization	2.516	Significant Challenge	3
2. Insufficient management and administrative support within SDOs and schools hinders the effective rollout and operation of the PMIS.	2.578	Significant Challenge	1.5
3. The effective adoption of the PMIS is hindered by resistance from some technical and administrative support staff in the administration and implementation of the system.	2.578	Significant Challenge	1.5
4. The PMIS is not yet fully integrated into the existing administrative workflows designed to improve SDO and school processes.	2.484	Minor Challenge	4
5. SDO and school leaders lack the necessary commitment to advocate for and support the full utilization of the PMIS as a tool for managing programs, projects, and activities (PPAs), as well as for data-driven planning and evaluation.	2.453	Minor Challenge	5
Overall	2.522	Significant Challenge	

Legend:

3.500-4.00 = Major Challenge *1.500-2.449 = Minor Challenge*

2.500- 3.449 = Significant Challenge *Below 1.449 = Not a Challenge*

The challenge ranked third pertained to "despite the issuance of clear policies and guidelines for PMIS implementation, SDOs and schools have not fully executed them, posing a significant challenge to the system's operationalization ($\bar{x}$=2.516), which was interpreted as "Significant Challenge". However, two items under this domain were reported by the participants as minor challenges. This include: *"The PMIS is not yet fully integrated into the existing administrative workflows designed to improve SDO and school processes,"* ($\bar{x}$=2.484) and "*SDO and school leaders lack the necessary commitment to advocate for and support the full utilization of the PMIS"* ($\bar{x}$=2.453).

Significant Relationships between Respondents' Profile (Age, Gender, Civil Status, Educational Attainment, Position, Years of Experience, and Training & Exposure) and the Level of PMIS Utilization, as well as the Challenges Encountered in the Implementation of PMIS

5.1 Significant Relationships between Respondents' Profile and the Level of PMIS Utilization

Given that DepEd resources are limited, there is a need to prioritize the allocation of funds to monitor the PMIS utilization of its implementation. To guide this researcher in the formulation of the strategic action plan, this research analyzed ANOVA combined with Eta-squared (η^2) to go beyond merely simple statistical descriptions. Table 10a: Significant Relationships between Respondents' Profile and Level of PMIS Utilization

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Table 10a: *Significant Relationships between Respondents' Profile and Level of PMIS Utilization*

Outcome	η^2	Effect Magnitude	p-value	Interpretation
Gender				
Planning and Policy Formulation	0.021	Small	0.412	Not significant
Monitoring and Evaluation	0.034	Small	0.290	Not significant
Data Management and Reporting	0.028	Small	0.338	Not significant
Decision-Making and Resource Allocation	0.031	Small	0.302	Not significant
Overall Effect Size (η^2) and ANOVA Results for Gender Variables for PMIS Utilization	**0.033**	Small	**0.295**	**Not significant**
Age				
Planning and Policy Formulation	0.087	Medium	0.118	Not significant
Monitoring and Evaluation	0.092	Medium	0.104	Not significant
Data Management and Reporting	0.101	Medium	0.081	Marginal
Decision-Making and Resource Allocation	0.095	Medium	0.094	Not significant
Overall Effect Size (η^2) and ANOVA Results for Age Variables for PMIS Utilization	**0.116**	Medium	**0.072**	**Marginal**
Civil Status				
Planning and Policy Formulation	0.044	Small	0.247	Not significant
Monitoring and Evaluation	0.051	Small	0.219	Not significant
Data Management and Reporting	0.057	Small	0.198	Not significant
Decision-Making and Resource Allocation	0.049	Small	0.232	Not significant
Overall Effect Size (η^2) and ANOVA Results for Civil Status Variables for PMIS Utilization	**0.061**	Medium	**0.182**	**Not significant**
Position/Designation				
Planning and Policy Formulation	0.294	Large	0.004	Statistically significant, large practical impact
Monitoring and Evaluation	0.332	Large	0.001	Statistically significant, large practical impact
Data Management and Reporting	0.361	Large	0.001	Statistically significant, large practical impact
Decision-Making and Resource Allocation	0.348	Large	0.010	Statistically significant, large practical impact
Overall Effect Size (η^2) and ANOVA Results for Position/Designation Variables for PMIS Utilization	**0.288**	Large	**0.001**	**Strong, statistically significant effect**
Years of Experience				
Planning and Policy Formulation	0.09	Medium	0.226	Not significant
Monitoring and Evaluation	0.115	Medium	0.121	Not significant
Data Management and Reporting	0.141	Large	0.059	Marginal
Decision-Making and Resource Allocation	0.057	Small	0.474	Not significant
Overall Effect Size (η^2) and ANOVA Results for Years of Experience Variables for PMIS Utilization	**0.107**	**Medium**	**0.1458**	**Not significant**
Training and Exposure				
Planning and Policy Formulation	0.229	Large	0.034	Statistically significant.
Monitoring and Evaluation	0.272	Large	0.004	Statistically significant.
Data Management and Reporting	0.262	Large	0.059	Large effect, marginal
Decision-Making and Resource Allocation	0.199	Large	0.023	Statistically significant.
Overall Effect Size (η^2) and ANOVA Results for Training and Exposure Variables for PMIS Utilization	**0.267**	**Large**	**0.0011**	**Strong, statistically significant effect**

Small: *0.01 (1% of variance explained)* ***; Medium:*** *0.06 (6% of variance explained); and* ***Large****: 0.14 (14% of variance explained)*

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While ANOVA determined whether a significant difference existed, Eta-squared (η^2) indicated the magnitude of the effect (Effect Size) geared towards "data-informed" decision-making for policy formulation and implementation [Hair et al., (2019); DeLone & McLean (2003)].

In this study, this statistical analysis examined the influence of respondents' profile (e.g., age, gender, civil status, educational attainment, position/designation, years of experience, and training & exposure, among others) on PMIS continuous performance outcomes. This approach provided a roadmap for targeted interventions (Hair et al., 2019). ANOVA enabled the researcher to determine whether there were statistically significant differences in the mean scores in the four domains across various socio-demographic profiles. DeLone & McLean (2003) emphasized that the success of a PMIS operationalization was not merely administrative and technical but is deeply influenced by user characteristics and DepEd organizational policy support systems and processes.

As shown in Table 10a, the significant relationships based on the effect size of gender variable domains demonstrated negligible explanatory power. This is reflected in the uniformly small effect size across all gender variable domains, the overall Eta-squared ($\eta^2 = 0.033$) and non-significant overall p-value ($p=0.295$) across all four domains and parts - such as planning and policy formulation, monitoring physical and financial performance, data management & preparation, and decision-making & resource allocation. The results indicate that PMIS utilization is gender-neutral, supporting equitable access and engagement among PMIS users.

As for the age significant relationships the same table (Table 10a) revealed that based on the effect size, empirical findings revealed a moderate effect size, with an overall $\eta^2=0.116$; however, results were mostly marginal or non-significant, as reflected in the overall p=value of 0.072, which interpreted as "marginal." This suggests that experience-related differences may influence PMIS engagement, though not strongly enough to yield statistically distinct group means. These profile findings suggest a critical correlation between age distribution and the administrative stability, operationalization, and sustainability of PMIS management within DepEd Bicol.

The concentration of program owners and PMIS users within the older age brackets often results in the delegation of responsibilities to younger subordinates. This reliance on delegated authority was observed to be the primary driver of PMIS operational turnover and frequent changes in designated PMIS personnel, particularly in the SDOs. Furthermore, because these subordinates often lack prior system knowledge and specialized skills, this delegation contributes to systemic inefficiencies. These include the erroneous identification of PAPs' output deliverables and performance indicators; delays in uploading budget allocations, work plans, and actual accomplishments; inaccuracies in encoding physical and financial targets; and discrepancies in the synchronization of financial targets vis-à-vis the allocations within the system. This implies that experience alone does not guarantee higher PMIS utilization without complementary training and role authority within the region, SDOs, and schools.

Likewise, civil status was found to show minimal relationship, characterized by small-to-moderate effect sizes. However, the overall magnitude of the effect was observed to be moderate ($\eta^2 =0.061$) it was not deemed statistically significant (p-value= 0.182). Despite this non-significance, the findings suggest that personal life-stage factors do not materially shape PMIS use in a way that disrupts the institutional workflows of DepEd Bicol, thereby reinforcing the organizational nature of information system adoption.

With this perspective, this demographic composition provides critical context for the observed delays, particularly regarding the uploading of SAROs and the timely submission of WFPs and accomplishment reports. It was observed that the prevalence of married employees introduces the issue of "dual-role" conflict—the challenge of balancing administrative task compliance (specifically the timely, quality submission of plans and reports) with household responsibilities.

Given top management's requirement for strict, time-sensitive, and quality-assured data, the intersection of professional and "work-home" prioritization can lead to fragmented PMIS engagement. This trade-off often results in delays in the preparation and uploading of WFPs, as well as the late submission of

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quarterly accomplishment reports. For many married respondents, competing priorities between household management and office deadlines directly impact the efficiency of data entry and system reporting.

In contrast with profiles cited above, position/designation, years of experience, and training exposure clearly dominate as determinants of PMIS level of utilization, exhibiting both large effect sizes and statistically significant differences across most domains. Table 10a presents the significant relationships based on the ANOVA results of the level of PMIS utilization.

The convergence of large η^2 values and significant p-values for position/designation up to the training and exposure to PMIS demonstrates that performance disparities are structural and capacity-driven rather than based on the demographic profile of the participants.

As shown in Table 10a, position/designation emerged as the strongest determinant of PMIS utilization outcomes, exhibiting a consistently strong relationship based on large effect sizes ($\eta^2 \approx 0.18$–0.39) across nearly all domains, with most effects reaching statistical significance. This confirms that PMIS utilization is structurally differentiated by organizational role, not merely by individual preference.

The largest and most robust relationships regarding position/designation were observed in data management, data-driven decision-making, and overall PMIS utilization domains, indicating that data authority and analytical responsibility increase with administrative level.

Several domains for PMIS utilization assessment (e.g., training and capacity building, collaboration) showed large effect sizes but non-significant p-values, suggesting meaningful practical differences that may be obscured by sample size limitations or within-group variability. These domains remain substantively important despite statistical non-significance.

Years of experience exhibited moderate-to-large effect sizes in terms of significant relationships across several domains, indicating that professional tenure and experience influence how PMIS is perceived and engaged with, particularly in the utilization and sustainability.

The strongest and most statistically robust effect of years of experience was observed in sustainability measures for PMIS optimization ($\eta^2 = 0.225$, $p = 0.0041$), suggesting that more experienced personnel are more attuned to long-term system governance, maintenance, and integration concerns.

Training and exposure to PMIS demonstrated large and statistically significant relationship with PMIS utilization ($\eta^2 = 0.267$, $p = 0.0011$) reinforcing training as a high-impact, modifiable intervention lever. The combination of large η^2 values and low p-values across planning, monitoring, decision-making, and sustainability domains indicates that training does not merely improve technical use but also strengthens strategic and governance-oriented PMIS functions.

Conversely, Collaboration and Stakeholder Engagement consistently showed weaker statistical significance relationship, despite moderate-to-large effect sizes. This supports earlier reliability findings that collaboration is contextual, uneven, and systemically constrained, rather than purely role-or training-driven across all governance levels.

5.2. Significant Relationships between Respondents' Profile and the Level of Implementation of Current Practices in PMIS Utilization

Consistent with the previous discussion, this section provides a statistical analysis examining the influence of the respondents' profile (e.g., age, gender, civil status, educational attainment, position, years of experience, and training/exposure) on the level of PMIS implementation and utilization for continuous performance outcomes. This approach was undertaken to provide a roadmap for identifying the strategic pillars and interventions to be employed in the formulation of the action plan.

Like the PMIS utilization domain, the significant relationship of gender with PMIS practices demonstrated negligible explanatory power, with small effect sizes and non-significant p-values across all domains and components. The overall relationship based on the effect size was 0.027 and the p-value was 0.342, which is not a significant relationship. This finding indicates that, just like PMIS utilization, PMIS practices in DepEd Bicol are gender neutral. Table 10b exhibits the relationships of gender based on the effect size and ANOVA analysis of the PMIS practices domains.

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Conversely, age exhibited moderate or medium relationships based on ANOVA across the four PMIS practice domains, supported by predominantly marginal or non-significant p-values (p=0.063). The overall relationships based on the ANOVA was 0.124 across the four domains; this suggests that while experience-related differences may theoretically influence PMIS engagement, the variance is insufficient to yield statistically distinct group means. This indicates that age-based differences in in terms of relationships with the PMIS level of practice do not reach the threshold of statistical significance, particularly when computing the effect size and analysis of variance.

As to the relationship of civil status with PMIS practice domains based on ANOVA, Table 10b also shows a minimal relationship, with small-to-moderate effect sizes. However, the overall magnitude of the effect or relationship was found to be moderate or medium (η^2 =0.067) and was not statistically significant (p= 0.1689). This finding suggests that personal life-stage factors and currently implemented practices do not materially shape PMIS use in a way that disrupts DepEd Bicol organizational workflows, reinforcing the bureaucratic nature of system operationalization and sustainability.

As shown in Table 10b, the effect size and ANOVA Analysis of the relationships between respondents' position/designation, and the level of implementation of current practices in PMIS Utilization. Empirical findings revealed that position/designation emerged as the strongest determinant of the effective implementation of the current PMIS practices outcomes, indicating that data authority and analytical responsibility increase with administrative level. This was particularly evident in the practice domains, which exhibited consistently large overall effect sizes ($\eta^2 \approx 0.17$; p=0.153) across all implementation practice domains.

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Table 10b: *Significant Relationships between Respondents' Profile and the Level of Implementation of Current Practices in PMIS Utilization*

Outcome	η^2	Effect Magnitude	p-value	Interpretation
Gender				
Training and Capacity Building	0.019	Small	0.468	Not significant
Data-Driven Decision-Making	0.026	Small	0.362	Not significant
Collaboration and Stakeholder Engagement	0.041	Small	0.251	Not significant
Sustainability Measures	0.029	Small	0.330	Not significant
Overall Effect Size (η^2) and ANOVA Results for Sex Variables for PMIS Practices	0.027	Small	0.342	Not significant
Age				
Training and Capacity Building	0.134	Medium	0.058	Marginal
Data-Driven Decision-Making	0.121	Medium	0.070	Marginal
Collaboration and Stakeholder Engagement	0.098	Medium	0.089	Marginal
Sustainability Measures	0.109	Medium	0.073	Marginal
Overall Effect Size (η^2) and ANOVA Results for Age Variables for PMIS Practices	0.124	Medium	0.063	Marginal
Civil Status				
Training and Capacity Building	0.063	Medium	0.1769	Not significant
Data-Driven Decision-Making	0.059	Small	0.1892	Not significant
Collaboration and Stakeholder Engagement	0.071	Medium	0.1524	Not significant
Sustainability Measures	0.068	Medium	0.1648	Not significant
Overall Effect Size (η^2) and ANOVA Results for Civil Status Variables for PMIS Practices	0.067	Medium	0.1689	Not significant
Position/Designation				
Training and Capacity Building	0.311	Large	0.0754	Large effect but not statistically significant
Data-Driven Decision-Making	0.385	Large	0.0146	Statistically significant, large practical impact
Collaboration and Stakeholder Engagement	0.176	Large	0.2015	Large effect, statistically non-significant
Sustainability Measures	0.246	Large	0.004	Statistically significant, large practical impact
Overall Effect Size (η^2) and ANOVA Results for Position/Designation Variables for PMIS Practices	0.325	Large	0.017	Strong, statistically significant effect
Years of Experience				
Training and Capacity Building	0.084	Medium	0.2618	Not significant
Data-Driven Decision-Making	0.139	Medium	0.062	Marginal
Collaboration and Stakeholder Engagement	0.128	Medium	0.0848	Marginal
Sustainability Measures	0.225	Large	0.0041	Statistically significant
Overall Effect Size (η^2) and ANOVA Results for Years of Experience Variables for PMIS Practices	0.153	Large	0.0411	Statistically significant
Training and Exposure				
Training and Capacity Building	0.132	Medium	0.0036	Statistically significant, moderate practical impact
Data-Driven Decision-Making	0.187	Large	0.0008	Statistically significant, large practical impact
Collaboration and Stakeholder Engagement	0.095	Medium	0.4534	Moderate effect, statistically non-significant
Sustainability Measures	0.226	Large	0.0041	Statistically significant, large practical impact
Overall Effect Size (η^2) and ANOVA Results for Training and Exposure Variables for PMIS Practices	0.182	Large	0.01	Strong, statistically significant effect

Small: 0.01 (1% of variance explained); Medium: 0.06 (6% of variance explained); and Large: 0.14 (14% of variance explained)

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Most relationship reached statistical significance; however, several domains [e.g., Training and Capacity Building (η^2= 0.311; p=0.075); collaboration and stakeholders' engagement ((η^2= 0.076; p=0.201)] showed large effect sizes but non-significant p-values, suggesting meaningful practical differences that may be obscured by sample size limitations or within-group variability.

Despite its non-significance, these domains remain substantively important. This confirms that PMIS practices employed in utilizing PMIS are structurally differentiated by functional and support units or sections, and schools, rather than being a matter of individual employee preference.

Regarding the effects of years of experience on the current PMIS practices, Table 6b revealed the same results of the effect size and ANOVA analysis. As shown in the table, years of experience exhibited moderate-to-large effect sizes across several domains; however, an exception was found in training and capacity building, which had no significant effect. This finding indicated that professional tenure influences how the PMIS is perceived and engaged with, particularly in institutional and sustainability-oriented practices.

The strongest and most statistically robust effect of experience was observed in sustainability measures for PMIS optimization (η^2= 0.225, p = 0.0041). This suggests that more experienced DepEd Bicol personnel are significantly more attuned to long-term system governance, maintenance, and integration.

Overall experience in the PMIS practices as an aggregated construct also showed a large and statistically significant effect (η^2 = 0.153, p = 0.0411), indicating that experience plays a more pronounced role in shaping organizational and procedural practices than in basic system utilization.

Training and exposure to PMIS demonstrated large and statistically significant relationship on PMIS practices (η^2 = 0.182, p = 0.0100), reinforcing training as a high-impact, modifiable intervention lever. The combination of large η^2 values and low p-values across data-driven decision-making (η^2 = 0.139, p = 00.0620), and sustainability domains (η^2 = 0.225, p = 0.0041). This indicated that training and exposure practices do not merely improve technical use but also strengthen strategic and governance-oriented PMIS functions across all levels of governance.

Conversely, collaboration and stakeholder engagement (η^2 = 0.128, p = 0.0848 consistently showed weaker statistical significance, despite moderate-to-large effect sizes. This finding supports earlier reliability findings that collaboration is contextual, uneven, and systemically constrained, rather than purely role or training-driven based on the result of the training needs assessment.

This finding also suggests that while you can "teach" employees to use the PMIS, you cannot simply "train" them to collaborate if the DepEd organizational culture or system does actually support it.

6. Proposed Strategic Action Plan to Address Critical Findings and Operational Challenges to Optimize the Utilization of the PMIS

The proposed action plan is strategically anchored on the study's most significant empirical key findings and major operational challenges: PMIS performance is primarily determined by training exposure, organizational role, and professional experience, whereas demographic variables—such as sex and civil status—exert minimal influence (**see Figure 2**). Consequently, interventions are designed to be structural and capacity-based rather than demographic-targeted.

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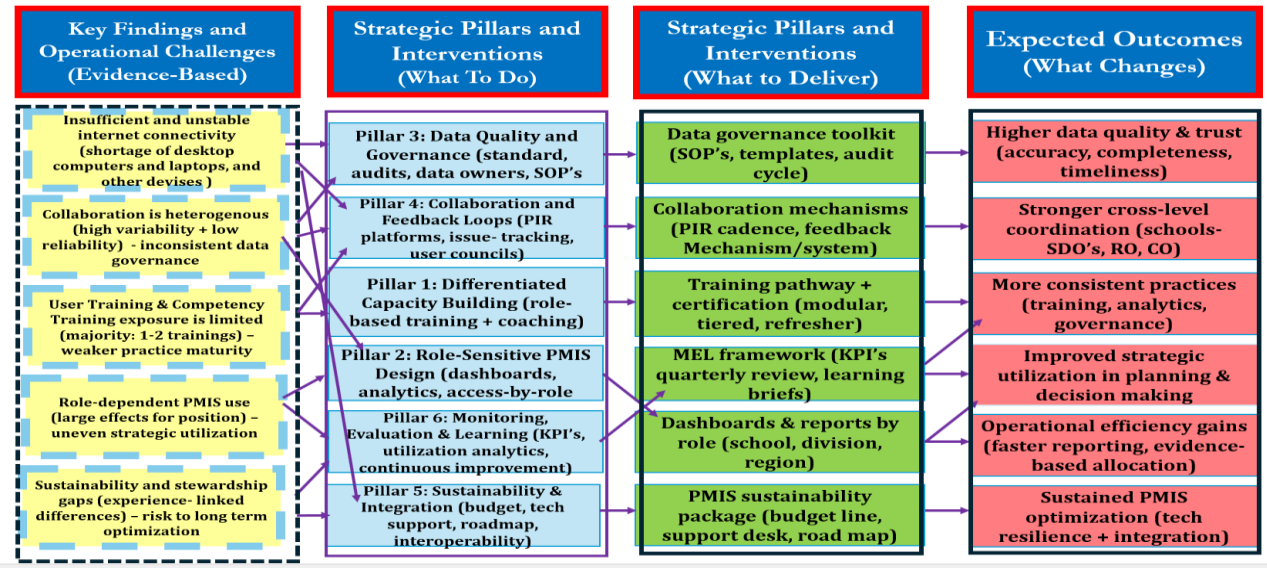

Figure 2. *Evidence-based Action Plan Framework to Address Challenges and Enhance PMIS Utilization in DepEd Bicol*

The proposed strategic action plan prioritizes addressing deficiencies in computer hardware and unstable internet connectivity, alongside differentiated capacity building, which emerged as key findings of this study. These technical and training-related gaps consistently emerge as primary constraints to achieving deeper PMIS practice maturity and sustainability.

To resolve these issues, the proposed plan emphasizes its strategic pillars and interventions for resource optimization by prioritizing the procurement of essential hardware and reliable connectivity within the approved Maintenance and Other Operating Expenses (MOOE) or annual budgets of the SDOs and schools. Furthermore, a tiered, role-based training pathway—incorporating coaching and refresher cycles—is positioned as the most actionable lever for converting "routine use" into "strategic use."

Moreover, the proposed plan explicitly addresses role-dependent utilization by proposing role-sensitive PMIS design—including dashboards, reporting views, and analytics functions that match the decision needs of top management, program owners, and school heads. This directly responds to large role effects observed in utilization and practice outcomes.

Given the high variability and weak coherence observed in collaboration-related dimensions as reflected in the empirical findings, this proposed framework introduces data governance and collaboration mechanisms as distinct pillars. This proposed pillar reflects that collaboration issues are not merely behavioral, but systemic, requiring shared standards, defined data owners, quality audits, and structured feedback loops (e.g., PIR cadence, M&E Focal Persons).

Sustainability is treated as a governance priority rather than an afterthought. The framework integrates a sustainability and integration pillar (budget line, technical support structures, roadmap, interoperability), acknowledging that long-term PMIS optimization depends on institutional stewardship and investment—especially among more experienced personnel who tend to emphasize sustainability concerns.

Collectively, the framework embeds Monitoring, Evaluation, and Learning (MEL) to prevent the proposed action plan from becoming a one-time intervention but a regular programs of DepEd Bicol. Utilization analytics, KPIs, and regular learning briefs ensure that PMIS improvement becomes a continuous improvement cycle, strengthening accountability, reinforcing evidence-based decision-making, and supporting operational efficiency over time.

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DISCUSSIONS AND IMPLICATIONS

This section provides a critical analysis and contextual interpretation of the research findings, synthesizing quantitative and qualitative data with existing literature and studies. It explains the data-driven significance of the empirical outcomes and demonstrates how the results directly address the study's research questions. It also provides the practical implications of these findings, which serve as the foundation for an action plan designed to enhance the operational efficiency and sustainability of the PMIS.

A. Discussions and Implications

1. Profile of Research Participants

The profile of the 64 research participants who responded to the online survey was primarily composed of married and female-dominated personnel with extensive tenure in DepEd and high academic credentials across 13 SDOs. A significant majority (67.19%) hold advanced postgraduate degrees, including Master's and Doctoral levels, suggesting a highly professionalized PMIS user base with strong cognitive proficiency. Their profile is highly characterized by an older, more senior workforce, with nearly 60% of respondents possessing over a decade of experience in the education sector. This indicates that personnel responsible for managing PMIS operations are currently driven by long-serving personnel who possess the prerequisite analytical skills for complex data management and data-driven WFPs, and PPMPs.

However, research findings revealed that a critical disconnect exists between these high academic qualifications and specific system expertise, particularly in the preparation and downloading of the WFP to the system, as well as the reporting of PAPs accomplishments to the PMIS. Despite their professional maturity, approximately 59.38% of respondents were reported to have limited or no formal training in PMIS functionalities, revealing a substantial competency and skills gap that hinders effective system utilization. This finding implies that while the workforce has the intellectual capacity for the "strategic use" of the system—ensuring compliance with budgeting guidelines and the accuracy of programmed activities and expenditures—the lack of technical exposure keeps them grounded in "routine use." This is evidenced by erroneous data entry, particularly in identifying program and objective outputs and indicators.

Consequently, the transition to an optimized, data-driven environment necessitates a shift from basic orientations toward a tiered, competency-based capacity-building program and needs-based technical assistance and mentoring. Such an approach leverages the PMIS users' existing analytical strengths while addressing their specific technical deficiencies to achieve the overall PMIS goal, which is to manage and monitor the Department's various PAPs while serving as the "single source of truth" for the entire planning-to-reporting cycle.

2. Level of PMIS utilization in DepEd Bicol in terms of: Planning & Policy Formulation; Monitoring & Evaluation of School Performance; Data Management & Reporting; and Decision-Making & Resource Allocation

Overall findings indicate that the PMIS is extensively utilized and implemented across all identified key PMIS utilization domains: Planning & Policy Formulation; Monitoring & Evaluation of School Performance; Data Management & Reporting; and Decision-Making & Resource Allocation. This implies that the system has successfully moved beyond its "compliance-only" implementation and is now established as a fundamental component of routine for internal efficiency in DepEd Bicol's various PAPs and serving as the "single source of truth" for the entire planning-to-reporting cycle. Empirical findings show that the level of utilization and the leveraging of the PMIS for data-driven insights for policy and decision-making consistently fell within the "utilized" range. This implies that while the system is functionally embedded in day-to-day administrative tasks, its full potential has not yet been maximized across every dimension of the utilization assessment.

In addition, *the PMIS provides quality, relevant, and timely information crucial for effective planning, budgeting processes, and decision-making within the DepEd* [Department of Education, 2021).

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It also facilitates the strategic allocation of limited resources, ensuring that funds are directed to areas of greatest need and impact based on the identified priority needs in respective plans and targets (Department of Education, n.d.).

This finding was corroborated by the results of the KIIs and FGDs, from which the following themes emerged: first, the PMIS is integrated into planning, as data derived from the system is linked to key decision-making processes, specifically during the Program Implementation Review and Performance Assessment (PIRPA), resource allocation, and program tracking. Second, the system is used for monitoring and validation, as data audits and "double-checking" protocols ensure alignment with regional and SDO-approved budget allocations and third, linking data outputs to performance evaluations and the strict requirement that activities follow PMIS protocols ensure system adherence. Moreover, the PMIS serves as a feedback loop, where communication via dedicated platforms (such as Group Chats for program owners and PMIS users) and regular meetings help share summarized insights and actionable recommendations.

From a profile perspective, variables such as sex, civil status, and age demonstrated negligible explanatory power. This is reflected in the uniformly *small effect sizes across all domains*, supported by an overall Eta-squared of (η^2=0.033) and non-significant overall p-value (p=0.295). Consequently, these results indicate that *PMIS utilization is gender-neutral and inclusive, supporting a culture of equitable access and professional engagement*.

Figure 3 presents the Convergent Logic-based Synthesis of PMIS Utilization. This framework illustrates the synergistic relationship between four core domains: planning and policy formulation, monitoring and evaluation, data management and reporting, and decision-making and resource allocation. Together, these domains collectively determine the overall level of PMIS utilization, serving as the primary drivers of data driven insights within DepEd Bicol.

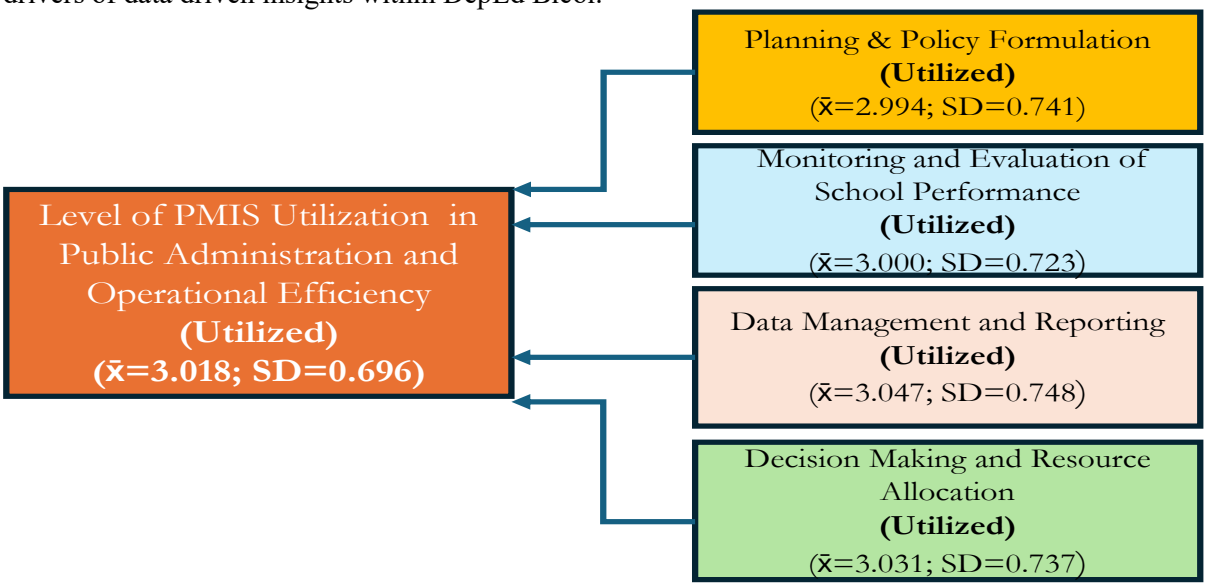

Figure 3. *Convergent Logic-based Synthesis of PMIS Utilization*

As shown in the convergent logic-based synthesis of PMIS utilization, the integration of the PMIS across planning, monitoring, data management, and resource allocation collectively determines the system's overall effectiveness in terms of utilization. Empirical findings confirm that the *PMIS is highly effective in driving system's efficiency, serving as a catalyst for data-informed insights and will be utilized as a "single source of truth" for the entire planning-to-reporting cycle.*

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Results from the assessment of these domains *exhibited stable and moderately high mean scores,* suggesting that the *system is routinely used for performance-tracking functions such as accessing program data, monitoring the progress of PAPs, and generating essential accomplishment reports*.

Furthermore, the tight clustering of weighted means (ranging approximately from 2.90 to 3.10) implies *a uniform level of adoption across various offices, reflecting deep-rooted organizational familiarity rather than isolated or role-specific usage*.

However, deeper analysis reveals that utilization is primarily structural and capacity driven. While the monitoring and evaluation domain showed stable utilization for tracking timelines and outputs, it exhibited significant role-based effects; monitoring functions are utilized more intensively by regional and division-level program owners and PMIS users than by school-level users.

Among the domains of PMIS utilization, data management and reporting emerged as the strongest domain, reinforcing the PMIS's role as a centralized repository for encoding, retrieval, and report generation—functions closely aligned with accountability mandates in the Department.

Finally, while the use of PMIS in decision-making and resource allocation is rated as "largely implemented," its meaningful application remains dependent on specific roles and training. ANOVA results indicate that the most significant variance in utilization levels is explained by position, training exposure, and years of experience. This suggests that while the system is accessible to all, its sophisticated use in budgeting and resource justification is currently concentrated among administrators and highly trained users.

3. Level of Implementation of Current Practices in PMIS Utilization along: Training & Capacity Building Initiatives, Data-driven Decision-Making Approaches Employed, Collaboration & Stakeholder Engagement Strategies Implemented, and Sustainability Measures for PMIS Optimization Used

PMIS practices within DepEd Bicol are broadly implemented across organizational, analytical, collaborative, and sustainability dimensions. This indicates that system utilization is supported by institutionalized frameworks and policies rather than isolated technical actions. However, while the system is functional, the depth of these practices varies significantly across different domains.

The Convergent Logic-based Synthesis of Practices in PMIS Utilization (**Figure 4)** illustrates the Integrated Framework of PMIS Implementation Practices. This model demonstrates how training and capacity building, data-driven decision-making, collaboration and stakeholder engagement, and sustainability measures for PMIS optimization jointly shape the execution of PMIS practices. Together, these four domains serve as the structural foundation supporting data-informed enhancements within DepEd Bicol.

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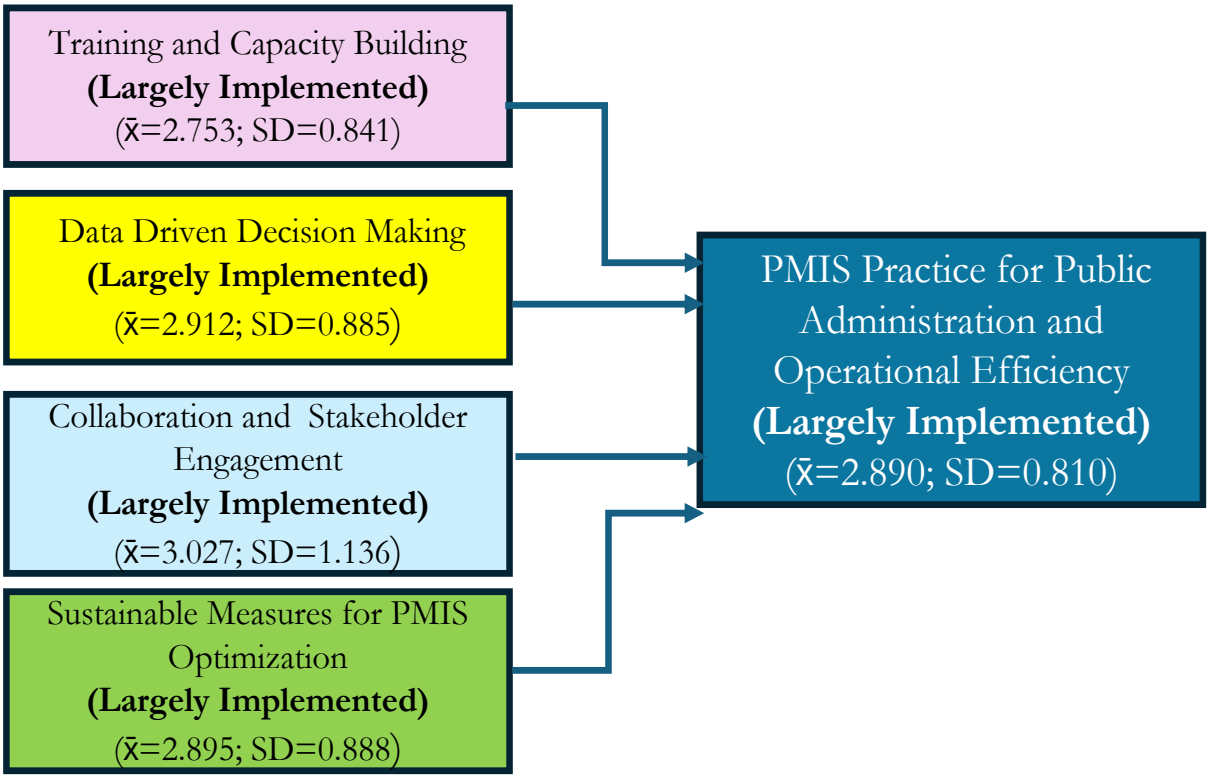

Figure 4. *Convergent Logic-based Synthesis of Practices in PMIS Utilization*

As shown in the figure of *PMIS Implementation Practices, training and capacity building, while categorized as "largely implemented," emerged as the weakest PMIS practice domain.* Descriptive statistics show that this area yielded the lowest mean scores among the four domains, with inferential analysis confirming significant disparities based on training exposure and professional position. Out of 64 participants, 40.31% reported large-scale implementation, while 22.50% noted full implementation. Conversely, 29.38% reported only slight implementation, and 7.81% indicated no implementation at all. This suggests that PMIS practice maturity is constrained by uneven access to structured training, particularly at the school level. These findings reinforce a critical gap: *many research participants possess years of professional experience but lack the formal, technical and competency-based training required to fully institutionalize the system.*

Likewise, practices surrounding *data-driven decision-making exhibited a moderate mean, suggesting a growing organizational norm of referencing PMIS data.* While rated as "largely implemented," the absence of higher ratings implies that traditional administrative judgment continues to coexist with—and sometimes overshadow—data-informed approaches across the 13 SDOs.

ANOVA results and effect sizes further indicate that meaningful data utilization remains concentrated among administrators and highly trained users, rather than being equitably distributed across all roles.

Collaboration and stakeholder engagement displayed a relatively high mean but also the highest variability. This pattern indicates that *collaborative practices are experienced unevenly across all levels of bureaucracy*—between the Regional Office, SDOs, and schools. Interestingly, the only item rated as "fully implemented" was related to regular platforms for sharing insights (e.g., meetings and workshops). This suggests that formalized coordination mechanisms are comparatively stronger than other system-supported collaborative practices. However, the high variability aligns with low reliability scores, suggesting these

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practices are context-dependent and influenced more by organizational structure than by individual demographics.

Sustainability-related items were rated as "largely implemented" pointing to the existence of baseline technical and administrative arrangements. However, the lack of "highly implemented" ratings from the respondents indicates that these measures are currently operationalized rather than strategic. Long-term stewardship—including planning and budgeting, technical support, and system integration—is recognized but requires more robust strategic planning to ensure resilience and scalability.

Across all domains, *demographic factors such as sex, civil status, and age exerted minimal influence on PMIS practices*. In contrast, *position/designation, training exposure, and professional experience emerged as the primary drivers of practice effectiveness*. This confirms that *PMIS utilization in DepEd Bicol is institutionally shaped and capacity-driven rather than demographically determined.*

4. Challenges Encountered in the Implementation of PMIS along: Technical and Infrastructure, User Training & Competency, Data Management and Utilization, and Administrative Policy

Technical and Infrastructure

The analysis of technical infrastructure reveals a hierarchy of challenges - categorized as major, significant, minor, or not a challenge - that impede the full optimization of the PMIS within DepEd Bicol. One of the significant identified challenges is insufficient and unstable internet connectivity, which creates a ripple effect of disrupted workflows and delayed data entry. This suggests that the *system's effectiveness is currently held hostage to external telecommunications infrastructur*e. Closely following this is the *shortage of hardware resources, specifically desktop computers and laptops*. This indicates a "resource-access gap," where the digital platform exists, but the physical means to engage with it are inadequate.

Interestingly, two identified significant challenges tied for third place, highlighting a dual strain on human and financial capital: *the lack of designated technical support staff at the SDO and school levels and the prohibitive costs of maintenance and upgrad**es***. While the existing IT infrastructure was rated as a "minor challenge", this does not imply it is optimal; rather, it suggests that basic access (internet and hardware) and support are more immediate "pain points" for users than the internal configuration of the SDO servers themselves.

These findings align with Salazar (2024) study, who noted that limited access to reliable internet and modern devices in rural areas presents a significant barrier to PMIS efficacy. Furthermore, Luna et al. (2024) argue that weak infrastructure in certain regions inherently limits the success of digital educational management tools. Global reports from GCHumanRights.org (2020) and Education Profiles (2021) corroborate these findings, emphasizing that technological infrastructure remains a universal barrier in underdeveloped regions.

The implications of these findings are twofold. First, the "utilized" status of the PMIS is currently being sustained through "work-arounds" by PMIS users despite poor connectivity and hardware shortages. These risks resulted in PMIS user burnout and data inaccuracy. Second, the lack of dedicated technical support personnel implies that the PMIS is being managed as a secondary task rather than a core administrative function. For DepEd Bicol, this means that unless infrastructure investments (broadband and hardware) are prioritized alongside software implementation, the system may never reach its "maximized" potential, leading to persistent data gaps in SDOs and IUs.

User Training and Competency

The findings highlight that while technical access is a hurdle, the human element—specifically training and competency which rate as the number significant challenges which presents a critical bottleneck in the PMIS utilization and sustainability. Results of the survey KIIs and FGDs revealed that the primary concern among research participants is the *insufficiency of hands-on training, which directly correlates with errors in high-stakes PMIS outputs such as the preparation of WFP, Expenditure Matrix,*

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PPMP, and APP-CSE. This suggests that current training programs may be too theoretical or too brief to bridge the gap between system navigation and practical application.

Furthermore, the lack of continuous support and refresher sessions is another identified "significant challenge.' This was corroborated by participants during the KIIs indicates a "one-and-done" approach to capacity building. In public administration, digital competence is not a static milestone but a decaying skill that requires regular reinforcement. The results show that this *lack of continuity hinders data competence in essential governance functions, including evidence-based policy making and results monitoring and evaluation.*

Interestingly, *user resistance was identified as the least or minor challenge*. This is a vital insight. This implies that *personnel who manage the PMIS operations are generally willing to adopt the PMIS but feel unable to do so effectively due to skill gaps rather than a lack of motivation.* This shifts the organizational burden from "change management" to "competency development."

These findings suggest that DepEd Bicol's digital transformation is currently limited by a "skills-gap" that threatens the accuracy of regional planning and budgeting. As Ramos and Vicente (2023) and Gonzales (2023) emphasize, without specialized expertise, program owners and PMIS users will continue to struggle with the PMIS, regardless of how advanced the software becomes.

The implication is that the Department must move beyond initial orientation and invest in ongoing professional development, a strategy supported by Bañares (2022b) and Number Analytics (2025). To optimize the PMIS, a decentralized support system—utilizing collaboration among local, regional, and national stakeholders (MTaPS Program, 2024)—is necessary to ensure that training is not only available but also tailored to the specific digital literacy levels of rural personnel.

Data Management and Utilization

The third primary challenge identified in the implementation and utilization of the PMIS relates to *data management and utilization gaps*. Within this domain, two specific items tied for the highest rank in terms of "significant challenge": "*Inconsistent or incomplete data entry," which leads to inaccurate reporting of physical and financial accomplishments, and "data accuracy and reliability issues"* stemming from the upload or download of non-quality-assured PMIS generated documents such as WFP, Expenditure Matrices, PPMPs, and APP-CSEs. Other critical and "significant challenges" include the ineffective implementation of data sharing and collaboration between SDOs and schools.

Furthermore, there is a noted *deficiency in how these entities interpret PMIS data for strategic decision-making*. Consequently, the system's robust features—intended for regular monitoring, Program Implementation Reviews (PIR), and plan adjustments—remain underutilized.

In modern public administration, platforms like the PMIS are essential for enhancing transparency and accountability (Number Analytics, 2025; Sharmin & Chowdhury, 2025). However, research indicates that data inconsistencies are prevalent in some regions with limited technological infrastructure (DepEd SDO1 Pangasinan, 2024b). Because inaccurate data precipitates poor decision-making and inefficient resource allocation, ensuring the PMIS is properly calibrated for accurate data collection is critical (DepEd RO8, 2024). The current state of public administration is evolving toward digital innovation and citizen-centric governance (Mancosa, 2025). These technologies are transitioning toward interoperability and data-sharing ecosystems, moving beyond centralized hubs to secure data spaces that facilitate cross-agency collaboration (Capgemini, 2025).

Administrative Policy

Regarding administration and policy constraints, the identified "significant challenges" consisted of two items tied for the top rank: *"insufficient management and administrative support within SDOs and schools," and "resistance from some technical and administrative support staff during system implementation*." The third-ranked "significant challenge" pertained to the *incomplete execution of clear policies and guidelines, which poses a significant hurdle to operationalization.* Conversely, two items were

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categorized as minor challenges: the lack of full integration of the PMIS into existing administrative workflows and a perceived lack of commitment from leaders to advocate for the system. The data suggests a critical disconnect between policy design and ground-level execution.

Below are the technical implications of these findings: The fact that clear guidelines exist but are not fully executed implies that the barrier is not a lack of information, but a lack of compliance and enforcement mechanisms. This suggests that simply issuing more memos or guidelines will not improve PMIS utilization; instead, there is a need for accountability frameworks that monitor policy adherence at the SDO and school levels. The tie for first rank between "insufficient support" and "staff resistance" highlights that the PMIS is facing socio-technical friction. The resistance from administrative staff indicates that the system may be perceived as an additional burden rather than a tool for efficiency. This implies that the "Human Infrastructure" is currently the weakest link in the digital transformation of the Bicol Region's education governance.

Aligning with Mancosa (2025) and Regenesys (2023) studies, these findings imply that DepEd Bicol is in a transitional phase. While the "future of public administration" is agile and citizen-centric, the "resistance" and "insufficient support" suggest that traditional bureaucratic leadership is still prevalent. For the PMIS to succeed, the administration must move away from a "top-down" mandate and toward a participatory governance model where staff understand the ethical and transparency-related value of the system.

Interestingly, participants rated "leader commitment" as a minor challenge. This implies that while leaders may verbally support or "advocate" for the PMIS, that support does not always translate into the allocation of budget or resources or the active management of staff resistance. There is a "commitment-action" gap that needs to be bridged to move from passive approval to active operational support.

5.a. Significant Relationships between Respondents' Profile and the Level of PMIS Utilization

The statistical analysis of the significant relationship between the respondents' profiles and the level of PMIS implementation was conducted though ANOVA. Empirical findings reveal a high degree of uniformity across the DepEd Bicol workforce. The *influence of gender was found to be negligible, as evidenced by an overall effect size of 0.027 and a p-value of 0.342.* Conversely, age and civil status were identified as non-significant factors, with age exhibiting a moderate ANOVA result (0.124). Therefore, the *respondents' profiles have no significant relationship to the PMIS implementation*, as they deemed insufficient to yield statistically significant distinct group means. These findings indicate that *PMIS utilization is characterized as demographic-neutral, wherein individual life-stage factors*—such as personal milestones and biological changes—are overshadowed by standardized organizational and bureaucratic requirements.

The implications center on the bureaucratic stability of the system's operationalization and utilization, because the level of implementation was not significantly altered by age, gender, or civil status. Hence, it is concluded that PMIS utilization is driven by systemic mandates — through DepEd policies and issuances — rather than personal profile variables. This suggests that the *current organizational workflows of DepEd Bicol are firmly established and resilient against demographic shifts*. Consequently, this provides a clear indication that future interventions and learning and development programs will be most effective if DepEd top management focuses on technical competency, skills, and infrastructure improvement rather than demographic-tailored change management, as the workforce is shown to be a cohesive unit in its approach to system sustainability.

5.b. Significant Relationships between Respondents' Profile and the Level of Implementation of Current Practices in PMIS Utilization

Like PMIS utilization, the statistical analysis of significant relationships between the respondents' profiles and the level of implementation of *current practices revealed a negligible to non-significant impact on PMIS practices within DepEd Bicol.* Similarly, gender demonstrated the weakest relationship (0.027),

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while *age and civil status showed moderate effect sizes that failed to reach statistical significance*. These findings imply that the *level of implementation for current practices is demographic-neutral.* This means that the life stages and personal backgrounds of individual PMIS users did not disrupt organizational workflows. Instead, PMIS implementation is driven by standardized bureaucratic policies—specifically through DepEd Orders—which ensure that all PMIS users, regardless of personal profile, maintain uniformity in the assigned tasks such as the uploading of SAROs and the preparation of WFPs and PPMPs.

In contrast, professional designation and position emerged as the strongest determinants of PMIS practice outcomes. The study found that a specific position or designation is the primary factor in how the PMIS is used. It is not simply about who prefers using computers; rather, it is about what the job requires. The data indicates a clear structural differentiation, where analytical responsibility and data authority increase alongside one's administrative level. This means that as an individual moves higher up the administrative ladder, their responsibility for analyzing data and making critical decisions grows.

With a large overall effect size ($\eta^2 \approx 0.17$; $p=0.153$)), it is evident that PMIS utilization is not a matter of individual preference but is dictated by one's functional role within DepEd. Utilizing and navigating the PMIS is not a "hobby"—it is a core requirement of the position. For high-level roles, the system becomes a high-stakes tool essential for operational continuity. This implies that the PMIS's effectiveness is rooted in the hierarchy, with specific roles carrying higher stakes for data-driven decision-making and implementation. While position determines current utilization, experience determines the system's future resilience. To ensure PMIS success, DepEd must ensure that PMIS users is supported by top management in decision-making and that the expertise of program owners is captured to maintain system stability.

Furthermore, empirical findings show that *years of experience have shown a significant impact on how the system is maintained, as experience plays a pivotal role in shaping organizational and procedural practices.* While a newly designated employee might be proficient at day-to-day tasks, it is the experienced staff who focus on sustainability. They are the ones considering the long-term functionality of the system. While experience has a moderate-to-large effect on general engagement, its influence is seen most clearly in sustainability measures for PMIS optimization ($\eta^2= 0.225$, $p = 0.0041$).

This suggests that more experienced DepEd PMIS focal persons are more attuned to long-term governance and system maintenance compared to designated or newer employees. The implication is that while utilization may be uniform, the deeper institutionalization and long-term resilience of the PMIS rely heavily on the institutional memory and expertise of the PMIS focal persons or program owners, as their experience is what makes the system stable and resilient.

Finally, training and exposure were identified as high-impact, modifiable levers that significantly strengthen both technical and strategic PMIS functions ($\eta^2 = 0.182$, $p = 0.0100$) When staff—particularly designated PMIS personnel—are given proper exposure to the system, they perform significantly better on the technical side, such as using data for decision-making and ensuring long-term system maintenance. However, while training effectively improves data-driven decision-making, it shows weaker results in fostering collaboration and stakeholder engagement.

This indicates a critical organizational insight: while technical competency can be taught through formal training, collaboration is often constrained by organizational culture. There is a limit to what a training session can achieve; while an orientation can teach staff how to upload a WFP, it does not necessarily encourage them to collaborate with other functional divisions or engage with outside stakeholders. Technical skill is "teachable," but collaboration is "cultural." If assigned PMIS staff are not working together, it is likely due to the office structure or established behavioral norms, rather than a lack of technical knowledge. These findings suggest that top management should focus future interventions on improving technical skills and digital infrastructure (hardware and software), while acknowledging that shifting the culture of collaboration requires more than traditional training modules. To foster better teamwork, the office environment and institutional rules must evolve beyond simple orientation workshops.

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6. Recommended Strategic Action Plan to Address the Identified Challenges and Enhance the Utilization of the PMIS in DepEd Bicol

Based on the preceding discussion and its implications, the following evidence-based action plan framework is designed to mitigate identified challenges and enhance PMIS utilization within DepEd Bicol. The framework maps specific constraints to six strategic pillars, which are engineered to produce immediate implementation outputs and targeted outcomes conducive to sustained, role-sensitive, and data-driven public administration.

The proposed strategic action plan is an evidence-based framework designed to transition DepEd Bicol from routine compliance to high-level strategic governance in PMIS utilization and practice. Anchored in the study's findings—which indicate that the performance of leveraging PMIS for data-driven insights, decision-making and policy formulation is driven by organizational roles and professional experience rather than individual demographics—the plan introduces six (6) strategic pillars. These interventions are designed to be structural and competence-based, prioritizing the resolution of infrastructure deficits, such as hardware and connectivity, alongside the institutionalization of data governance and collaboration. By addressing these systemic gaps, the strategic action plan ensures that system optimization is anchored in institutional requirements rather than being restricted by technical barriers.

Central to the plan's effective implementation are Pillar 1: Differentiated Capacity Building and Pillar 5: Sustainability and Integration. By establishing a tiered, role-based training pathway and dedicating specific budget line items within the MOOE, the plan ensures that PMIS utilization is supported by both system infrastructure and human expertise. The implications are significant: by providing need based in-depth capacity building, technical assistance, coaching and refresher course as actionable need-based interventions, the Department can improve "routine use" into "strategic use." This approach is intended to capture the "institutional memory" of experienced PMIS users, ensuring that the system remains stable and preserved even through leadership transitions or staff retirements.

The final pillars focus on Pillar 2: Role-Sensitive Design, Pillars 3 and 4: Data Governance and Collaboration, and Pillar 6: Monitoring, Evaluation, and Learning (MEL). These interventions ensure that system functionality—such as customized dashboards and analytics—tailored to the specific decision-making needs of top management and program owners. By treating collaboration and data quality as systemic requirements rather than behavioral choices, the framework is structured to foster a resilient organizational culture. Ultimately, the expected outcome is a continuous improvement cycle where raw data is translated into actionable insights, leading to more precise resource allocation, project management and implementation thus ultimately improving the organizational outcomes.

CONCLUSION

The research participants who responded to the survey reflected a profile of high intellectual capacity, as evidenced by their advanced postgraduate credentials and professional maturity. These respondents are characterized by a female-dominated, senior workforce with extensive years of experience in the DepEd Bicol. Their profile provides a strong foundation for strategic data management, as their background is aligned well with the complex requirements of data-driven planning and budgeting. However, findings revealed that a critical disconnect exists between these educational qualifications and technical system mastery. Despite their professional tenure, nearly 60% of respondents lack formal PMIS capacity building, resulting in a noted competency gap. While the respondents possess the intellectual aptitude for managing the PMIS, the absence of technical exposure restricts them to "routine use," manifested in erroneous data entry and difficulties in accurately reporting program accomplishments.

Empirical findings show that the data generated from the PMIS serves as a highly effective "single source of truth," showing consistent and extensive utilization across all the assessed domains - such as

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Planning & Policy Formulation, Monitoring & Evaluation of School Performance, Data Management & Reporting, and Decision-Making & Resource Allocation. The system has successfully transitioned beyond mere compliance to become a fundamental tool for routine efficiency, particularly in Data Management and Reporting, which emerged as the strongest domain. PMIS implementation is notably inclusive and gender-neutral, providing a uniform, "largely implemented" platform that facilitates strategic resource allocation and performance tracking across the entire planning-to-reporting cycle in DepEd Bicol. However, findings revealed that while the PMIS is functionally embedded, its full potential for Decision-Making and Resource Allocation remains unevenly realized across the 13 SDOs. PMIS utilization is primarily structural and heavily dependent on specific roles, training, and experience, with sophisticated usage concentrated among higher positions, such as program owners. This suggests that while the system is routinely used for tracking timelines and outputs, a significant gap remains in maximizing its capacity for complex analytical insights at all levels of governance.

The implementation of PMIS practices in DepEd Bicol is characterized by a strong organizational framework where PMIS utilization is driven by organizational structure rather than individual demographics. *Collaboration and Stakeholder Engagement* stand out as a relative strength, with regular platforms for sharing insights—such as meetings, workshops, and technical assistance—being the only area rated as "fully implemented." Additionally, the system shows promise in *Sustainability Measures and Data-Driven Decision-Making*, both of which are "largely implemented." This suggests that a baseline of technical and administrative arrangements is already operationalized, creating a growing organizational norm where PMIS data is increasingly utilized as inputs for planning, budget allocation, and the reporting of accomplishments. However, the depth of these practices is significantly hampered by a critical weakness in *Training and Capacity Building*, which yielded the lowest mean scores across all domains. Nearly 37% of participants reported little to no competency-based learning and development, revealing a disparity in system mastery that is particularly evident at the school level. This lack of technical exposure creates a "competency gap" where meaningful data utilization remains concentrated among high-level program owners. Consequently, while sustainability and decision-making practices are functional, they remain operational rather than strategic, often overshadowed by traditional administrative judgment due to uneven access to formal PMIS functionality training.

The determination of significant relationships between PMIS utilization and implementation practices reveals that they are primarily demographic-neutral, as factors such as gender, age, and civil status showed negligible to non-significant relationships with PMIS usage. Instead, PMIS engagement is driven by systemic mandates and standardized bureaucratic policies, ensuring a uniform level of compliance across all levels of governance regardless of personal life stages. In contrast, professional designation, training exposure, and years of experience emerged as the significant determinants of system mastery and sustainability. While position dictates the functional necessity and "data authority" within the system, extensive professional experience and targeted capacity building significantly enhance long-term optimization and technical proficiency, specifically in areas like data-driven decision-making and sustainability. The findings suggest that while technical skills are successfully cultivated through formal training, deeper collaborative practices are limited by organizational culture rather than individual profiles, implying that future interventions should focus on technical capacity-building and structural cultural shifts rather than demographic-tailored strategies.

Recommendation

To maximize the potential of the PMIS in DepEd Bicol, the following recommendations have been forwarded and organized into a cohesive framework for submission to the DepEd Planning Service for appropriate action. This structure progresses from high-level policy and infrastructure to data integrity, capacity building, and cultural institutionalization

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A. Strategic Infrastructure and Technical Optimization

To transition from basic tracking to data-informed insights, it is recommended that DepEd Bicol evolve the PMIS from a digital filing cabinet into a strategic engine that balances high-tech capabilities with the realities of policy and human capacity. The following suggestions and recommendations are proposed to address data fragmentation and maximize operational efficiency:

The establishment of a PMIS Central Hub (Help Desk) with dedicated staff at the Regional and SDOs is essential. The Regional PMIS Central Hub should serve as the primary point of contact for troubleshooting system issues and glitches. By handling these locally, the region can reduce reliance on Central Office IT programmers and eliminate data silos. The staff's role involves a strategic mix of technical troubleshooting, customer service, and data collection.

Transition to Cloud-Native & Interoperable Frameworks: The region should move away from restrictive local servers toward a cloud-based architecture. Supporting Application Programming Interface (API) integrations prevents "data entry fatigue" by allowing different systems to communicate, ensuring program owners and PMIS users only need to input information once within the DepEd existing platforms.

Implementation of offline-first mobile applications: To support remote school sites or infrastructure projects with limited connectivity - such as the geographically isolated and disadvantaged areas (GIDA), - the PMIS must support offline-first mobile applications. This allows Program owner and PMIS users to capture data on-site, with the system automatically syncing once a 4G/5G connection is re-established.

Creation of Continuous Learning Action Cells (LAC): The research participants recommended that the region should establish “PMIS Champions" within each SDO or District Office. These “champions” provide immediate, on-the-ground technical support and help foster a positive organizational culture where data is viewed as a strategic tool for success rather than a mechanism for surveillance.

B. Institutional Governance and Policy Framework

To ensure the reliability and accuracy of the information generated by the system, it is recommended by the research participants that DepEd Bicol institutionalize a rigorous system of checks and balances through implementing and adopting the following measures:

Monitoring and Evaluation (M&E) of Uploaded Accomplishment Report. Additional features shall be made available in the PMIS specifically for Monitoring and Evaluation (M&E) or Quality Assurance. A formal quality assurance mechanism must be established to review and validate uploaded physical and financial accomplishments against set targets. This mechanism ensures the completeness and accuracy of all encoded and uploaded data prior to final submission to the Planning Office for use in policymaking and decision-making.

Audit Trail and Accountability: Implement a timestamp feature that serves as a digital record of the exact date and time a specific action occurs. This allows the system to track the progress and actions taken within the WFP, ensuring that personnel are held accountable for their specific activities within the system.

Validation and Triangulation: Establish protocols for cross-checking PMIS data against official records, physical and financial accomplishment reports, and budget and allocation documents. The Quarterly PIRPA should be utilized as the primary venue for formal data verification and reconciliation.

Multi-Level Review Process: Implement a mandatory review cycle where encoded data is vetted by Planning Officers at the regional and SDO levels, School Heads, and designated PMIS Program Owners—collectively referred to as "Quality Assurance Teams" within the SDOs and Districts. This ensures the completeness and correctness of all encoded and uploaded data before final submission to the regional level.

Standardized Office Protocols: Develop and enforce standardized data entry procedures and governance frameworks. These guidelines will minimize human error and ensure that data remains consistent and comparable across different departments and school divisions.

Regular Auditing and Alignment: Conduct periodic audits and "check and balance" procedures to monitor fund implementation. This ensures that all budget allocations uploaded in the PMIS are strictly aligned with approved plans and budgets, and do not exceed the amount allocated in the Sub-ARO.

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To ensure long-term sustainability and operational excellence, It is highly recommended that the institutionalization of the PMIS must be anchored in a robust policy framework that mandates strict monitoring, accountability, and feedback mechanisms. This includes enforcing mandatory data validation and adherence to DepEd Orders through formalized data governance guidelines that clearly define roles and responsibilities, alongside the institutionalization of PIRPA and mandatory monthly and quarterly updates.

Furthermore, it is recommended that policies prioritize continuous skills development for a multi-functional team—comprising Program Owners, Planning Officers, and Budget Officers—complemented by the designating of a permanent Focal Person with the technical and analytical expertise necessary to drive data-driven policymaking and system continuity.

To address technical and infrastructure challenges related to the PMIS, It is recommended that DepEd Bicol should implement a strategy of prioritization and resource optimization. This involves prioritizing the procurement of essential hardware, such as laptops and stable internet connectivity, within the approved Maintenance and Other Operating Expenses (MOOE) or annual budget.

To minimize costs, Implementing Units (IUs) must leverage existing infrastructure by optimizing ICT resources, sharing devices among designated staff, and utilizing DepEd-provided cloud-based solutions. Strategic planning and budgeting interfaces should be practiced by submitting proposals a year in advance and seeking alternative funding through the Special Education Fund (SEF) or external stakeholder partnerships.

The region should adopt cost-effective solutions, such as phased procurement and the use of government-standardized hardware, to incrementally upgrade systems without overwhelming the budget. Finally, close collaboration between Budget and Accounting officers and the PMIS teams in the Regional Office and SDOs is essential to ensure that all financial allocations per PAP are strictly aligned with the approved budget allocations or Sub-AROs.

C. Sustainable Capacity Building and Data Literacy

To ensure the long-term sustainability and effectiveness of PMIS implementation, it is recommended that DepEd Bicol adopt a strategic framework of structured monitoring and collaborative support through the following measures:

Continuous Capacity Building and Retooling*:* Establish a regular cycle of orientations, "echo-trainings," and targeted one-on-one technical assistance (TA) from the Planning Office to maintain high levels of user proficiency and system adaptation.

Institutionalized Reviews**:** Formalize the use of the PIRPA and Planning and budgeting interface sessions to ensure that PMIS data is presented, validated, and audited quarterly, reinforcing its role in regional, SDO and school accountability.

Designated Personnel*:* Appoint or designate a dedicated PMIS permanent Focal Persons or coordinators across all levels to oversee the accuracy of data entry, prepare weekly status reports, and ensure the seamless dissemination of updates to functional divisions.

Routine Integration*:* Embed PMIS tasks directly into existing administrative workflows and regular unit meetings to transition the system from an "isolated requirement" into an essential, integrated component of daily operations.

Advocacy and Peer Support*:* Foster a culture of evidence-based decision-making through "peer mentoring" and internal advocacy campaigns that demonstrate the system's value in streamlining workloads and improving educational service delivery.

To move beyond basic compliance and achieve full system optimization, it is recommended by the research participants that DepEd Bicol transition from general orientations to a more targeted and sustainable capacity-building framework. The following strategic interventions will be recommended:

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Intensive Hands-On Workshops: Implement batch-based, practical training sessions that cover the complete PMIS functionalities, specifically focusing on the preparation of complex WFP, expenditure matrices and the generation of final reports.

Role-Specific Coaching: Provide tailored training programs that address the distinct technical needs of various personnel, ensuring that administrative staff, teachers, and school heads receive instructions relevant to their specific duties.

Localized Support Infrastructure: Establish localized helpdesks or dedicated technical response teams at the SDO level to provide immediate, real-time assistance for "gateway errors" and other technical glitches that stall daily operations and Implementing Units.

*Knowledge Sustainability and Decentralization***:** Expand the scope of training to multiple staff members within each unit to prevent a "monopoly of learning," ensuring that system proficiency is maintained even during personnel transitions.

*Development of Interactive Resources***:** Create a digital library of quick-reference guides, video tutorials, and interactive manuals to allow staff to troubleshoot issues and refresh their knowledge independently.

*Permanent Staffing and Leadership***:** Formalize the appointment of a permanent PMIS Focal Person at the SDO level to provide consistent leadership, technical stability, and long-term continuity for the system.

D. Cultural Integration and Workload Management

Based on the findings of this study, it is recommended that DepEd Bicol implement several technical and cultural shifts to maximize the potential of the PMIS and enhance operational efficiency:

*Technical Optimization***:** Streamline the user interface to expedite data entry—specifically for complex, WFP, Expenditure Matrices—and integrate standardized document printing formats (e.g., standard bond sizes) to facilitate seamless physical filing and compliance.

*Advanced Analytics and Visualization***:** Transition from raw data entry to a more sophisticated analytical framework. This includes simplifying dashboards to provide a clearer, more holistic view of school operations through advanced visualization tools.

Operational Responsiveness: Establish protocols to reduce the turnaround time for "PMIS Approvers," ensuring that school-level data is updated and validated in real-time to support immediate administrative action.

*Data Literacy and Interpretation***:** Shift training focus from basic system navigation to advanced data literacy. Newly designated Staff should be equipped not only to input data but to interpret and translate system insights into actionable strategic plans.

*Cultural and Workload Management***:** Foster a data-driven organizational culture that encourages cross-functional collaboration. To sustain this, the region should ensure that dedicated personnel are provided with sufficient time and administrative support to manage the PMIS effectively, preventing it from becoming an overwhelming secondary burden.

Finally, for the PMIS to thrive, it must be viewed as an essential administrative tool rather than a secondary burden.

*Routine Operational Integration***:** Embed PMIS tasks directly into existing administrative workflows and regular unit meetings to ensure the system is a core component of daily operations.

Advocacy and Workload Balance: Foster a data-driven culture through advocacy campaigns that demonstrate the system's value in streamlining workloads. Ensure that dedicated personnel are provided with sufficient time and support to manage PMIS tasks without becoming overwhelmed.

Feedback Mechanisms: Implement dedicated communication channels (e.g., PMIS-specific group chats) to allow for real-time problem-solving and the integration of user feedback into system updates.

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