Information Systems Technology Plan for Panabo City National High School

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ABSTRACT

Panabo City National High School is utilizing a manual system for essential administrative and academic tasks such as enrollment, student data management, communication, and attendance monitoring. These outdated practices lead to inefficiency, a heightened risk of human error, and delays in service delivery. This research introduces an Information System Technology Plan that encompasses the integration of a Management Information System (MIS) alongside a Student Information System (SIS), Document Management System (DMS), and Biometric Attendance System (BAS). The objective is to enhance data accuracy, optimize processes, and facilitate data-driven decision-making within the institution. The proposed strategy defines the IT infrastructure, software applications, and personnel necessary to seamlessly transition from manual to automated processes. It is hoped the school will significantly improve stakeholder satisfaction, operational efficiency, and service quality through the adoption of these technologies.

Keywords: Information System, Student Information System (SIS), Biometric Attendance System (BAS), Data Management, Operational Efficiency.

INTRODUCTION

Background

Panabo City National High School is a public secondary institution in Panabo City, Davao del Norte, Philippines. Recognized for its commitment to academic excellence and holistic student development, the school provides a strong foundation for learners pursuing Diverse Career Paths and higher education opportunities. According to [1], a school's culture and structure significantly influence student growth, emphasizing the need for institutions that support both intellectual and personal development.

To meet the demand for 21st-century education, Panabo City National High School implements the Senior High School (SHS) program under the K to 12 Curriculum. This national reform aims to equip Filipino students with skills relevant to global standards [2]. The school offers various academic and technical vocational livelihood (TVL) strands, including science and technology. Engineering and Mathematics (STEM); Arts and Design; and TVL strands such as Home Economics (HE), Industrial Arts (IA), and Information and Communication Technology (ICT). These tracks are designed to address students' diverse interests and strengths [3], enabling them to acquire the competencies needed for employment, entrepreneurship, or further education [4].

Each strand integrates knowledge and skills and values education, aligning with the Department of Education's goal of producing functionally literate, productive, and responsible citizens [5]. As noted in [6], comprehensive and content-responsive programs prepare students for a dynamic and complex future.

Current routines and business processes

Current Routines

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Panabo City National High School currently follows traditional and manual routines in its administrative and academic operations. During enrollment, the school implements a paper-based enrollment system wherein students and parents must fill out physical forms. The school registrar then manually processes these forms, encodes them into essential spreadsheet files, or stores them in physical folders.

Academic and student records, such as School Forms (SF1—School register, SF5—Report on promotion and learning progress & Achievement, and SF10—permanent Record), are physically stored in filing cabinets or drawers within the school's records office. Teachers manually record grades and student attendance, while class schedules are distributed and posted physically. Communication between teachers, students, and staff is often facilitated through face-to-face interactions or through informal information digital channels such as social media group chats.

Business Process

The school's business process revolves around the manual management of enrollment, academic instruction, record keeping, and student support services. A simplified overview includes the following:

1. **Enrollment and Registration Process**
    - Students manually fill out enrollment forms.
    - School personnel encode the data and organize it into physical and digital files.
2. **Records Management**
    - Student information, grades, and other academic records are documented on printed forms (SF1, SF5, SF10) and stored physically.
    - Teachers and staff retrieve and update these records as needed for evaluation and reporting.
3. **Instruction and Evaluation**
    - Teachers conduct classes following a set schedule and manually record student performance.
    - Grade computation and report card preparation are also conducted manually.
4. **Administrative and students Services**
    - Requests for academic records, certifications, and other student services are processed through face-to-face interactions.
    - Communication within departments is commonly done through meetings and informal messaging platforms.

Problems Found

Various challenges have been identified in the current routines and business processes of Panabo City National High School. These issues impact the efficiency, accuracy, and accessibility of school operations:

- Paper-Based Enrollment: The manual processing of enrollment forms often leads to delays, long sequences, and data encoding errors, especially during peak enrollment periods.
- Physical Storage of Records: The exclusive use of physical storage for critical documents such as SF1, SF5, and SF10 poses a risk related to data loss, document damage, and limited accessibility.
- Manual encoding and reporting: Teachers and staff face an increased workload due to the repetitive and time-consuming process of manually encoding grades and generating reports.

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- Limited system integration: There is no centralized digital platform to streamline processes across departments, resulting in fragmented workflows and potential miscommunication.
- Inconsistent Communication Channels: Reliance on face-to-face interactions and informal digital tools may lead to miscommunication or delays in the dissemination of important information.

Goals and Objectives

General Objectives

Researchers aim to propose a Management Information System (MIS) designed to enhance the administrative and academic processes of Panabo City National High School. The general objective of this study is to analyze the current system and introduce a digital solution that streamlines enrollment procedures, improves student records management, and boosts the overall efficiency,accuracy, and accessibility of school operations through the implementation of the proposed MIS.

Specific Objectives

- To assess the existing paper-based enrollment and record-keeping procedures currently utilized by the school.
- To identify the inefficiencies and risks associated with manual data encoding, physical document storage, and communication methods.
- To design and propose a computerized system to digitize enrollment, automate record management (SF1, SF5, SF10), and support accurate and secure data handling.
- To develop a user-friendly interface enabling administrative staff, teachers, and students to access relevant information and perform routine tasks efficiently.
- To evaluate the potential impact of the proposed system on data accuracy, processing time, accessibility, and overall institutional productivity.

Organizational Structure

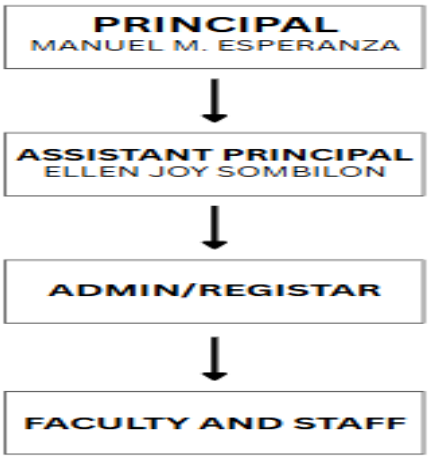

Figure 1: Organizational Structure of Panabo City National High School

This organizational structure shows the hierarchy within the school department. At the top of the structure is the principal, Mr. Manuel M. Esperanza, who oversees all school-wide decisions, programs, and leadership directives. The Assistant Principal, Ms. Ellen Joy Sombilon, supports him, assists in supervising school operations, and acts as a liaison between the principal and the administrative/teaching staff.

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The Admin/Registrar is crucial in maintaining records and managing documentation. And ensuring the smooth functioning of academic processes. Lastly, the faculty and staff are the essential workforce that carries out the educational and operational tasks, ensuring that the institution's day-to-day activities and learning goals are fulfilled.

Each level of this structure contributes to the smooth and effective functioning of the institution, as illustrated in Figure 1.

Stakeholders

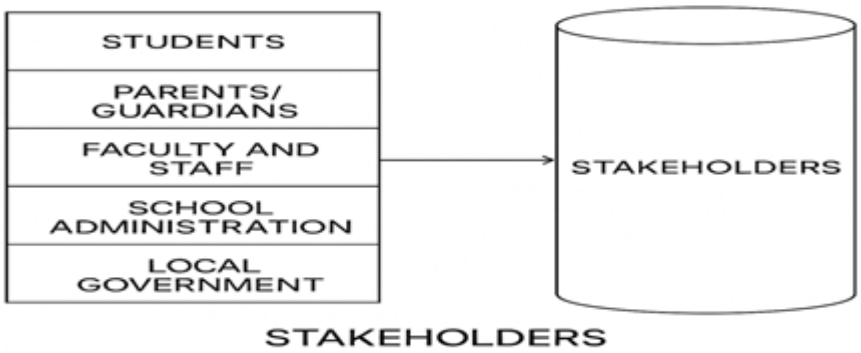

Figure 2: Stakeholders of Panabo City National High School

Students, parents/guardians, faculty and staff administration, local government, and department of Education (DepEd) are considered stakeholders of the institution. Students are the primary focus of the school and benefit directly from its services. Parents and guardians play a vital role by supporting students financially and emotionally and participating in school-related activities. Faculty and staff are responsible for delivering quality education and maintaining daily school operations. The school administration manages and implements policies to ensure smooth functioning and academic success. The local government supports the school through infrastructure, partnership, and community involvement. Lastly, the Department of Education sets educational standards, provides funding, and oversees the overall operation of schools, as shown in figure 2.

Proposed Information System

This study proposes the development and implementation of a management information system (MIS) to address the challenges of Panabo City National High School's paper-based enrollment system. The system aims to streamline registrar operations, improve data accuracy, and support efficient student enrollment through digital automation and integration.

Type of information system

Management Information System (MIS) for Enrollment and Registrar Operations

This study proposes a **Management Information System (MIS)** tailored to support and improve Panabo City National High School's enrollment and registrar functions. The system will centralize key administrative processes, reduce manual workload, and enhance the accuracy, accessibility, and timeliness of student-related data.

Core functionalities of the proposed MIS:

- Online Student Registration
- Online Student Application
- Validation and Secure Storage of Student Information

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- Real-time monitoring of enrollment Status and class assignments
- Generation of academic documents such as class schedules and enrollment certifications
- Controlled access to student records for authorized personnel

The proposed MIS is expected to modernize registrar operations and contribute to more efficient, responsive, and data-driven school administration.

RELATED LITERATURE

The combination of management Information System (MIS) into educational institutions offers significant opportunities to improve data accuracy, resource management, and strategic planning. In the context of Panabo City National High School, where administrative efficiency and data transparency are critical, the adoption of a customized MIS is both timely and essential.

MIS should not only automate tasks but also align with institutional strategy to create long-term value. Their strategic approach suggests that when effectively implemented, MIS can transform routine educational operations into performance-driven systems [7]. Performance measurement systems evolve over time, especially in small to medium-sized enterprises (SMEs), offering lessons applicable to schools. They argue that robust management systems allow organizations to shift from basic data recording to dynamic performance tracking. For Panabo City National High School, this suggests that a well-designed MIS could evolve from basic record-keeping (e.g., attendance, grades) to advanced performance monitoring (e.g., academic trends, teacher effectiveness) [8]. The integration of biometric technology with MIS for classroom attendance. Their system, which uses fingerprint authentication, demonstrates how biometric MIS applications reduce administrative errors and improve accountability. Implementing a similar system in Panabo City National High School could enhance student tracking and deter proxy attendance [9]. In the public education sector, MIS improves communication and service delivery, which is crucial for schools managing large volumes of data. They concluded that MIS adoption enhances data accessibility and administrative responsiveness [10]. The importance of real-time data in management systems, noting that such systems support quick and evidence-based decision-making. These insights, though from healthcare, underscore the relevance of MIS in ensuring timely interventions in academic and operational issues [11]. MIS boosts productivity, accountability, and data integration. In schools, this translates to easier report generation, centralized students records, and better coordination between departments and staff [12]. Collectively, the literature emphasizes that a Management Information System designed for Panabo City National High School should not only address current administrative needs but also support future scalability, real-time performance insights, and strategic improvements in education delivery.

Functionality

Management Information System (MIS) for Panabo National High School consists of four integrated components, each designed to optimize key administrative and academic functions. Together, these components ensure efficient data processing, secure information management, and accessible services for all stakeholders.

Enrollment Management Module

- Onlive Student registration and application submission
- Real-time validation and verification of enrollment data
- Automated class assignment and schedule generation
- Issuance of digital enrollment confirmations and certifications
- Real-time tracking of enrollment status
- Dashboard interface for registrar staff to monitor enrollment metrics

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Student Information System (SIS)

- Centralized database for student profiles, including personal, academic, and contract information
- Graded encoding and automated report card generation
- Academic progress monitoring across the school year
- Quick record retrieval by authorized personnel
- Role-based access to ensure data security

Document Management System (DMS)

- Digital archiving of essential documents such as SF1, SF5, and SF10
- Efficient upload, research, and retrieval of files
- Secure access control to safeguard sensitive student record
- Compliance with Department of Education (DepEd) documentation standards
- Backup and recovery features to prevent data loss

Biometric Attendance System (BAS)

- Biometric-based student attendance logging
- Real-time attendance monitoring and reporting
- Integrating with SIS for accurate attendance record linkage
- Automated generation of attendance reports for faculty and administrators
- Reduce manual work and improve data accuracy.

The integration of these modules within the MIS framework is intended to streamline administrative tasks, enhance data integrity, and support responsive decision-making within the school's operations.

System Architecture

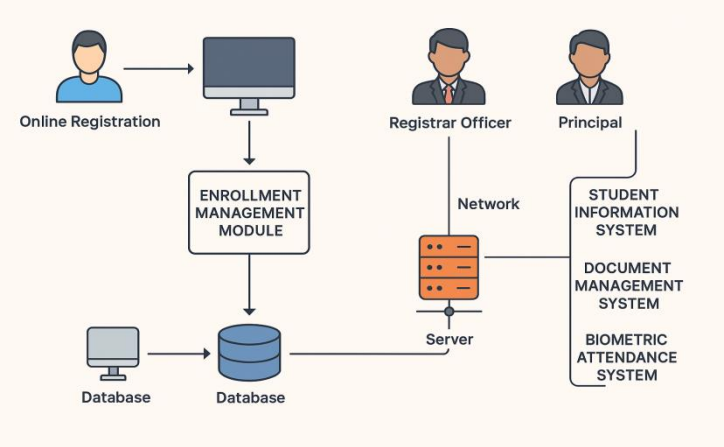

Figure 3: System Architecture of Panabo City National High School

Figure 3 shows the system architecture of Panabo City National High School using a Management Information System (MIS) that integrates the enrollment management module, student information System (SIS), document Management system (DMS), and biometric Attendance System (BAS). The data entered by students through the

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online registration portal are processed by the enrollment management module, validated by the registrar, and stored in a centralized database. Registrar staff access and manage this data through a computer interface, while the principal monitors enrollment status and reports through the network. The SIS maintains student academic records, while the DMS stores digitized documents such as SF1, SF5, and SF10. The BAS captures student attendance through biometric scanning and synchronizes it with the SIS. All components are connected via a secure server and network, ensuring real-time access and efficient data management across departments. These data are used to support registrar operations, facilitate accurate reporting, and improve administrative decision-making within the school.

Economic Feasibility

Table 1. Economic Feasibility of Panabo City National High School

Cost Description	**Cost**
Operational Cost	Php. 15,000
Development Cost	Php. 35,000
Maintenance Cost	Php. 20,000
Total Cost	**Php. 70,000**

Table 1 shows the overall cost of the business if they apply the proposed system.

Proposed It Infrastructure

The researcher wants to facilitate the recommended Management Information System (MIS), Student Information System(SIS), Document Management System (DMS), and Biometric Attendance System (BAS). This will improve seamless digital operations, streamline efficiency, and improve administrative and academic services.

Proposed Computer Hardware

The proposed computer hardware setup includes standard desktop units to support academic and administrative operations. This will be deployed in key offices such as the Registrar and Computer Laboratory.

Table 2. Proposed Computer Hardware for Panabo City National High School.

Computer Hardware	**Specifications**	**Unit Cost**	**Qty.**	**Total Cost**
Desktop Computer Set	Intel Core i5, 8GB RAM, 500GB SSD, Windows 11 Pro, 19” Monitor	Php 25,000.00	2	Php 50,000.00
Biometric Scanner + software	Fingerprint-based; includes durable scanner, attendance tracking software, driver	Php 10,000.00	1	Php 10,000.00
Total Hardware Cost				Php 60,000.00

Table 2 shows the total hardware cost of Panabo City National High School if they apply the proposed plan.

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Proposed Operating System Platform

The operating system plays a fundamental role in handling all hardware resources and software applications running. The school will use stable and secure platforms for administrative and academic purposes.

Table 3. Proposed Operating System for Panabo City National High School

OS Platform	System Requirements	Unit Cost	Qty.	Total Cost
Windows 11 Pro	1Ghz CPU, 4GB RAM, 64GB Storage, DirectX 12 CPU	14,999.0	2	29,998.00
Overall OS Platform Cost	29,998.0			

Table 3 shows the overall cost of the operating system of Panabo City National High School if they apply the proposed plan.

Proposed Enterprise Software Application

Enterprise software will be used to automate core operations, such as productivity suites and a management system.

Table 4. Proposed Enterprise Software Application for Panabo City National High School

Software Application	Specification	Unit Cost	Qty.	Total Cost
School Management System	Tracks enrollment, grades, student records, and attendance	2,500.00	2	5,000.00
Overall Enterprise Software Application Cost	5,000.00			

Table 4. shows the cost of the enterprise software application of Panabo City National High School if they apply the proposed plan.

Proposed Data Management

Effective data management ensures data security, organization, and easy access.

Table 5. Proposed Data Management for Panabo City National High School

Data Management	Specifications	Unit Cost	Qty	Total Cost
Microsoft 365 Education	Word, PowerPoint, Teams, OneDrive, Outlook, Access, Publisher	Free (DepEd)	2	Free
Overall Data Management Cost	none			

Table 5. shows the overall data management cost of Panabo City National High School if they apply the proposed plan.

IT Manpower

IT Coordinator is responsible for managing and maintaining IT systems, ensuring they operate efficiently and effectively . They provide technical support and troubleshoot problems.

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Table 6. Proposed IT Manpower for Panabo City National High School

IT Personnel	Job Description	Monthly Salary
IT Coordinator	Maintains school systems, updates software, handles troubleshooting.	Php 12,000.00
Total Monthly Cost		Php 12,000.00

Table 6. Shows the total monthly cost of Panabo City National High School if they apply the proposed plan.

CONCLUSION AND RECOMMENDATION

Conclusion

The implementation of a comprehensive Information System Technology Plan for Panabo City National High School represents a transformative step toward modernizing its administrative and academic operations. The current manual processes in enrollment, records management, communication, and attendance have proven to be time-consuming, error-prone, inefficient. By proposing integrated systems such as the Transaction Processing System (TPS), Student Information System (SIS), Document Management System (DMS), and Biometric Attendance System (BAS), this study outlines a practical and sustainable digital solution to these challenges.

Through Automation, Centralized Data Management, and Real-time Accessibility, the proposed system aims to Streamline Workflows, enhance Data Accuracy, and Support informed decision-making. Furthermore, the cost-effective IT infrastructure and staffing recommendations ensure that implementation is both feasible and scalable. Overall, this development technology plan underscores the critical role of the information system in fostering institutional efficiency, accountability, and continuous improvement in the educational environment.

Recommendation

The findings of the study indicate that enhancing the administrative and academic operation of the school requires the adoption of IT infrastructure and information System. The following are the researchers' suggestions for Panabo City National High School:

- To utilize information technology in managing enrollment, student records, and attendance.
- To implement the proposed information system for better workflow and data management.
- To enhance communication and coordination among departments through digital platforms.
- To acquire reliable computer hardware and software suited for academic and administrative use.
- To hire an IT coordinator to maintain system performance and provide technical support.

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