Technology Integration: Streamlining the School Leaders' Management System

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ABSTRACT

This study determined the effectiveness of technology integration in school management among school leaders in Bicol-speaking towns in the Schools Division of Camarines Norte. A quantitative descriptive-correlational design was used, and survey data from 132 respondents were processed using SPSS Version 21. Findings revealed that respondents comprise of predominantly older individuals and have relatively fewer years of administrative experience. The majority work in very large schools and hold the position of master teacher. Communication platforms, student information systems, and virtual meeting platforms were the most frequently reported technologies. Overall effectiveness ratings were neutral for student enrollment (M = 3.05) and attendance monitoring (M = 3.15), effective for class scheduling (M = 3.80), and very effective for fiscal management (M = 4.82) and communication (M = 4.92). The reported association results indicate significant relationships between years of administrative service and enrollment, attendance monitoring, and class scheduling, and between school type and those same three areas. Age was reported as significantly associated with communication ($p = .043$). Key challenges included limited access and digital literacy, attendance-data management, scheduling complexity, limited staff technical expertise, and communication-channel overload. The study proposes LEAD-TECH (Leadership Exchange and Development through Technology Collaboration) as an intervention. The implementation of LEAD-TECH along with further research on effective training models suited to different leadership levels and technological proficiency is also recommended.

Keywords: Technology integration, school management system, streamlining, student enrollment, attendance monitoring, class scheduling, fiscal management, and communication

INTRODUCTION

Technology has changed the way people live their daily lives, including using the Internet and talking to one another through text messaging and emails. That change is reflected in the educational system as well. The progress of information and communication technology (ICT) essentially creates new opportunities in managing and distributing educational content (Fauzi et al., 2023). However, modern-day school managers face different challenges than their predecessor (Uğur and Koç, 2019). In the past, daily school operations were largely carried out manually or through basic, standalone software tools that lacked integration. However, with the expansion of the education sector, the need for more advanced and centralized administrative systems has significantly increased (Syed, 2024).

The integration of technology into school management systems has brought great improvement in the efficiency of administration, decision-making, and transparency in educational organizations across the world. Many school management systems are designed with multiple modules for managing basic administrative needs, such as student admission, grade management, attendance, financial management, library management, and reporting (National Center for Education Statistics, n.d.).

Education management information systems are essential tools for improving educational governance and ensuring that schools are equipped to meet evolving challenges. However, without addressing the digital divide, their effectiveness may be limited. Education management information is a system platform that acts as a centralized database in many nations, gathering and analyzing school data to support policy choices and

guarantee adherence to national educational standards. Even if technology increases productivity, problems such as uneven access, data security, and infrastructure gaps exist worldwide. Public-private partnerships and policies advance digital literacy among educators and administrators to surmount these barriers. Technology is often promoted to democratize education, but it can deepen inequalities. Many students, particularly in low-income countries or marginalized communities, lack access to reliable internet, devices, and digital literacy skills, putting them at a disadvantage (Azoulay, 2023).

In the Philippines, technology for educational and administrative purposes has been on the rise. However, it is seriously hindered in its generalized application due to a lack of financing and infrastructure. Plans like the DepEd Computerization Program aim to provide schools with appropriate ICT resources that are being repurposed for administrative applications on a progressive basis. The program is designed to address the issue of the digital divide by providing computers, connectivity, and other related resources to public schools. It also enhances teaching strategies, improves administrative processes, and increases the digital literacy rate among both students and teachers. Pieces of training are also conducted to ensure effective usage of the technology provided (Espinosa et al., 2023).

The DepEd has also initiated several policies and programs to infuse technology into school management systems and education processes. This includes the following: Information Communication Technology Governance under DepEd Order No. 1, s. 2007, this order aimed to rationalize ICT-related activities in the various offices of DepEd for better coherence in governance and management. It has instituted ICT governance and technical committees to harmonize initiatives and ensure alignment with national development plans. This policy also strengthened coordination, accountability, and strategic planning in the implementation of ICT programs across different levels of the Department.

However, despite policies and programs put in place by DepEd for integrating technology into school management, the Department of Education still needs to address significant issues and gaps in integrating technology to streamline school management systems, including fragmented systems and a lack of standardization. Different schools use different platforms to perform administrative tasks, leading to inefficiencies and inconsistencies in data. There is a shortage of an integrated, centrally managed school management system wherein schools, divisions, and central offices are integrated into this. This lack of a unified system not only hampers data sharing and decision-making but also increases the administrative burden on school leaders, making it difficult to track and assess performance across various levels of the education system (Mella and Peña, 2019).

The Division of Camarines Norte is well-known for producing awardees at the regional, national, and even international levels, continues to uphold its commitment to excellence not only in academic achievement but also in the efficiency of its administrative systems. This pursuit of high standards emphasizes the need for more effective and streamlined technological solutions that can further strengthen school operations and support its long-term goals. Such innovations are essential in ensuring accurate, timely, and data-driven decision-making in school management. However, persistent challenges in school management particularly those related to repetitive documentation, manual data handling, and time-consuming administrative processes continue to hinder operational efficiency and delay timely decision-making. These concerns highlight the critical importance of streamlining technology integration to improve overall efficiency and optimize the use of available resources.

In light of these considerations, the present study aims to address significant gaps in the efficiency of the School Management System, particularly in its capacity to streamline operations through technology integration. This study sought to determine the level of effectiveness of technology integration in school management systems in public secondary schools in Bicol-speaking towns within the Schools Division of Camarines Norte, examine the significant relationship between the profile of the respondents and the effectiveness of technology integration, and identify the challenges encountered by school leaders in implementing technology.

METHODOLOGY

This study employed a quantitative research method utilizing a descriptive-correlational design to determine the profile of the respondents and the current technology integration in the management systems of public secondary

schools in the Bicol-speaking Schools Division of Camarines Norte. The study also identified the challenges encountered by school leaders in performing administrative tasks and managing school operations. A descriptive-correlational design was employed to describe the relationships among variables without establishing causal relationships. This design was used to meet the objectives of the study, which sought to determine the relationship to the level of effectiveness of technology integration in key areas like student enrollment, attendance monitoring, class scheduling, fiscal management, and communication and the profile of the school of leaders

The study employed total enumeration as the sampling technique, wherein all eligible individuals who met the established criteria were included in the final sample. This sampling method was deemed appropriate as it ensured complete coverage of the target population, thereby minimizing sampling bias and enhancing the validity and reliability of the findings, particularly because the population was small and could be easily reached, making it possible to include all eligible respondents in the study.

Survey questionnaires were administered in person or electronically, depending on respondents' access and preferences. Respondents received an orientation on the study's purpose and questionnaire instructions, were informed how their responses would be used, and were assured that the data would be stored securely and analyzed for research purposes only. Informed consent was obtained from all respondents.

The questionnaire consists of four main sections. The first section focused on the profile of the respondents, including their age, years of administrative experience, current position, type of school and the current technology used. The second section examines the level of effectiveness of current technologies employed by school leaders in performing administrative tasks such as student enrollment, attendance monitoring, class scheduling, fiscal management, and communication. This section utilized checklist items and Likert-scale questions to measure the level of effectiveness of the use of technology. In the third section, school leaders identified the challenges associated with integrating technology into their administrative duties. This section includes a checklist, allowing respondents to select all options that apply to them.

Education experts who were composed of two (2) Public School District Supervisors, two (2) Head Teachers and one (1) Associate Professor from SUC set the instrument through a thorough testing process to make sure it was valid. These experts supplied good suggestions to make sure that the instrument measured what it was supposed to. A pilot test was also conducted with a group of twenty (20) school leaders from Tagalog speaking-towns who were excluded from the primary survey. Researcher used this pilot test to see how clear, complete, and valuable the tool. The pilot test results were used to determine the instrument's reliability using Cronbach alpha, and the survey questionnaire for Part III – Level of effectiveness of current technology in student enrollment, attendance monitoring, class scheduling, fiscal management and communication resulted in a reliability coefficient of .919, .939, .902, .956 and .835 respectively, showing that there is an internal consistency.

The data were processed using the Statistical Package for the Social Sciences (SPSS), Version 21. Somers' Delta Correlation Coefficient (d) was used to determine the relationship between the profile of respondents and the level of effectiveness technology integration in student enrollment, attendance monitoring, class scheduling, fiscal management, and communication. Somers' Delta measures the strength and direction of association that exists between an ordinal dependent variable and an ordinal independent variable. The use of this software was deemed essential, as it facilitated the efficient management of large datasets, minimized computational errors, and provided advanced statistical tools for comprehensive analysis. By employing these statistical tools, the researcher ensured a thorough and robust analysis, resulting in a more objective interpretation of the findings and establishing a strong foundation for valid conclusions and recommendations regarding the current technology integration of school leaders within their management systems.

RESULTS AND DISCUSSIONS

Profile of the Respondents. Age. Most school leaders are in their late career stage, suggesting a workforce largely composed of experienced administrators. Such a distribution implies that leadership within the school system is dominated by individuals who have accumulated substantial professional experience, which may contribute positively to decision-making, stability, and institutional knowledge. In a typical public-school

setting, the predominance of school leaders within the 50–59 age group is reflected in the manner administrative functions and technology integration are carried out. As observed during school-based management activities, meetings, and coordination of school operations, most principals and school heads are experienced administrators who have already served in the education sector for several years. During the implementation of school management systems such as enrolment encoding, attendance monitoring, and reporting through digital platforms, many of these school leaders demonstrate a strong understanding of administrative processes and policy requirements, often guiding their schools through established procedures based on years of experience.

Table 1 Profile of the Respondents in terms of Age

Age	Frequency	Percentage
21-29	6	4.55
30-39	19	14.39
40-49	48	36.36
50-59	54	40.91
60-65	5	3.79
Total	132	100.00

However, it was also observed that while these experienced leaders are highly knowledgeable in management and decision-making, some of them take additional time in adapting to new or updated digital systems. In several instances, they rely on support from ICT coordinators or younger staff members when navigating unfamiliar features of school management platforms. Despite this, their extensive experience contributes significantly to ensuring that school operations remain stable, organized, and compliant with policy standards.

These findings were supported by A'mar and Eleyan (2022) that school leaders' demographic and professional profiles, including years of experience, significantly influence their capacity to implement and sustain technology integration in schools, as leadership experience is linked to stronger ICT implementation practices.

Years in Administrative Service. A significant proportion of school leaders are relatively new to administrative roles. Many administrators are in the early stages of developing their leadership and management skills. While they may be more open and adaptable to new technologies, their limited experience may pose challenges in effectively implementing and managing technology-driven systems.

School leaders with 1–5 years of administrative experience are still adjusting to their roles, particularly in understanding administrative policies, reporting procedures, and technology-based management systems, as observed during school coordination meetings and digital system implementation.

During the implementation of systems such as electronic enrolment encoding, attendance monitoring, and submission of school reports, it was observed that these relatively new administrators often require additional guidance from ICT coordinators or more experienced colleagues. In several instances, they actively seek clarification on system procedures and rely on step-by-step assistance to ensure that reports are completed accurately and submitted on time. Despite these challenges, their adaptability is evident, as they demonstrate willingness to learn and quickly adjust to the use of digital tools in managing school operations.

This finding aligns with Drossel et al. (2020), who noted that age and experience may influence technology adoption, while training and institutional support promote effective integration. Friesen et al. (2025) emphasized that newer administrators bring innovative practices, suggesting that combining experience and innovation can improve school management.

Table 2 Profile of the Respondents in terms of Years of Administrative Experience

Years of Administrative Experience	Frequency	Percentage
1-5	32	24.2
6-10	27	20.5
11-15	27	20.5
16-20	16	12.1
21-25	23	17.4
26 and above	7	5.3
Total	132	100

Type of School. Most respondents come from very large schools, that school leadership and management practices are mainly based in institutions with bigger organizational structures and more complex administrative and technological needs.

The predominance of respondents from very large schools reflects the complexity of school operations and the extensive use of technology in managing enrollment, attendance, scheduling, fiscal management, and communication. These schools require close coordination among school heads, department heads, and administrative staff, making technology essential for efficient information sharing and timely decision-making.

Table 3 Profile of the Respondents in terms of Type of School

Type of School	Frequency	Percentage
Small	10	7.6
Medium	17	12.9
Large	23	17.4
Very Large	82	62.1
Total	132	100

It was also observed that very large schools rely heavily on integrated school management systems to handle the volume of data and transactions, particularly during peak periods such as enrolment and submission of reports. This reflects the greater need for technological support in managing complex organizational structures.

The findings were conformed by the Organisation for Economic Co-operation and Development (2020), corroborated the findings that the predominance of respondents from large and very large schools indicates that school leaders in larger institutions often encounter greater challenges related to resource allocation and administrative complexity.

Current Position. The data reveals that the majority of respondents are master teachers. The predominance of master teachers and head teachers in the data also indicates that those with direct classroom and leadership experience are central to the study, potentially influencing the perspectives shared on administrative practices, resource allocation, and leadership effectiveness in schools. This distribution highlights the crucial role that

senior educators play in shaping school policies and decision-making, with their extensive experience providing a solid foundation for the study's findings.

The predominance of master teachers among respondents reflects their active role in instructional leadership and school-based decision-making. During LAC meetings, school planning, and curriculum implementation, they facilitate instructional improvement, mentor teachers, and assist school heads in applying policies and addressing concerns related to teaching strategies, learning outcomes, and resource utilization.

During school activities such as the preparation of instructional plans, division of workloads, and implementation of school programs, master teachers are frequently consulted by school heads due to their familiarity with both classroom realities and administrative requirements. In several instances, they also serve as coordinators or subject area leaders, bridging the gap between school administration and teaching staff, particularly in the implementation of school-based initiatives and technology-supported instructional practices.

Table 4 Profile of the Respondents in terms of Current Position

Current Position	Frequency	Percentage
Principal	13	9.8
Officer-in-Charge	13	9.8
Teacher-in-Charge	2	1.5
Head Teacher	42	31.8
Master Teacher	62	47.0
Total	132	100.00

The results were supported by Bao (2024) on teacher leadership that leadership roles are often distributed among experienced teachers who demonstrate competence, credibility, and institutional knowledge, allowing them to contribute significantly to collaborative decision-making and school improvement processes.

Current Technology Integration. The current technologies utilized by school leaders in the management system were, Student Information System (SIS), communication platforms, and virtual meeting platforms emerged as the most frequently utilized for streamlining operations and supporting administrative functions, highlighting a growing trend towards digital transformation, efficiency and innovation in education.

School practices reflect the findings, with Student Information Systems (SIS), communication platforms, and virtual meeting tools being the most frequently used technologies, while Human Resource Management Systems (HRMS) remain underutilized. This indicates that school personnel prioritize tools that support student services and administrative coordination.

During enrollment, school personnel use the Learner Information System to register learners, update records, verify Learner Reference Numbers (LRNs), and assign students to classes. These tasks highlight the importance of SIS in managing learner data and ensuring accurate and efficient enrollment processes.

In the same way, communication and coordination in schools are strongly supported by digital platforms and virtual meeting tools. School leaders and teachers regularly use systems such as the Microsoft Teams, Google Meet, and Zoom for meetings, training sessions, and consultations with stakeholders. These platforms have become part of daily operations, making communication faster and more accessible, which explains their high level of utilization in the study results.

Table 5 Current Technologies Integration by School Leaders in the Management System

Technologies Utilized	Frequency	Rank
Student Information Systems (SIS)	132	2
Learning Management Systems (LMS)	71	5
Communication Platforms (e.g., email, messaging apps)	132	2
Data Analytics Tools	13	8
Scheduling and Planning Software	38	6
Financial Management Systems	120	4
Human Resource Management Systems	1	9
Virtual Meeting Platforms	132	2
Document Management Systems	33	7

This finding aligns with the OECD (2023), which identified SIS, communication platforms, and virtual meeting tools as commonly used in school management. However, Malabanan (2025) noted limitations in their utilization, suggesting that digital proficiency, training, and technical support influence their effective use.

Level of Effectiveness of the Current Technology Integrations Used by School Leaders on the School Management System. Student Enrollment. School leaders recognize a clear operational benefit of technology integration in minimizing manual tasks and improving efficiency in student enrollment. Technology is already present in the enrollment system, but its use has not yet fully transformed or optimized administrative processes. This means that its implementation remains at a moderate or transitional stage rather than being fully optimized or ineffective.

These findings align with current public-school enrollment practices, where the Department of Education's Learner Information System (LIS) serves as a centralized platform for learner registration and record management. However, its effectiveness depends on consistent and efficient utilization across schools.

Through the LIS, school personnel manage learner profiles, 4Ps beneficiaries, BMI, ARAL participants, enrollment status, class assignments, and academic records. Its individual and batch enrollment features, including LRN verification for transferees, streamline procedures and reduce manual documentation. However, the neutral rating suggests that limitations in system utilization, accessibility, and technical capacity may affect its overall effectiveness.

Table 6 Level of Effectiveness of Current Technology Integration on Student Enrollment

Indicators	Weighted Mean	Interpretation
1.Streamlined Enrollment Process The students can complete applications online without having to visit in person.	3.01	N
2. Increased Accessibility The students can apply from anywhere, increasing access for students in remote areas or international applicants	2.92	N
3. Streamlined record keeping: The digital records reduce paperwork and securely store enrollment details for easy access.	3.08	N

4. Reduces Administrative workloads using automated scheduling.	3.20	N
Overall Weighted Mean	3.05	N

Rating Scale	Descriptive Interpretation
4.21 – 5.00 -	Very Effective (VE)
3.41 – 4.20 -	Effective (E)
2.61 – 3.40 -	Neutral (N)
1.81 – 2.60 -	Ineffective (IE)
1.00 – 1.80 -	Very Ineffective (VI)

These findings align with Kamraju (2024), who highlighted the growth of online learning as a means of expanding educational access and student participation. Similarly, Matias and Timosan (2021) emphasized the use of Student Information Systems (SIS), such as the Learner Information System, in managing learner data, streamlining enrollment, and improving administrative coordination in Philippine schools.

Attendance Monitoring. Table 7 presents the level of effectiveness of technology integration along with attendance monitoring with an overall weighted mean of 3.15, interpreted as neutral. While, the highest-rated indicator is administrative workload reduction with a weighted mean of 3.51, interpreted as effective. This highlights a strong positive outcome of technology integration.

These findings are consistent with actual practices observed in some public schools, attendance monitoring has become more organized with the help of both traditional and digital systems. Every morning, when students arrive at school, they do not only enter the classroom but also pass through a scanning area where they use a barcode or QR code ID. The code is scanned when they log in, and the system automatically records the time of their arrival. The same process is done when they leave school, where they scan again to log out. This allows the school to monitor student attendance more accurately and in real time.

Table 7 Level of Effectiveness of Current Technology Integration on Attendance Monitoring

Indicators	Weighted Mean	Interpretation
1. Record of Attendance: This method reduces manual errors associated with conventional paper-based methods and ensures accuracy in teachers' presence records.	3.17	N
2. Real-time Monitoring—Technology has enabled real-time updates and access to attendance data on school administrators', teachers', and parents' mobile apps or dashboards.	2.97	N
3. Parental Involvement: Instant notifications to parents regarding attendance increase accountability on both ends for timely communication between home and school.	2.96	N
4. Administrative Workload Reduction: This frees teachers from much mundane attendance marking, enabling them to devote more time to instructional work.	3.51	E
Overall Weighted Mean	3.15	N

Rating Scale		Descriptive Interpretation
4.21 – 5.00	-	Very Effective (VE)
3.41 – 4.20	-	Effective (E)
2.61 – 3.40	-	Neutral (N)
1.81 – 2.60	-	Ineffective (IE)
1.00 – 1.80	-	Very Ineffective (VI)

After scanning, the system is linked to a messaging feature that automatically sends a notification to parents or guardians. Once a student is marked present, late, or absent, a message is sent to the parent's phone informing them of the student's attendance status for the day. This helps parents stay updated and more aware of their child's school attendance even without going to school physically. Inside the classroom, teachers still check attendance as part of their routine, but the barcode system helps reduce manual recording. In many cases, attendance data is also encoded in the Learner Information System for official records and monitoring.

For teachers, attendance is also monitored daily by school heads or administrative staff. Depending on the school system, this may be done through logbooks, biometric scanners, or digital check-in systems. Teachers are required to record their arrival and departure times to ensure punctuality.

The findings were affirmed by Kamalaveni et al. (2025) who showed that digital attendance systems streamline administrative processes, minimize human error, and free up staff time for more critical academic and managerial responsibilities. In addition, Bolasco et al (2025) confirms that an automated attendance and computer usage monitoring system enhanced security, streamlined attendance processes, and aligned well with user needs, demonstrating practical improvements over manual lab attendance tracking. Similarly, Perin (2025), affirmed that a QR code–based attendance system was functional, user-friendly, and more efficient than manual methods, improving the accuracy and ease of attendance recording in educational settings.

Class Scheduling. The respondents perceive the use of technology in scheduling as well-implemented and beneficial in organizing classes, managing timetables, and coordinating academic activities.

Table 8 Level of Effectiveness of Current Technology Integration on Class Scheduling

Indicators	Weighted Mean	Interpretation
1.Increased Precision and Conflict-Free Scheduling: Automated scheduling systems can reduce class conflicts, room conflicts, and teacher double-booking errors. Algorithms ensure optimized allocation of rooms, teachers, and time slots.	3.77	E
2.Scheduling Efficiency: Digital platforms create schedules quicker, in minutes, versus manual processes. With ease of use, administrators can make real-time adjustments via user-friendly interfaces.	3.63	E
3. Data-Driven Insights: Advanced scheduling tools provide insight into room utilization, the distribution of teacher workload, and time management.	3.88	E

4. Real-time updates and notifications: Changes due to classroom cancellations or reallocations are immediately conveyed through apps or emails, reducing misunderstandings and facilitating timely information among all concerned.	3.89	E
Overall Weighted Mean	3.80	E

Rating Scale		Descriptive Interpretation
4.21 – 5.00	-	Very Effective (VE)
3.41 – 4.20	-	Effective (E)
2.61 – 3.40	-	Neutral (N)
1.81 – 2.60	-	Ineffective (IE)
1.00 – 1.80	-	Very Ineffective (VI)

These findings align with actual scenario observed in some public schools, class scheduling is carefully organized before the start of each school year and is later adjusted as needed to ensure smooth daily operations. School administrators, particularly the school head and designated coordinators, prepare the official class schedule using digital tools such as spreadsheet software like Microsoft Excel. In some schools, scheduling is also supported by school management systems or planning templates to properly assign teachers, subjects, and time slots for each grade level.

Once the schedule is finalized, it is shared with teachers and learners through printed copies, messaging platforms, or school-based communication systems. Teachers then follow this schedule daily in conducting their classes, ensuring that subjects are delivered at the correct time and classroom assignments are properly observed. In schools with stronger digital integration, updates or changes in schedules are quickly communicated through platforms such as Google Classroom or messaging tools like group chats, which help ensure that everyone is informed in real time.

These finding were supported by Kimmel et al. (2025) who emphasize that real-time notification systems significantly improve administrative responsiveness and user coordination, as timely updates enhance decision-making and reduce delays in task execution. Similarly, Singh and Patel (2024) found that scheduling accuracy and workload balancing remains a continuing challenge in implementation. Additionally, Lopez et al. (2023) revealed that automated attendance systems show that while digital platforms improve efficiency and communication, ongoing refinement is still needed to optimize scheduling and resource allocation.

Fiscal Management. The system integration significantly enhances payroll accuracy, minimizes data inconsistencies, and reduces the likelihood of errors in computation and record-keeping. It improved operational efficiency as data is automatically synchronized across platforms, reducing manual encoding and duplication of tasks.

These findings are consistent with actual practices observed in some public schools, fiscal management is carefully implemented through structured processes that depend on whether a school is an independent or non-independent unit. This ensures proper handling, monitoring, and reporting of school funds in line with government rules

In independent schools or school units, the school head has more authority in managing funds. In actual day-to-day practice, the principal or school head directly oversees the planning and use of the Maintenance and Other Operating Expenses (MOOE). They work with administrative staff to prepare budget plans, record expenses, and ensure that funds are used for school needs such as supplies, utilities, and small repairs. Financial records are usually encoded using Microsoft Excel, where expenses are tracked and reports are prepared for submission.

In some cases, independent schools also use DepEd-required electronic reporting systems to submit liquidation and financial reports to the division office, making the process faster and more organized.

In non-independent schools, fiscal management is more centralized. The school head does not fully control the funds directly, as financial transactions are usually processed and approved through the division office. In actual practice, the school submits requests, liquidation reports, and supporting documents to the higher office for approval before funds are released or reimbursed. Administrative staff still use tools like Microsoft Excel to encode expenses and prepare reports, but final processing and approval are done outside the school. This makes the process more controlled but sometimes slower compared to independent units.

Table 9 Level of Effectiveness of Current Technology Integration on Fiscal Management

Indicators	Weighted Mean	Interpretation
1.Accuracy and Reduction of Error: Automatic payroll systems reduce errors in calculating salaries, deductions, and tax computations compared to manual methods.	4.77	VE
2.Efficiency and Time Savings: Digital payroll platforms reduce the time spent on repetitive administrative tasks while processing payroll. Some of its features include bulk salary transfer and automated pay slip generation, making the whole exercise swift.	4.80	VE
3.Data Security and Confidentiality: Advanced encryption and secure storage protect sensitive employee data from breach incidents. Access controls ensure that only authorized persons can manage payroll records.	4.86	VE
4.Integration with Other Systems: The payroll software integrates attendance, time tracking, and performance management systems to capture accurate data input.	4.86	VE
Overall Weighted Mean	4.82	VE

Rating Scale		Descriptive Interpretation
4.21 – 5.00	-	Very Effective (VE)
3.41 – 4.20	-	Effective (E)
2.61 – 3.40	-	Neutral (N)
1.81 – 2.60	-	Ineffective (IE)
1.00 – 1.80	-	Very Ineffective (VI)

The findings were supported by Gabriel-Wettey et al. (2025) who found that technology integration in school management positively influenced management efficiency, financial processes, data accuracy, communication, and record-keeping themes consistent with the results showing improved payroll accuracy, time savings, and data security through technology use. Similarly, Bañanola (2025) developed and assessed a payroll information system for technical-vocational schools in Davao City, Philippines, highlighting how automation can improve efficiency, accuracy, and staff welfare, supporting your finding on improved payroll management through technology.

In addition, the findings were supported by Sudi et al. (2023) who emphasized that automation in human resource and payroll systems significantly improves data accuracy by reducing manual encoding and validation errors. However, studies also note that even highly automated systems may still encounter occasional discrepancies due to system limitations or user input errors, which highlights the need for continuous monitoring and improvement of digital systems to sustain high accuracy levels.

Communication. The current technology integrations in communication are highly effective, reflecting strong efficiency, reliability, and user satisfaction in facilitating clear and timely information exchange within the organization.

Table 10 Level of Effectiveness of Current Technology Integration on Communication

Indicators	Weighted Mean	Interpretation
1. Speed of Information Sharing: Messages, updates, and notifications can be sent and received instantly through email, messaging apps, and communication platforms. Real-Time Interaction: Video conferencing, live chats, and instant messaging make it possible to hold real-time discussions.	4.95	VE
2. Accessibility and Reach: Inclusivity: Technology ensures that communication encompasses all stakeholders irrespective of geographical distance, whether remote workers, parents, or students.	4.93	VE
3. Transparency and Accountability: Tracking and Archiving: Digital communication channels have tracking features that denote when a message is delivered and how long it takes to respond. Email trails, message histories, and meeting recordings ensure a transparent and accountable exchange of information.	4.92	VE
4. Shared Platforms: Collaboration tools like Slack, Trello, or shared drives help departments work together. Technology bridges the gaps between departments and makes them work as one.	4.89	VE
Overall Weighted Mean	4.92	VE

Rating Scale		Descriptive Interpretation
4.21 – 5.00	-	Very Effective (VE)
3.41 – 4.20	-	Effective (E)
2.61 – 3.40	-	Neutral (N)
1.81 – 2.60	-	Ineffective (IE)
1.00 – 1.80	-	Very Ineffective (VI)

These findings correspond to real situations experienced in some public schools, communication is part of the daily routine and plays a big role in how school tasks are carried out smoothly. From the start of the day, teachers, school heads, and staff coordinate through mobile messaging applications. Most schools use Facebook Messenger and Viber where group chats are created for teachers, grade levels, and school-wide updates. Through these, instructions, reminders, and announcements are sent instantly, making communication faster and easier even during busy school hours.

When official meetings are needed, school personnel shift to virtual platforms such as Google Meet, Zoom, or Microsoft Teams. In actual school situations, school heads conduct online meetings with teachers to discuss schedules, reports, and other school concerns, especially when face-to-face meetings are not possible. Teachers also join online trainings and webinars through these platforms to improve their skills and comply with updates.

Communication with parents is also done regularly using these same tools. Teachers send messages about student performance, attendance, and school reminders through chat groups, allowing parents to stay informed without needing to visit the school. Some schools also use official Facebook pages to post announcements and updates for the whole school community.

These findings were corroborated by Tulowitzki et al. (2022); Smith and Benavot, (2019) who demonstrated that ICT integration in educational management significantly improves the speed and efficiency of information dissemination by enabling real-time communication and streamlined data sharing across stakeholders, which strengthens institutional coordination and decision-making.

These findings also confirmed by Wang and Dufresne (2021) discussed how digital technologies support school leaders by improving administrative efficiency, communication, and decision-making. Their study highlights the importance of professional development for school leaders and shows how technology adoption enhances data-driven decisions and organizational effectiveness, leading to better educational outcomes.

Relationship between the Profile of the Respondents and the Level of Effectiveness of Current Technology Integration. The results reveal that age and current position consistently yielded non-significant correlations across all areas such as, student enrollment, attendance monitoring, class scheduling, fiscal management, and communication, as indicated by p-values greater than 0.05 (p-values>.05). However, years in service demonstrated a weak but statistically significant positive relationship with several areas such as, student enrollment (d = .140, p = .032), attendance monitoring (d = .141, p = .027), and class scheduling (d = .151, p = .016). Similarly, type of school showed a moderate and highly significant relationship with student enrollment (d = .483, p = .000), attendance monitoring (d = .524, p = .000), and class scheduling (d = .568, p = .000). On the other hand, age shows significant relationship with communication, while fiscal management did not show significant relationships with any profile variables, indicating that effectiveness in these areas may depend on other factors not captured in the respondents' profiles.

Table 11Test for Significant Relationship between the Profile of the Respondents and the Level of Effectiveness of Current Technology Integration of the School Heads

Effectiveness of the Current Technology Integration	Profile							
	Age		Years in Adm. Service		Type of School		Current Position	
	d	*p-value*	*d*	*p-value*	*d*	*p-value*	*d*	*p-value*
1. Student Enrollment	.014	.270	.140*	.032	.483**	.000	-.073	.388
2. Attendance Monitoring	.015	.296	.141*	.027	.524**	.000	-,116	.192
3. Class Scheduling	.028	.747	.151*	.016	.568**	.000	-.141	.103
4. Fiscal Management	-.058	.701	-.027	.876	-.004	.932	-.034	.479
5. Communication	-.030*	.043	-.010	.723	.029	.357	.182	.277

***Correlation is significant @ 0.01 level.*

**Correlation is significant @ 0.05 level.*

In public school, the integration of technology often varies not by age or position, but by experience in handling school operations. In a large school, it is observed that both a younger school head and a more senior one utilize similar digital tools such as the Learner Information System (LIS) and DepEd Commons. Despite differences in age or designation, both are able to navigate these systems for student enrollment, attendance encoding, and communication with teachers. This reflects the finding that age and current position do not significantly affect how effectively technology is used.

However, a more experienced school head, someone who has spent many years in service often demonstrates a slight advantage in maximizing these tools. During the opening of classes, the experienced principal in the school efficiently oversees enrollment using LIS by anticipating common issues such as duplicate records or delayed submissions. Instead of relying solely on manual follow-ups, instructions are immediately relayed to staff through group chats such as via Messenger and shared spreadsheets, ensuring faster resolution.

In attendance monitoring, the same school head implements streamlined processes where teachers submit daily attendance through digital forms. These are automatically consolidated, reducing paperwork and allowing teachers to focus more on instruction rather than routine recording. Similarly, in class scheduling, structured spreadsheets are used to quickly adjust timetables when a teacher is absent, and changes are immediately communicated through group chats or email to avoid confusion.

Also, a common situation in the school occurs during unexpected class suspensions due to weather. The experienced school head promptly coordinates with teachers using Messenger or SMS groups, updates class schedules, and ensures that announcements are disseminated in real time. As a result, students and parents receive timely and accurate information, minimizing disruptions. In contrast, less experienced school heads may still rely more on manual coordination or take longer to respond to such situations, even if they are equally capable of using the same technologies.

The present findings are supported by several studies emphasizing that the effectiveness of technology integration in school management is largely influenced by institutional and contextual factors rather than the demographic characteristics of school leaders. The United Nations Educational, Scientific and Cultural Organization (2023) highlighted that the effectiveness of ICT integration in education is primarily determined by system-level factors such as access to technology, continuous professional development, and institutional readiness. It further emphasized that disparities in technology implementation are more closely linked to resource availability and organizational support than to the age or position of school personnel.

The findings were corroborated by World Bank (2022) underscored that the success of digital transformation in education systems depends heavily on structural and institutional conditions, including funding allocation, technological infrastructure, and capacity-building initiatives. The report noted that without adequate institutional support, even highly experienced school leaders may encounter difficulties in effectively integrating technology into school management processes.

Conversely, some studies present findings that partially contradict the present results by emphasizing the role of individual characteristics in technology integration effectiveness. Alharbi (2021) found that school leaders with greater experience and stronger ICT competencies perform better in using digital systems for administrative tasks such as scheduling, reporting, and communication. This indicates that differences in expertise and exposure to technology can influence the effectiveness of ICT integration.

Likewise, Sailer et al. (2021) argued that leadership orientation toward innovation, digital competence, and prior experience with educational technologies significantly influence the successful implementation of ICT-based management systems in schools. The study implies that while institutional factors are important, individual readiness and capability may also play a critical role in determining the effectiveness of technology integration. This suggests that even with available systems and resources, the success of technology use in schools largely depends on how well school leaders and personnel are prepared and willing to adopt and apply these tools in their daily management practices.

Challenges Encountered by School Leaders in Using Technology in their School

Management System. Student Enrollment. The most pressing challenge encountered by school leaders in using technology for student enrollment processes is limited access and digital literacy. Despite the availability of digital systems, a significant number of school personnel and stakeholders still experience difficulties in accessing necessary technological resources and demonstrating sufficient digital skills.

This suggests that the technological systems used for student enrollment are generally stable and reliable, with minimal interruptions or technical failures. The low frequency implies that system infrastructure and platform maintenance are relatively well-managed, resulting in fewer disruptions in daily operations.

Moreover, it is commonly observed during the enrollment period that a significant number of parents and even some learners encounter difficulty in accessing online forms and digital platforms. Many come from households with limited internet connectivity or without personal devices, prompting them to physically visit the school for assistance. In such cases, school personnel and teachers extend support by manually guiding parents through the encoding process or by encoding the information on their behalf. Additionally, some stakeholders demonstrate limited digital literacy, requiring step-by-step instructions even for basic tasks such as filling out online forms or verifying submitted information. This situation often leads to longer processing times and increased workload for school staff, thereby supporting the finding that limited access and digital literacy remain the most pressing challenges in technology-assisted enrollment.

Conversely, issues related to system downtime and technical glitches are less frequently encountered in school. While there are occasional instances when LIS becomes temporarily unavailable or experiences slow performance, particularly during peak enrollment days these disruptions are typically short-lived and are resolved without causing significant delays in the overall process. School heads and designated ICT coordinators are generally able to manage such situations by scheduling encoding tasks during off-peak hours or by temporarily shifting to manual recording until the system stabilizes.

Table 12 Challenges Encountered by School Leaders in Using Technology along Student Enrollment

Indicators	Frequency	Rank
1. Infrastructure and technical issues	38	2
2. Cost and budget constraints	35	3
3. Limited access and digital literacy	42	1
4. System downtime and technical glitches	7	4

The prominence of limited access and digital literacy as the top challenge aligns with the findings of the Celeste and Osias (2024) identified equity and access as the highest challenge to technology integration in schools, which means that limited access to technology and insufficient digital literacy hinder enrollment processes. It also highlighted infrastructure and resource limitations as major obstacles.

Similarly, Rafiq et al (2024) identifies challenges such as technical glitches, limitations in the availability of resources, and a lack of training that hinder effective use. His study underlines the need for increased technical support, professional development, and institutional support in maximizing the benefits of digital learning platforms.

Attendance Monitoring. Data management that ensures accuracy, consistency, and security of attendance records remains a critical concern. Errors in data entry, difficulties in updating records, and issues with data integration across platforms may compromise the reliability of attendance information, which is essential for decision-making and reporting.

These findings suggest that successful implementation of attendance monitoring technologies requires not only access to digital tools but also strong data management practices and user-friendly system design. There is a need for capacity-building initiatives, such as training programs focused on data handling and system navigation, to enhance school leaders' competencies. Additionally, developers and institutions should prioritize simplifying system interfaces and providing reliable technical support to minimize operational difficulties. Ultimately, addressing these challenges improves the accuracy, efficiency, and overall effectiveness of technology integration in attendance monitoring. In public schools, attendance monitoring has increasingly been supported by digital tools and reporting systems. However, in actual school practice, challenges related to data management and system complexity remain evident.

Table 13 Challenges Encountered by School Leaders in Using Technology along Attendance Monitoring

Indicators	Frequency	Rank
1. Data accuracy and management	103	1
2. System complexity and technical issues	65	2

Public school teachers record daily attendance through digital forms or systems aligned with the Learner Information System (LIS). However, encoding errors, incorrect absence tagging, and delayed submissions require additional verification and correction. Discrepancies between manual records and digital reports may also affect data accuracy, reporting efficiency, and decision-making.

In addition, maintaining the accuracy and security of attendance records remains a continuing concern. School heads consistently ensure that only authorized personnel are able to access and modify attendance data, especially when such records are utilized for reporting, monitoring, and intervention purposes. This supports the finding that data management is the most pressing challenge in technology-supported attendance monitoring.

Meanwhile, system complexity and technical issues are also observed in routine practice. Some teachers encounter difficulty navigating digital attendance tools, particularly when platforms involve multiple steps for encoding or updating records. Occasional technical concerns such as slow system response, device compatibility issues, or unfamiliar interfaces can further hinder effective utilization. In response, school heads and ICT coordinators provide guidance or implement temporary alternatives, such as manual recording, while issues are being addressed.

A common observation also in public schools also occurs during the preparation of monthly attendance reports, where minor encoding inaccuracies accumulate and require careful review before submission. This process often involves coordination among teachers, advisers, and administrative staff, demonstrating how both data management concerns and system-related challenges can affect overall efficiency.

The findings were supported by Perin (2025), who conducted a study on QR code-based attendance monitoring, reporting that system usability and interface design issues negatively affected user confidence and performance, despite efficiency improvements. Similarly, Garrido (2024) also investigated a QR based automated attendance solution for Grade 12 students, illustrating benefits in reliability but also highlighting practical barriers in transitioning from manual attendance, such as teacher and student familiarity with technology and initial system adaptation challenges, which school leaders must manage.

Class Scheduling. The challenges encountered by school leaders in using current technology along with class scheduling where complexity in scheduling algorithm, ranked first. These findings suggest that class scheduling requires careful consideration of multiple interconnected factors such as teacher assignments, subject loads, classroom availability, and time constraints. School leaders find it challenging to balance these variables simultaneously, particularly when adjustments or revisions are needed due to conflicts or unexpected changes. As a result, the complexity of the scheduling process can lead to delays, inefficiencies, and occasional errors, which affect the smooth implementation of academic schedules.

Table 14 Challenges Encountered by School Leaders in Using Technology along Class Scheduling

Indicators	Frequency	Rank
1. Complexity in scheduling algorithm	35	1
2. Data accuracy and management	28	2
3. Adaptability to policy changes	21	3
4. User training and technical proficiency	13	4

Professional development should focus on advanced scheduling competencies, particularly managing scheduling constraints and resolving conflicts. Continuous upskilling is essential to help school leaders address increasingly complex scheduling demands and improve efficiency.

Despite the use of spreadsheets and scheduling software linked to the Learner Information System (LIS), class scheduling remains challenging due to teacher specialization, subject requirements, classroom availability, and time allocations. Conflicts often require repeated revisions, manual checking, and re-encoding, delaying the preparation of a workable class schedule.

Moreover, sudden changes in school operations, such as teacher absences, reassignment of classes, or unforeseen activities, further complicate the scheduling process. In such situations, school heads must quickly modify existing schedules; however, the structure of the system may not easily accommodate rapid adjustments. This often leads to temporary inconsistencies or the need to communicate changes separately through group messages or printed notices, highlighting the challenge posed by the complexity of scheduling algorithms and system design.

The findings were corroborated by the DepEd Panabo City Division (2025), which adopted the Automated Class and Teacher Scheduler (ACTS) and noted that while automation reduced scheduling redundancies, scalability limitations and complexity for larger schools were challenges. This reflects the practical difficulties leaders face with technology scalability and scheduling complexity management.

Fiscal Management. The most significant challenge encountered by school leaders in fiscal management is the limited technical expertise among staff. Despite the availability of systems and processes for managing financial tasks, the effectiveness of fiscal management is largely hindered by the insufficient technical skills of personnel responsible for handling financial data, records, and reporting.

Table 15 Challenges Encountered by School Leaders in Using Technology along Fiscal Management

Indicators	Frequency	Rank
1. Data security and privacy risks	3	3
2. System compatibility and integration issues	12	2
3. Limited technical expertise among staff	84	1

In preparing financial reports, particularly MOOE liquidation, some personnel experience difficulties using digital spreadsheets and prescribed templates. Repeated verification, manual computation, and assistance from school heads are often necessary to ensure accuracy, resulting in delays in completing fiscal reports.

During audit preparation and submission of financial documents to the division office, personnel may also experience difficulties in organizing digital files, consolidating data, and meeting reporting requirements. These challenges may delay submissions and reduce the efficiency of fiscal management.

In contrast, data security and privacy concerns were less significant, as financial records were generally handled by authorized personnel and stored in secured folders or official devices.

These findings align with Bantungan (2025) and Bacani and Mercado (2020), who identified limited budgets, delayed financial processes, insufficient personnel, and inadequate accounting expertise as key fiscal challenges among secondary school heads in Region III. These constraints may also hinder the adoption of digital financial management tools, such as electronic budget tracking and digital accounting systems.

Communication. The school administrators are currently dealing with multiple and overlapping platforms or modes of communication, which may include emails, messaging applications, official memos, and other digital or institutional channels.

These findings suggest that multiple communication channels may cause message duplication, information gaps, delayed responses, and confusion, reducing efficiency in school management. To address these challenges, schools should establish clear communication protocols, adopt centralized communication systems, and provide training to help administrators and staff organize, prioritize, and manage information effectively.

Table 16 Challenges Encountered by School Leaders in Using Technology along Communication

Indicators	Frequency	Rank
1. Digital divide and accessibility issues	21	3
2. Overload of communication channels	127	1
3. Data privacy and security concerns	27	2
4. Technical issues and platform reliability	3	4

These also suggest that the communication systems currently in use are generally considered stable and functional, with minimal disruptions caused by system failures, downtime, or platform instability. It also implies that users have relatively positive experiences with the technical performance of the communication tools they utilize in their daily administrative tasks. These findings further suggest that the effectiveness of communication in school management is less hindered by technological infrastructure and more influenced by other factors, such as the management and coordination of multiple communication channels. In this sense, the low ranking of technical issues implies that the existing platforms are sufficiently reliable to support communication needs, and that challenges are more organizational than technical in nature.

The results conveyed that improvement efforts do not need to focus heavily on upgrading platform reliability or resolving technical faults, as these are not perceived as major concerns. Instead, attention shall be directed toward optimizing communication processes, such as establishing clear protocols, reducing unnecessary message duplication, and streamlining the use of multiple channels. Additionally, strengthening communication management practices and digital literacy among users may further enhance efficiency and reduce overload.

In public schools, communication overload commonly occurs when administrators and teachers receive overlapping messages through emails, group chats, and official memoranda from different offices. Repeated instructions and announcements require personnel to verify updates, clarify information, and filter messages to avoid confusion and duplicated tasks, consuming valuable time. In contrast, technical issues and platform reliability are rarely major concerns because communication tools are generally functional and stable. Thus, managing excessive and overlapping communication channels remains a greater challenge than technical disruptions.

The findings were corroborated by Ariate and Bacasmot (2025), who found that leaders with low tech literacy face challenges in using ICT tools for communication leadership, such as structured email updates, LMS communication with staff and parents. Similarly, Liu et al. (2025) emphasized that ICT integration in school

administration significantly improves communication efficiency and system stability, enabling smoother information exchange among stakeholders and reducing technical disruptions in daily operations. However, Farhoomand and Drury (2002) refuted the findings, that communication overload is not solely caused by the number of channels but by poor coordination, lack of governance, and irrelevant messaging rather than channel quantity itself.

Proposed Intervention to Improve the Level of Effectiveness of Technology Integration in The School Management System. The researcher developed and proposed an Activity LEAD-TECH or Leadership Exchange and Development through Technology Collaboration (See Appendix H). Its aim is to conduct a collaborative session where school leaders share best practices, challenges, and solutions in technology integration, with focus on the lowest rated indicators identified in the study for effective school management. The aforesaid activity aims to encourage collaboration among school leaders, enabling them to make informed decisions regarding the adoption and implementation of technology for more efficient school management.

CONCLUSIONS

The conclusions drawn from the study's findings are as follows:

1. The respondents were primarily experienced school leaders, with a broad range of administrative experience. Most of them worked in very large schools, holding roles such as master teachers and head teachers. In terms of most widely adopted technologies were Student Information Systems (SIS), Communication Platforms, and Virtual Meeting Platforms, all of which were highly effective in improving communication and managing student data. On the other hand, technologies like Data Analytics Tools, Scheduling and Planning Software, and Human Resource Management Systems (HRMS) had lower adoption rates.

2. The integration of technology in areas like student enrollment, attendance monitoring, class scheduling, fiscal management, and communication showed mixed effectiveness, while communication and fiscal management were rated mostly as very effective.

3. Current position showed no significant correlation across all areas. However, years in administrative service and type of school demonstrated weak but significant positive relationships with student enrollment, attendance monitoring, and class scheduling. Additionally, class scheduling and age has also showed significant relationship with communication. While fiscal management showed no significant relationships with any profile variables. Therefore, the null hypothesis is rejected.

4. The biggest challenges in technology integration were limited access and digital literacy, data accuracy and management, complex scheduling algorithms, limited technical expertise among staff, and overload of communication channels.

5) The proposed Activity LEAD-TECH or Leadership Exchange and Development through Technology Collaboration is a platform for school leaders that will facilitate discussions, and they can talk about the best ways to use technology in the classroom, the problems they face, and how they solve them. The activity provides an opportunity for the school leaders to work together so they can make smart choices about how to use technology to run their schools more efficiently.

RECOMMENDATIONS

Based on the findings of the study, several recommendations are proposed:

1) School leaders may offer professional development programs to school leaders based on their experience levels. Newer administrators may benefit from foundational training in technology, while seasoned leaders might require more advanced or specialized courses. SDO may also expand the adoption of underutilized technologies such as Data Analytics Tools, Scheduling Software, and HR Systems. Schools may explore options for these tools and integrate them into their existing systems to improve overall operational efficiency. Furthermore, resources may be allocated for training and technical support to ensure smooth implementation.

2) School leaders may prioritize simplifying complex systems, improving technical support, and enhancing accessibility to reduce barriers for users, especially in remote areas or those with limited internet access.

3) School leaders may implement personalized technology training that accounts for different leadership roles, ages, and years of experience. This would help bridge any gaps in digital literacy and ensure all school leaders, regardless of their background, can effectively integrate and utilize technology.

4) School leaders may explore technologies that offer data-driven insights and automation to streamline operations and improve management efficiency, particularly in areas such as student enrollment and attendance monitoring.

5) The School head may implement the Activity LEAD-TECH or Leadership Exchange and Development through Technology Collaboration to highlight successful examples of technology integration in schools, especially in areas with the lowest-rated indicators, and share these stories during the sessions to inspire and motivate leaders to adopt similar practices.

6) Future researchers may conduct further studies that include the evaluation of the effectiveness of different training models and identify the best approaches for various leadership levels and technological proficiency.

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