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Assessing the Efficiency of the Learners Information System in a Rural Philippine National High School

James Edward B. Bete*, Angelie A. Collera
College of Science and Technology Education, University of Science and Technology of Southern Philippines, Cagayan de Oro City, Philippines

*Corresponding Author Email: edward.jamesbete@gmail.com

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Abstract. The Learners Information System (LIS) was introduced by the Department of Education (DepEd) in the Philippines to streamline administrative processes and enhance educational governance. However, its effectiveness in rural settings remains underexplored. This study evaluates the implementation of LIS in a rural Philippine high school using the E-Government and Digital Inclusion frameworks. A mixed-methods explanatory sequential design was employed, combining surveys and focus group discussions with 69 participants, including teachers, LIS coordinators, and the school principal. Findings reveal that LIS improves record-keeping and reduces administrative workload, but faces significant challenges, including inadequate IT infrastructure, technical failures, high maintenance costs, and limited inclusivity. These barriers hinder its potential to support Sustainable Development Goal 4 (SDG 4) and DepEd's digital transformation goals. The study recommends targeted investments in IT infrastructure, offline functionalities, stakeholder training, and accessibility features to enhance the efficiency and inclusivity of LIS. Addressing these issues is critical for ensuring equitable digital transformation in rural education.

Keywords: Digital inclusion; E-government in education; Educational governance; Learners information system; Sustainable Development Goal 4

1.0 Introduction

Integrating digital technologies in schools and institutions in the Philippines has transformed administrative efficiency (Grepon et al., 2021; Los Baños et al., 2023), particularly in managing student information. The Department of Education introduced the Learners Information System (LIS) in 2011, marking a significant development in this field. As comprehensive storage of student data, the LIS promotes more effective administrative procedures and enhances educational services (Glen Grepon, 2020). Systems that centralize and manage educational data improve institutional operations, track learners' development, and simplify administrative tasks, enabling policymakers to make well-informed decisions (Taylor et al., 2023). However, its implementation in a rural school in Cagayan de Oro, Northern Mindanao, has encountered unique challenges and technological and infrastructural limitations, which hinder the effective implementation and seamless adoption of the Learning Information System (LIS). As a result, educators face significant barriers to accessing and utilizing the system.

Aside from the technological limitations, the school serves a predominantly low-income, agrarian, and Indigenous community, with a significant number of students coming from economically disadvantaged backgrounds. While frameworks like (Ingrams et al., 2020), Heeks' E-Government Readiness Model (2002), (Van Dijk, 2020) Digital

Divide Framework (2020), and (Atherton et al., 2021), UNESCO's Digital Inclusion in Education (2021) provide insights into digital adoption and disparities; there is a lack of research on LIS as a digital governance tool in rural Philippine contexts. This study addresses the gap by evaluating the economic efficiency and governance impact of LIS in a rural high school, focusing on accessibility, affordability, responsiveness, transparency, and sustainability.

Using an explanatory sequential research design, the study combined quantitative surveys with focus group discussions involving teachers, LIS coordinators, and the school principal. Key findings reveal that the Learning Information System (LIS) enhances record-keeping efficiency and lowers administrative costs. However, its effectiveness is hampered by technical failures, high maintenance expenses, and limited inclusivity. The system relies on a stable internet connection, modern computer hardware, and secure cloud-based infrastructure for optimal performance. These requirements pose significant challenges in resource-constrained settings, exacerbating digital inequities and limiting LIS's ability to support Sustainable Development Goal 4 (SDG 4) and the Department of Education's (DepEd) digital governance initiatives. The study recommends targeted improvements to address these barriers, including IT infrastructure investments, offline capabilities, enhanced user training, and greater inclusivity. By addressing these issues, LIS can become a more effective and sustainable tool for reducing digital disparities in rural Philippine schools.

2.0 Methodology

2.1 Research Design

This study employs explanatory sequential research design, which involves two distinct phases: a quantitative phase followed by a qualitative phase. In the first phase, quantitative data was collected through structured surveys to evaluate the economic efficiency and governance impact of the Learners Information System (LIS) in a rural high school in the Philippines. The second phase involved qualitative data collection through focus group discussions (FGDs) and interviews to explore stakeholder experiences and challenges in greater depth. This design provides a comprehensive understanding of LIS implementation, combining statistical analysis with rich contextual insights. The research is guided by E-Government and Digital Inclusion frameworks, including Heeks' E-Government Readiness Model (2002), Van Dijk's Digital Divide Framework (2020), and UNESCO's Digital Inclusion in Education (2021), which collectively frame LIS as a digital governance tool and highlight barriers to accessibility, efficiency, and sustainability in rural education settings.

2.2 Research Locale

The study was conducted in a national high school situated in rural area of Cagayan de Oro, Northern Mindanao, Philippines, deliberately not named to maintain confidentiality and protect the institution's identity. This school was explicitly selected due to its implementation of the Learners Information System (LIS) and its unique challenges. Rural schools often grapple with systemic barriers, including limited resources, inadequate infrastructure, and insufficient access to technology, which can hinder the successful integration of digital tools in education. This context highlights the digital divide that disproportionately affects underserved areas, reinforcing the gap identified by (Selwyn, 2011), who emphasizes the transformative potential of digital systems in improving educational governance and administrative efficiency.

2.3 Research Participants

The study involved sixty-nine (69) participants from the entire school staff, comprising sixty-seven (67) teachers. One (1) of the teachers was designated as Learners Information System (LIS) coordinator, one (1) school registrar, and one (1) school principal. The participants were divided into two groups for the mixed-methods approach: Quantitative Phase: All 69 participants completed structured surveys. The sampling strategy for this phase was census sampling, as the entire school staff involved in LIS implementation was included to ensure comprehensive data collection. Inclusion criteria required participants to be active users of the LIS, either for data entry, management, or oversight. Qualitative Phase: A subset of 13 participants was selected for focus group discussions (FGDs). Ten (10) participants were chosen through simple random sampling from the teacher population. At the same time, the remaining three (3) were selected via purposive sampling to include the LIS coordinators and the school principal due to their specialized roles and insights into system operation. The inclusion criteria for the qualitative phase emphasized participants' direct involvement in LIS implementation and their ability to provide detailed, experiential insights. This participant selection ensured a multidimensional evaluation of LIS, capturing

perspectives from end-users (teachers), technical overseers (LIS coordinators), and decision-makers (principals). This diverse group of participants was strategically selected to ensure a comprehensive understanding of the LIS's implementation, benefits, challenges, and areas for improvement. Each participant played a distinct yet interconnected role in the operation and utilization of the LIS, providing valuable insights into its performance and impact.

2.4 Research Instrument

The study utilized two primary research instruments. One is the Survey Questionnaire, a structured questionnaire focused on five essential dimensions: accessibility, affordability, responsiveness, transparency, and sustainability. The questionnaire primarily included closed-ended questions, rated on a five-point Likert scale to capture respondents' perspectives effectively. Second is the Focus Group Discussion (FGD): The FGD guide included open-ended questions to explore participants' experiences, challenges, and recommendations regarding LIS implementation. Before its full deployment, the questionnaire was pilot-tested with a select group of teachers to provide clarity and reliability. Furthermore, it underwent expert validation to verify its alignment with the study's goals and underlying theoretical frameworks, ensuring its suitability for the intended evaluation.

2.5 Data Gathering Procedure

This research study collected sixty-nine (69) responses over one (1) month using Google Forms questionnaires distributed to school participants, and thirteen (13) respondents participated in the Focus Group Discussion (FGD). The one-month timeline included seeking approval from the division superintendent to conduct the study at the school and obtaining Free, Prior, and Informed Consent (FPIC) from the respective teachers involved. Before distributing the questionnaires, the researchers secured an official endorsement letter from the Schools Division Superintendent of the Department of Education. This letter was then shared with the school principal to outline the data collection procedures. As a formal communication bridge between the researchers and participants, the letter helped ensure transparency and legitimacy throughout the data-gathering process.

2.6 Data Analysis

The study utilizes mean, standard deviation, and frequency distribution to assess user perceptions and experiences with the LIS. Descriptive statistics provide a clear and structured approach to analyzing survey results, ensuring that findings are presented meaningfully and interpretably. The system's evaluation was conducted using a Five-point Likert Scale, which provided a structured framework for assessing the LIS's usability, affordability, and responsiveness. Respondents rated each category on a scale from 1 to 5, where one corresponded to "Strongly Agree" (indicating the system fully met the criteria) and five corresponded to "Strongly Disagree" (indicating the system failed to meet the requirements). This approach allowed for a standardized and quantifiable assessment of stakeholder perceptions. Descriptive statistical methods were then applied to analyze the data, ensuring comprehensive and reliable interpretation.

The qualitative phase of this study employed thematic analysis, following Braun, V., and Clarke's (2006) six-phase framework, to systematically analyze data from Focus Group Discussions (FGDs). The process began with transcribing FGD audio recordings verbatim and familiarizing researchers with the data through repeated readings to identify recurring ideas. Initial codes were generated inductively using NVIVO 14 software, labeling meaningful text segments related to the research objectives. These codes were grouped into broader themes, capturing significant patterns in the data. Themes were reviewed and refined at two levels: first, against the coded data for consistency, and second, within the entire dataset to ensure coherence. Final themes were defined and named to reflect their essence and relevance to the research questions. The data were interpreted in the context of theoretical frameworks, such as Heeks' E-Government Readiness Model and Van Dijk's Digital Divide Framework, to situate findings within broader literature. This systematic approach ensured a thorough, transparent, objective analysis aligned with the study's goals.

2.7 Ethical Considerations

Adherence to Ethical Guidelines

The study was conducted strictly by established ethical standards to uphold participant rights, ensure data integrity, and maintain research credibility. To ensure voluntary participation and informed decision-making, free, Prior, and Informed Consent (FPIC) was obtained from all participants before their involvement in the study.

Several measures were implemented to safeguard participant well-being and privacy throughout the research, reinforcing ethical considerations and respect for individual autonomy.

Informed Consent and Voluntary Participation

Before participating, all participants received a clear explanation of the study's purpose, methods, potential risks, benefits, and rights. This allowed them to make a fully informed decision about whether to participate. Participation was voluntary, and participants were assured they could withdraw without any negative consequences.

Confidentiality and Data Protection

Protecting participants' privacy was a top priority. In line with the Data Privacy Act of 2012, we removed any identifying information from the data and anonymized responses during analysis and reporting. All data was stored securely in password-protected systems, with access limited to the researcher. Participants could choose whether to share their names or other personal details.

Department of Education Approval

Before data collection, the study received formal approval from the Department of Education – the School's Division Superintendent, ensuring that the research design aligned with institutional and ethical guidelines. This approval validated the research approach and confirmed adherence to the moral framework established by the Department of Education.

Non-Maleficence and Participant Protection

A key ethical principle guiding this study was avoiding physical, emotional, or psychological harm. We carefully designed the research process to minimize risks and create a safe, respectful space for participants to share their thoughts and experiences.

3.0 Results and Discussion

3.1 Accessibility Findings

Table 1 data reveals that 39.1% of respondents have access to computers provided by the school, while an equal proportion (39.1%) rely entirely on personal computers without any provision from the school. Additionally, 21.7% of respondents have access to school-provided and personal computers. This suggests that the school plays a significant role in ensuring computer access for a substantial group. However, nearly 40% of respondents depend solely on personal computers, indicating that a significant segment may face challenges if their devices are unavailable or malfunctioning. This duality underscores the need for schools to assess whether their current provision of computers is sufficient to meet the needs of all teachers, particularly those who lack personal devices. Regarding tablets or mobile devices, the data shows that 37.7% of respondents have access to devices provided by the school, while a much more significant proportion (59.4%) rely entirely on personal devices. Only 2.9% of respondents can access school-provided and personal tablets or mobile devices. This indicates that most respondents depend on their own devices, which may reflect the school's limited provision of tablets or mobile devices.

Table 1. *Accessibility Assessment Result (n=69)*

Provision of IT Resources	Computers		Tablets or Mobile Devices		Internet Access	
	n	%	n	%	n	%
Provided by the school	27	39.1	26	37.7	17	24.6
Provided by the school (and have personal)	15	21.7	2	2.9	27	39.1
Personal (no provision from the school)	27	39.1	41	59.4	25	36.2

The heavy reliance on personal devices could pose challenges for individuals who cannot afford or maintain such devices, potentially creating disparities in access to digital tools. (Dridi et al., 2020) highlight similar challenges in low-resource educational settings, such as refugee camps, where unreliable internet connectivity and inadequate digital tools hinder access to management systems. Their study suggests that integrating offline functionalities and expanding school-provided digital resources in areas with poor infrastructure can help reduce educational inequalities. On internet access, 24.6% of respondents have access provided by the school, while 39.1% have

school-provided and personal internet access. However, a significant proportion (36.2%) rely entirely on personal internet access. This suggests that while the school provides internet access to a notable portion of respondents, a substantial number depend on their connectivity. For those without reliable personal internet access, this could create barriers to participation in digital activities, and the reliance on personal resources may exacerbate inequalities, as not all individuals may have the means to afford or maintain such devices and services.

3.2 Affordability Findings

Table 2 shows that participants agreed that the LIS helps reduce costs by minimizing manual paperwork, as reflected in the mean score of 2.28. This suggests that the system is perceived as an effective tool for cutting down on time-consuming and resource-intensive manual processes. However, the relatively high standard deviation of 2.10 indicates significant response variability. This variability may stem from differences in how users experience the system's efficiency or the extent to which they rely on manual processes in their specific contexts. For instance, some users may have fully transitioned to digital workflows, while others may still depend on hybrid (manual and digital) methods, leading to differing perceptions of cost savings. This finding aligns with (Haleem et al., 2022), who highlight the efficiency of digital systems in reducing operational costs through automation and eliminating traditional paper-based processes.

Table 2. *Affordability Assessment Result (n=69)*

Cost-Saving Indicators	Mean	Interpretation	sd
The LIS helps reduce costs by minimizing manual paperwork.	2.28	Agree	2.10
The LIS streamlines data management, allowing class advisers to focus more on teaching and mentoring	2.55	Agree	2.29
The LIS automates tasks like enrollment, grading, and attendance tracking, reducing administrative workload.	2.65	Neutral	2.42

The streamlining of data with a mean score of 2.55 indicates that participants agree that LIS streamlines data management, enabling class advisers to dedicate more time to teaching and mentoring. This finding highlights the system's potential to enhance productivity and shift focus from administrative tasks to core educational responsibilities. However, the high standard deviation of 2.29 again points to variability in user experiences. Some educators may find the system highly effective in simplifying data management, while others may encounter challenges or inefficiencies that limit its perceived benefits. This disparity could be influenced by factors such as user familiarity with the system, the quality of training provided, or the specific functionalities available in their implementation of the LIS.

The mean score of 2.65 for this indicator falls into the "Neutral" category, indicating that participants neither strongly agree nor disagree with the statement that the LIS effectively automates tasks like enrollment, grading, and attendance tracking. This neutral response suggests that the system's performance in automating these critical tasks may not consistently meet user expectations. The high standard deviation of 2.42 further underscores the variability in user experiences, which could be attributed to differences in the system's functionality across institutions, the complexity of tasks, or the level of customization required to meet specific needs. For example, some users may find the system highly effective for grading but less for attendance tracking, leading to mixed perceptions.

The findings suggest that the LIS is generally perceived as a valuable tool for reducing costs and streamlining data management, allowing educators to focus more on teaching and mentoring. However, the neutral response regarding task automation and the high variability in responses across all indicators highlight areas for improvement. These results indicate that while the system has potential, its effectiveness may not be uniformly experienced by all users. This could be due to differences in implementation, user training, or the specific needs of individual institutions.

3.3 Responsiveness Findings

Table 3 shows that participants strongly agreed that technical issues, such as system downtime or slow performance, significantly hinder the efficient use of the LIS, as reflected in the mean score of 1.75. This strong consensus, coupled with a relatively low standard deviation of 1.32, underscores the widespread impact of these issues on user experience. System downtime and slow performance can disrupt workflows, delay administrative tasks, and frustrate users, ultimately reducing the system's reliability and utility. These findings suggest that the LIS may require upgrades to its infrastructure, such as more robust servers or optimized software, to ensure

consistent and smooth performance. Proactive measures like regular maintenance and real-time monitoring could mitigate these technical challenges. The mean score of 1.70 for access challenges indicates that users strongly agree that limited internet connectivity and inadequate IT resources, particularly in rural or underserved areas, pose significant barriers to using the LIS. This issue received the lowest mean score among the three indicators, highlighting its critical importance. The low standard deviation of 1.29 confirms this is a widely shared concern among users. Limited internet access and insufficient IT resources can exclude specific populations from fully benefiting from the LIS, exacerbating educational inequalities. Addressing these challenges may require innovative solutions like offline functionality, portable Wi-Fi devices, or partnerships with local governments and organizations to improve digital infrastructure in underserved areas. Respondents agreed that compatibility issues with hardware or software configurations lead to operational inefficiencies within the LIS, as evidenced by the mean score of 2.25. While this issue is perceived as less severe than technical and access challenges, it remains a notable concern. The higher standard deviation of 1.88 suggests variability in user experiences, which may stem from differences in the types of hardware or software used or varying levels of technical expertise among users. For instance, some users may encounter compatibility issues when using older devices or unsupported operating systems, while others may not face these problems at all. Ensuring broader compatibility with standard configurations and providing precise system requirements could reduce these inefficiencies. In his study, (Rado, 2020) highlighted that compatibility issues are less severe but still contribute to operational inefficiencies and user frustration.

Table 3 *Responsiveness Assessment Result (n=69)*

Responsiveness Issues	Mean	Interpretation	sd
Technical issues such as system downtime or slow performance hinder the efficient use of the LIS.	1.75	Strongly Agree	1.32
Challenges in accessing the LIS due to limited internet connectivity or inadequate IT resources, particularly in rural or underserved areas	1.70	Strongly Agree	1.29
Compatibility issues with hardware or software configurations lead to operational inefficiencies within the LIS.	2.25	Agree	1.88

This shows that responsiveness issues are a significant barrier to the effective use of the LIS. Users strongly agree that technical issues and access challenges are critical problems, with the latter being perceived as slightly more pressing. This reveals that expanding internet connectivity and providing IT resources in underserved areas are essential to bridging the digital divide. The low standard deviations for technical and access issues indicate a high consensus among users about their severity, while the higher standard deviation for compatibility issues reflects more varied experiences. These results highlight the need for targeted interventions to address these challenges and improve the overall responsiveness of the LIS. Expanding internet connectivity, improving IT infrastructure, and integrating automation tools such as Excel-based workflows, as suggested by (Monsalve, 2024), are critical steps in bridging the digital divide and enhancing system performance.

3.4 Transparency Findings

Table 4 shows respondents agreed (Mean: 2.25) that data integrity and accuracy issues within the LIS create significant challenges for accountability and transparency. The high standard deviation (1.81) suggests that these challenges are experienced unevenly, with some users facing more severe issues than others. This variability may stem from differences in how data is managed across institutions or departments. Privacy and security concerns emerged as the most pressing challenge, with the highest mean score (2.54). Many respondents shared their hesitation to fully utilize the system due to fears about the safety of student data. The high standard deviation (2.13) indicates a wide range of opinions, reflecting differing levels of trust and exposure to security breaches. This highlights the need for stronger safeguards and transparent communication about data protection measures.

Table 4. *Transparency Assessment Result (n=69)*

Transparency Challenges	Mean	Interpretation	sd
Data integrity and accuracy issues within the LIS lead to challenges in ensuring accountability and transparency.	2.25	Agree	1.81
Concerns about the privacy and security of student data within the LIS lead to hesitation in fully utilizing the system.	2.54	Agree	2.13
Data quality issues such as inaccuracies, inconsistencies, or incompleteness affect the reliability of information.	1.99	Agree	1.57
Disparities in access to the LIS arise due to factors such as limited internet connectivity or inadequate IT resources.	1.83	Agree	1.42

Data quality issues, such as inaccuracies, inconsistencies, and incompleteness, were also identified as a significant concern (Mean: 1.99). These issues undermine the reliability of the information provided by the LIS. The lower standard deviation (1.57) suggests this challenge is more consistently experienced across users, though it is perceived as slightly less severe than privacy and data integrity issues. Disparities in access to the LIS, driven by factors such as limited internet connectivity or inadequate IT resources, were also acknowledged (Mean: 1.83). While this challenge received the lowest mean score, it remains a critical barrier for some users. The low standard deviation (1.42) indicates that this issue is consistently experienced, though it may not be as pronounced as other challenges.

These findings underscore the multifaceted nature of transparency challenges within the LIS. Privacy and security concerns are the most critical, followed by data integrity and accuracy issues, data quality problems, and access disparities. This mistrust can impede system adoption and limit utility, further exacerbating inefficiencies and underutilization. Providing transparent data access, particularly for parents and students, would address these concerns by fostering confidence in the system's reliability and privacy measures, supported by (Heath et al., 2015). While some challenges are more severe than others, all require attention to ensure the LIS functions as a reliable and inclusive tool for educational stakeholders.

3.5 Sustainability Findings

Table 5 indicates an average score of 1.97, which shows that most respondents agree there are significant challenges in making the LIS inclusive and accessible, especially for marginalized or remote communities. This isn't surprising, as many studies have pointed out the difficulties underserved groups face in accessing digital resources. The moderate variation in responses (SD: 1.52) suggests that some people feel these challenges more acutely than others, likely due to differences in location, resources, or personal experiences. Respondents, with an average score of 1.93, agree that the lack of consistent technical support is a significant hurdle. This is a common issue in many information systems, as users often struggle when they don't have timely help for technical problems. The variation in responses (SD: 1.53) suggests that some users might feel this more strongly, possibly because they have less technical experience or have faced more frequent issues. To address this, it's crucial to set up reliable support systems, help desks, online guides, or regular training sessions. The average score of 2.89 indicates a neutral stance on resistance to external oversight and audits. However, the high response variation (SD: 2.54) shows that opinions on this issue are pretty divided. Some people might resist oversight because they feel it's intrusive or unnecessary, while others may see it as essential for improving transparency and accountability. This divide highlights the need for open conversations about the purpose and benefits of audits. By showing how oversight can lead to better system performance and increased trust, stakeholders may become more open to these processes. Involving users in designing and implementing audits could also help reduce resistance and build a shared responsibility.

Table 5. *Sustainability Assessment Result (n=69)*

Indicators of Sustainability	Mean	Interpretation	sd
Challenges in ensuring inclusivity and accessibility for all users, including those from marginalized or remote communities.	1.97	Agree	1.52
Lack of ongoing technical support or guidance makes it challenging to address technical problems or questions related to the LIS	1.93	Agree	1.53
Resistance to external oversight and audit processes hinders efforts to improve accountability and transparency.	2.89	Neutral	2.54

The data highlights several key sustainability challenges that must be addressed to ensure the LIS remains effective and inclusive in the long term. This shows that the sustainability of the Learners Information System (LIS) depends on its ability to address barriers related to inclusivity, technical support, and governance. (Aziz et. al. 2023) suggest integrating IT sustainability principles, such as infrastructure improvements, proactive maintenance, and long-term user support mechanisms, can enhance digital service reliability and efficiency. By implementing targeted strategies to improve accessibility, providing robust technical assistance, and reinforcing accountability measures, the LIS can serve as an effective and sustainable platform for educational data management.

3.6 Identified Benefits of LIS

Table 6 shows a clear picture of its impact on schools. It's clear that the system has become an essential tool, but it also has room to grow to better meet the needs of everyone involved. One of the standout benefits of the LIS is its simplicity in data management. Teachers and coordinators appreciate how it keeps student information organized and accessible. For example, one coordinator shared how the system helps verify that students are enrolling in the correct grade level, while another mentioned how it gives teachers quick access to student records. This not only saves time but also reduces errors, making processes like enrollment and recordkeeping much smoother. Another benefit is the cost savings it brings. Schools have noticed a significant reduction in paperwork, especially during busy times like enrollment. One participant mentioned how the system has reduced printing costs by generating forms and reports digitally. These savings are a game-changer for schools working with tight budgets, freeing up resources for other essential needs. The LIS has made significant progress in transparency, yet more work remains. Some school leaders highlighted how transparent data access can help parents feel more connected to their child's education. However, others pointed out a significant gap: parents and students often can't see their data or track performance. This lack of access was described as unfair and frustrating, with one participant emphasizing that adding this feature would build trust and make the system more inclusive. Generally, the LIS has proven to be a valuable tool for schools, making data management easier, cutting costs, and improving transparency in many ways. However, for the LIS to truly excel, it must tackle the issues related to parent and student access. Doing so can become an even stronger school support system, helping them work more efficiently while fostering trust and collaboration with families.

Table 6. *Benefits of LIS (n=69)*

Themes	Frequency of codes		Exemplar Excerpt
	Contributing (N=13)	Excerpts assigned	
Ease of Data Management	4	6	*"LIS helps me gather accurate and reliable data, information, and profiles of learners needed for enrollment/admission." (SH Coordinator)* *"Having a centralized database reduces errors and gives teachers quick access to student records." (JH Coordinator)* *"As an adviser, the LIS has benefited in identifying if the learner is really in the grade level he or she is enrolling in." (FGD Participant 1)*
Cost Savings on Paperwork	3	4	*"Switching to LIS saves on paperwork, especially for enrollment and record-keeping processes." (FGD Participant 7)* *"We've reduced printing costs significantly by using the LIS to generate forms and reports." (School Head)* *"LIS is great for saving time and money when producing records like enrollment reports and class lists." (JH Coordinator)*
Improved Transparency	4	5	*"Transparent data access ensures that parents feel included in their child's academic journey." (School Head)* *"Adding a parent and student access feature will help in tracking performance and improving trust in the LIS." (SH Coordinator)* *"Parents and students can't see their own data or performance, which is unfair and not transparent." (FGD Participant 4)*

3.7 Identified Challenges of LIS

Table 7 highlights both its potential and the challenges that come with it. While the system has brought many benefits, significant hurdles must be addressed to make it work effectively for everyone, especially in remote and under-resourced areas. One of the most pressing challenges is the system's limitations in remote areas. Many rural schools struggle with poor internet connectivity, making accessing the LIS in real-time complex. This delays submitting and updating data, leaving these schools behind schedule. For example, one school head shared how their location makes it nearly impossible to meet deadlines, while a focus group participant pointed out that rural schools lack the infrastructure to use the system efficiently. This creates a clear divide between urban and rural schools, with the latter often feeling left behind. Another issue is the high cost of maintaining the LIS. While the system has helped save resources in some areas, the overall maintenance costs, especially at the national level, are seen as a burden. Some school coordinators expressed frustration, noting that the continuous funding required doesn't always translate into direct benefits for their schools. This raises questions about the system's sustainability, particularly for schools with limited budgets. Economic barriers to IT access also pose a significant challenge. In many rural areas, teachers are forced to use their own devices because the IT equipment provided by schools is either inadequate or breaks down frequently. Budget constraints make it hard to replace outdated

hardware, further limiting access to the LIS. This creates a cycle of inequality, where schools in already disadvantaged areas struggle even more to keep up. System downtime and inefficiencies are another major headache for schools. Frequent technical issues, such as slow loading times and connectivity problems, disrupt operations, especially during critical periods like grading or enrollment. One school head mentioned how system downtime during grading periods throws everything off track, while another coordinator shared how delays in generating school forms cause unnecessary stress. These inefficiencies make it harder for schools to rely on the system when needed. Finally, the lack of access for parents and students is a recurring concern. Many feel it's unfair that parents and students can't see their data or track performance. One participant described this as non-transparent, while another suggested that giving parents and students access could help build trust and inclusivity. This gap in the system leaves many stakeholders feeling excluded and unheard. In general, while the LIS has the potential to be a powerful tool for schools, there are still significant challenges that need to be tackled. Improving internet connectivity and infrastructure in remote areas, addressing the high maintenance costs, providing better IT equipment, reducing system downtime, and enabling parent and student access are all critical steps. By addressing these issues, the LIS can become a more reliable, inclusive, and effective system that truly serves the needs of all schools and communities.

Table 7. *Challenges of LIS (n=69)*

Themes	Frequency of codes		Exemplar Excerpt
	Contributing (N=13)	Excerpts assigned	
System Limitations in Remote Areas	5	7	*"Internet connectivity is a barrier in rural schools, and sometimes we can't use LIS when there's no connection." (FGD Participant 2)* *"Our location hinders real-time access to the LIS, delaying submissions and updates." (School Head)* *"Rural schools lack the infrastructure to run LIS efficiently, which leaves us behind deadlines." (FGD Participant 6*
High Maintenance Costs	2	2	*"Maintaining LIS at the national level demands continuous funding, which not all schools feel the benefits of." (SH Coordinator)* *"While LIS saves resources, the infrastructure maintenance costs nationwide are burdensome." (School Head)*
Economic Barriers to IT Access	4	5	*"Teachers in rural areas often use their own devices because the IT equipment provided is inadequate or breaks easily." (FGD Participant 9)* *"Budget constraints make it hard to replace outdated hardware used to access the LIS." (School Head)*
System Downtime and Inefficiencies	6	8	*"System downtime during critical times like grading periods disrupts operations." (School Head)* *"We experience delays in generating school forms due to frequent loading issues with the LIS." (SH Coordinator)* *"Technical issues, like internet connectivity, especially during LIS submission deadlines, cause delays." (FGD Participant 2)*
Lack of Parent & Student Access	3	3	*"Parents and students can't see their own data or performance, which is unfair and not transparent." (FGD Participant 4)* *"Allowing parents and students access to the LIS can address inclusivity concerns." (SH Coordinator)*

3.8 Identified Recommendation for LIS Implementation

Table 8 shows both its potential and the areas of improvement. The system has brought clear recommendations for making it more effective, inclusive, and user-friendly. These suggestions come from real experiences and challenges schools face, particularly those in under-resourced areas. The most common recommendation is to include parents and students in the LIS. Giving parents and students access to their data, like performance records, would build trust and make the system more transparent. For example, a school head mentioned that transparent data access helps parents feel more involved in their child's education. At the same time, a coordinator emphasized that this feature would improve trust in the system. This small but significant change could go a long way in fostering collaboration between schools and families. Another critical area is addressing infrastructure challenges.Rural schools, in particular, struggle with limited IT resources, such as unreliable power and inadequate equipment, which make it hard to use the LIS effectively. One school head pointed out how power outages disrupt the system, while a focus group participant highlighted how infrastructure gaps in public schools limit the LIS's potential. Investing in better infrastructure, especially in these areas, is essential to ensure that all

schools benefit equally from the system. Stakeholders also stressed the need for regular updates to keep the LIS functional and relevant. Many suggested that updates should happen annually and be communicated to all users. A coordinator noted that without consistent updates, the system risks becoming outdated, while another participant emphasized the importance of training users in advance whenever new features are introduced. Regular updates and clear communication would help schools stay on top of changes and make the most of the system. There's a strong call for offline functionality and system upgrades in connectivity issues, especially in areas with poor internet access. A school head shared that having offline capabilities would solve many of the connectivity problems they face. At the same time, a focus group participant suggested adding practical features like student attendance tracking and more straightforward grade encoding. These upgrades would make the LIS more responsive to the day-to-day needs of schools and teachers. Finally, there's a clear need for better training and capacity building.

Many users find the system difficult to navigate, especially when updating learner profiles or encoding grades. Current training sessions, like those during INSET and LAC, are often too introductory and don't cover advanced usage or troubleshooting. A coordinator highlighted the need for training focusing on these areas, while another participant pointed out that mastering the LIS requires more than just introductory sessions. Providing comprehensive and advanced training would empower users to use the system confidently and effectively. In conclusion, the recommendations for improving the LIS focus on making it more inclusive, accessible, and user-friendly. By involving parents and students, improving infrastructure, ensuring regular updates, adding offline features, and enhancing training, the LIS can become a more reliable and effective tool for all schools. These changes would address current challenges and ensure that the system meaningfully meets the needs of educators, students, and families.

Table 8. *Recommendations of LIS Implementation (n=69)*

Themes	Frequency of codes		Exemplar Excerpt
	Contributing (N=13)	Excerpts assigned	
Inclusion of Parents & Students in the LIS	4	5	*"Adding a parent and student access feature will help in tracking performance and improving trust in the LIS." (SH Coordinator)* *"Transparent data access ensures that parents feel included in their child's academic journey." (School Head)*
Infrastructure Challenges	3	3	*"Limited IT resources in rural schools make it hard to sustain the system, especially during power outages." (School Head)* *"Infrastructure gaps in public schools limit the full potential of the LIS." (FGD Participant 9)*
Need for Regular Updates	4	4	*"LIS updates should happen annually and be communicated to all users." (FGD Participant 6)* *"Users must be trained in advance when new features are introduced." (SH Coordinator)* *"Without consistent updates, the LIS risks becoming outdated and less functional." (JH Coordinator)*
Offline Functionality & System Upgrades	4	5	*"Having offline capabilities for LIS would solve many of the connectivity problems we face." (School Head)* *"Adding features like student attendance tracking and easier grade encoding will make the LIS more responsive to our needs." (FGD Participant 9)*
Training and Capacity Building	5	5	*"Training provided during INSET and LAC sessions is very basic and insufficient for mastering the LIS." (FGD Participant 8)* *"Capacity building must focus on LIS troubleshooting and advanced usage." (JH Coordinator)* *"The LIS is difficult to navigate when updating learner profiles or encoding grades." (JH Coordinator)*

4.0 Conclusion

This study provides a comprehensive evaluation of the Learner's Information System (LIS) within the context of a rural national high school, shedding light on its potential to enhance educational management and uncovering significant barriers to its effective implementation. The findings reveal that the LIS has made notable strides in improving administrative efficiency, reducing operational costs, and fostering transparency in data management. These benefits align with the broader objectives of Sustainable Development Goal 4 (SDG 4),

which emphasizes inclusive and equitable quality education for all. However, the study also highlights critical challenges that hinder the system's ability to deliver on its full potential, particularly in resource-constrained rural settings. The primary obstacles identified include inadequate IT infrastructure, frequent technical failures, high maintenance costs, and limited inclusivity for key stakeholders such as parents and students. Poor internet connectivity and systemic inequities compound these challenges, disproportionately affecting rural schools and exacerbating the digital divide. The data underscores the urgent need for targeted interventions to address these barriers and ensure that the LIS can function as a truly equitable and sustainable tool for educational governance.

To bridge these gaps, the study proposes several evidence-based recommendations:

- Investment in IT infrastructure to improve internet connectivity and provide reliable hardware, particularly in underserved areas.
- Offline functionalities should be developed to ensure uninterrupted access to the system, even in areas with limited or no internet access.
- Enhanced training programs for teachers, administrators, and LIS coordinators to improve system usability and address technical challenges.
- Including accessible features for parents and students enables them to access and track their data, promoting transparency and inclusivity.
- Regular system updates and capacity-building initiatives to ensure the LIS remains relevant, functional, and aligned with evolving educational needs.
- Future research should explore longitudinal assessments of LIS implementation in multiple rural schools to measure long-term sustainability and scalability.

These recommendations are not merely technical adjustments but are essential steps toward achieving equitable digital transformation in education. By addressing the systemic inequities that currently limit the LIS's effectiveness, policymakers and stakeholders can ensure that the system is a powerful tool for bridging educational disparities, particularly in rural and underserved communities.

In conclusion, this study underscores the importance of contextualized implementation and sustained investment in digital tools like the LIS. While the system holds immense promise for improving educational governance, its success ultimately depends on addressing rural schools' unique challenges. By prioritizing inclusivity, accessibility, and sustainability, the LIS can evolve into a transformative tool that enhances administrative efficiency and advances the broader goal of equitable education for all. This research serves as a call to action for policymakers, educators, and stakeholders to collaborate in creating a more inclusive and sustainable digital future for education in the Philippines.

5.0 Contributions of Authors

Conceptualization of the Study- JE Bete, A Collera
Literature Review- JE Bete, A Collera
Methods of the Study- JE Bete, A Collera
Development of Research Questionnaire- JE Bete, A Collera
Gathering of Data- JE Bete, A Collera
Data Interpretation- JE Bete, A Collera
Writing and Editing- JE Bete, A Collera
Formatting- JE Bete, A Collera

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7.0 Conflict of Interests

The authors affirm that there is no conflict of interest

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