LYING-IN CLINIC INFORMATION MANAGEMENT SYSTEM FOR BUHI MUNICIPALITY

Introduction

Globally, healthcare systems are increasingly adopting Health Information Systems (HIS) to enhance data management and streamline processes. HIS ensures the availability of real-time patient data, facilitating better clinical decisions and improved healthcare delivery. It plays a critical role in addressing inefficiencies, such as disjointed patient flows and uncoordinated care (Epizitone et al., 2023). Furthermore, with advancements in information technology, clinics and hospitals worldwide have transitioned towards digital systems to promote better patient outcomes and support public health objectives (PLOS ONE, 2022).

In the Philippines, healthcare systems face challenges in achieving full digitalization, yet initiatives are underway to promote the use of information technology in hospitals and primary care centers. The government, through the Department of Health (DOH), supports the integration of HIS to provide better management of records and access to services. National efforts, such as the Universal Health Care (UHC) Act, emphasize the importance of data-driven strategies to improve care coordination, especially in underserved rural areas (Department of Health, 2023).

At the local level, Buhi Municipality in Camarines Sur encounters the typical struggles of rural healthcare providers, including limited resources and inefficient data handling. Traditional paper-based processes at clinics, including lying-in facilities, have led to operational delays, hindering patient care and complicating record-keeping. An information management system dedicated to these clinics would not only streamline patient records but also reduce administrative burdens, ensuring more timely and efficient maternal care services.

This project, the Lying-In Clinic Information Management System for Buhi, aims to address these gaps by providing an efficient platform for managing patient information, appointments, and medical history. Such a system is essential in promoting quality maternal care and improving health outcomes in the community. The system's advantages include enhanced data accessibility, reduced paperwork, and better patient

monitoring, which aligns with national health goals and community well-being objectives. It is also expected to foster smoother coordination between local health workers and municipal health units, benefiting both patients and providers.

General Objective

The general objective of this study is to design and develop an empowering healthcare provider through a comprehensive patient information system with dynamic medical inventory system.

Specific Objectives

Specifically, the study aimed to:

1. Develop an Enhanced Patient Care System by ensuring all patient records include:
    - 1.1. Patient profile
    - 1.2. Medical histories
    - 1.3. Test results
    - 1.4. Current medications
    - 1.5. Treatment plans
    - 1.6. Providing real-time updates in all records
2. Integrate optimized workflow efficiency by:
    - 2.1. Automating tasks such as:
    - 2.2. Appointment scheduling
    - 2.3. Patient documentation
3. Improve inventory management system by:
    - 3.1. Implementing real-time tracking: ensure that necessary supplies are always available, minimizing, stock outs or overstock situations.
    - 3.2. Setting an automated Alerts: For low stock levels or approaching expiration dates, to prevent shortages and ensure timely reordering.
4. Develop a system that supports clinical decision-making by:
    - 4.1. Providing decision Support Tools: Utilize patient data and evidence-based guidelines to assist in making accurate and timely treatment decisions.

4.2. Using predictive analytics: Anticipate patient needs, identify potential complications, and optimize resource allocation based on historical data and trends.

5. Evaluate the system using ISO 25010 standards in terms of:
    5.1 Functional Suitability
    5.2 Performance Efficiency
    5.3 Compatibility
    5.4 Usability
    5.5 Reliability
    5.6 Security
    5.7 Maintainability
    5.8 Portability

Related Literature

Documentation is a critical vehicle for conveying essential clinical information about each patient's diagnosis, treatment, and outcomes and for communication between clinicians, other providers, and payers. Documentation should proactively answer questions that payers ask about services, such as the following: Is the service medically necessary? Is it a service requiring the knowledge and skills of a speech-language pathologist? Are the goals and treatment functionally relevant? How does this service add value to the patient's interdisciplinary care and overall health? Does the documentation clearly support a specific and effective treatment for the patient's condition? (Asha, 2024)

Properly documenting patient's medical records has always been important, but never more than now, given today's healthcare landscape where the government ties reimbursement to the quality of the medical record… Documentation communicates the what, why, and how of clinical care delivered to patients. These records allow other clinicians to understand the patient's history so they can continue to provide the best possible treatment for each individual (SCP Health, 2024).

Medical documents, essential for patient care, contain vital information for both healthcare professionals and patients. There are a wide range of document types, which is

why professional medical translators are needed to perform the translation of this type of text. They master and are familiar with various types of documents involved in effective healthcare communication (Okomeds, 2024).

Appointment scheduling software automates the appointment process from start to finish. You can set the hours of appointment for yourself as well as other members of your team. Clients can then book, modify, or cancel appointments based on the slots available and their personal preferences. You can then track and manage your appointments from a single location (EngageBay, 2024).

Making appointments ensures that important tasks are completed on time. Additionally, making appointments creates a sense of structure and organization. By having a set schedule, it can be easier to plan out tasks and prioritize and track important tasks thereby reducing stress (Mujuru, 2024).

Outsourcing appointment settings for your team provides various benefits, such as freeing time to focus on more pressing tasks, driving revenue, and increasing warm leads. Increasing the number of appointments you have scheduled can also drive positive attention to your business and improve brand recognition. Instead of managing the hassle and time of hiring and training a new in-house sales team member, outsourcing your appointment setting can save your business time and money (ROI, 2024).

The purpose of obtaining a health history is to gather subjective data from the patient and/or their care partners to collaboratively create a nursing care plan that will promote health and maximize functioning. A comprehensive health history is completed by a registered nurse and may not be delegated. It is typically done on admission to a health care agency or during the initial visit to a health care provider, and information is reviewed for accuracy and currency at subsequent admissions or visits (NLM, 2024).

Medical history is important because when GPs have more information about a patient’s medical history, health professionals can deliver the most appropriate and effective treatment or support for their concerns. It can also help diagnose possible illnesses, understand hereditary and likely diseases in your family, as well as allergies, your past and current medication, and vaccination records (Mygp, 2024).

The literature from Mygp is crucial to the present study as it highlights the significance of comprehensive medical histories in delivering effective and personalized patient care. This directly supports the objectives of the Enhanced Patient Care System, which seeks to integrate and manage detailed medical histories to improve treatment accuracy and effectiveness. By providing healthcare professionals with complete and up-to-date information on patients' past and current conditions, medications, allergies, and vaccination records, the system enhances the ability to diagnose illnesses, identify hereditary conditions, and tailor treatment plans accordingly. This alignment ensures that the system not only supports informed decision-making but also contributes to better patient outcomes by facilitating a thorough understanding of each patient's health background and needs.

Health care in the Philippines varies with private, public and barangay health centers (many in rural municipalities). Most of the national burden of health care is provided by private health providers, with the cost shouldered by the state or by patients (Utc, 2024).

The Philippine healthcare system is shared between the public and private sectors. The pandemic allowed hospitals to upgrade and increase their facilities to cope with the situation. Public hospitals focus their efforts on preventive and primary care while also taking the lead in educating the public on health issues. (ITA, 2024).

The Department of Health (DOH) has an ongoing free medicine program for indigents called Medical Assistance Program (MAP), a program of the Department of Health intended to provide medical assistance to patients seeking consultation, rehabilitation, examination or otherwise confined in government hospitals (DSWD, 2024).

Overall, the healthcare system in the Philippines is of a high standard. Filipino medical staff are highly trained, although the facilities may not be as impressive as those found in high-end US or European hospitals (Allianzcare, 2024).

In 2019, the Philippines implemented Republic Act. No. 11223, also known as the Universal Healthcare Act, instituted universal healthcare for all Filipinos. It also recognizes the role of evidence-based decisions in developing and implementing better

programs. Currently, there is no legislation to support eHealth in the Philippines. House Bill No. 7422, also referred to as the Philippine E-Health and Services Act, aims to promote the delivery of medical services through information and communication technologies (ICT) and this legislation is still pending (ITA, 2024).

The Community Health Information Tracking System (CHITS), as the first homegrown EMR system in the Philippines, employs an open-source, user-friendly, modular, and extensible system that enables automation of core processes in health centers and thereby contributes to the effective and efficient delivery of services. As a digital health application, CHITS helps health centers and rural health units (RHUs) in improving the delivery of health services by facilitating efficient data entry and storage through secure access of records by healthcare workers, expediting patient record retrieval, and minimizing waiting time of patients in clinics and RHUs. It helps health program managers and local chief executives with resource allocation strategies and organizational development by helping project patient load and understanding the usage of resources (GovPh, 2020).

Republic Act no. 11223 otherwise known as the Universal Health Care Act, provides that the Corporation shall support the implementation of standards for clinical care set forth by the Department of Health (DOH) based on approved clinical practice guidelines. Further, Section 51 of the revised Implementing Rules and Regulations of the National Health Insurance Act of 2013 (RA7875 as amended by RA9241 and RA10606) provides the implementation of quality assurance standards as reference for ensuring quality of health care services (PHIC, 2022).

The Lying-In Clinic Information System for Santa Rosa, Laguna was developed in response to the inefficiencies of manual practices in clinic operations, particularly in record management, and appointment scheduling. Researchers employed a descriptive-quantitative research design involving both healthcare providers and patients to understand these challenges. Findings revealed that midwives and healthcare providers expressed doubts about the effectiveness of manual processes, while patients reported dissatisfaction with the paper-based system. The study emphasized the need for an integrated information system to enhance operational efficiency and improve patient

satisfaction by streamlining record management, and scheduling (Balocon, Dator, Legrama, and Vicuña, 2024).

Both the present study and the Lying-In Clinic Information System for Santa Rosa, Laguna addressed the challenges posed by manual practices in healthcare settings. Both studies focused on improving operational efficiency and patient satisfaction through the development of an integrated system for managing records, and appointments. Both systems also involved healthcare providers and patients to identify existing barriers and understand the impact of manual processes on care delivery. However, the key difference lay in the scope and setting: while the Santa Rosa system specifically targeted a lying-in clinic and focused on maternal care, the present study aimed to enhance healthcare delivery across multiple clinics within a municipality of Buhi, Camarines Sur.

METHODOLOGY

Project Development Methodology

The development methodology for the Lying-In Clinic Information Management System for Buhi Municipality focused on creating a user-friendly platform that streamlined clinic operations. This methodology emphasized iterative processes, allowing for continuous feedback from healthcare providers to ensure that the system effectively met their needs. By engaging stakeholders throughout the development phase, the project aimed to adapt to the dynamic requirements of the clinic environment. The use of a systematic approach facilitated clear communication, ensuring that the final system supported efficient patient management, appointment scheduling, and medical record keeping. Overall, this thoughtful approach was essential in developing a tailored solution that enhanced healthcare delivery within the municipality.

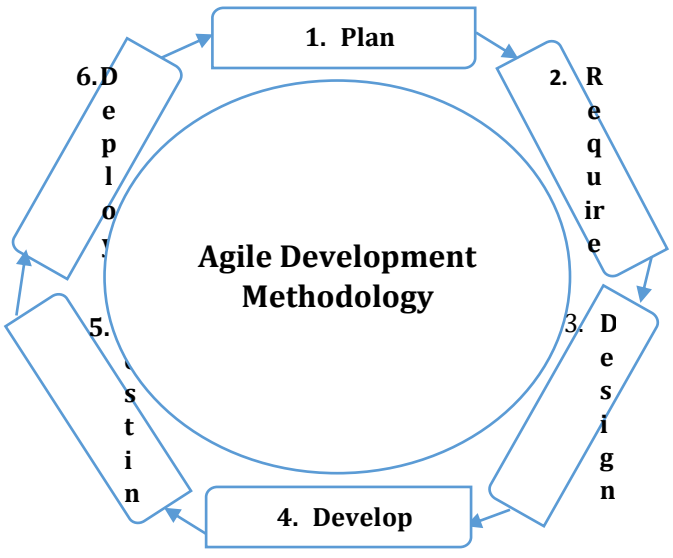


Figure 3.1Agile Development Methodology

Figure 3.1 illustrated the Agile Development Methodology, which was a flexible, iterative process used in software development. It consisted of six key phases: Plan, Requirement, Design, Develop, Testing, and Deployment. The process began with Planning, where the project's scope and objectives weredefined, followed by the Requirement phase, which involved gathering user needs and system functionalities. In the Design phase, the system's architecture, user interface, and workflows were outlined based on the identified requirements. Next was the Development phase, where the system wasbuilt through coding and the creation of features. Once developed, the system moved to the Testing phase, where it wasthoroughly examined for bugs and performance issues to ensure it functioned as expected. Finally, the system reached the Deployment phase, where it was made operational for end users. Agile was a cyclical process, meaning feedback from users or stakeholders during each phase could be incorporated, allowing continuous improvement and adaptation throughout the project lifecycle.

RESULTS AND DISCUSSION

LYING-IN CLINIC INFORMATION MANAGEMENT SYSTEMFOR BUHI MUNICIPALITY

Requirements

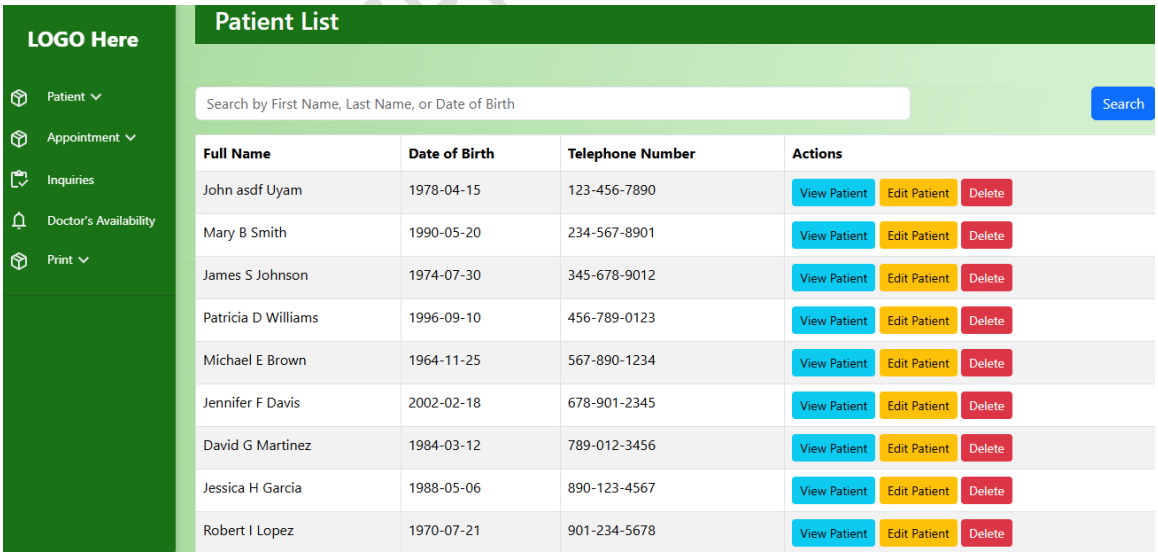
This section outlines the essential components and specifications needed to develop and implement the Lying-In Clinic Information Management System for Buhi Municipality. It identifies both functional and non-functional requirements critical to the system's success. Functional requirements include features like patient registration, appointment scheduling, medical record management, report generation, and billing functionalities. Non-functional requirements cover aspects such as system performance, data security, scalability, and user-friendliness to ensure efficient and secure operations. This section also details the hardware and software prerequisites, such as server capacity,

database management tools, and user interfaces, along with internet connectivity requirements. By defining these requirements, the study establishes a clear framework that guides the system's design, development, and deployment phases, ensuring it meets the clinic’s operational needs effectively.

Design

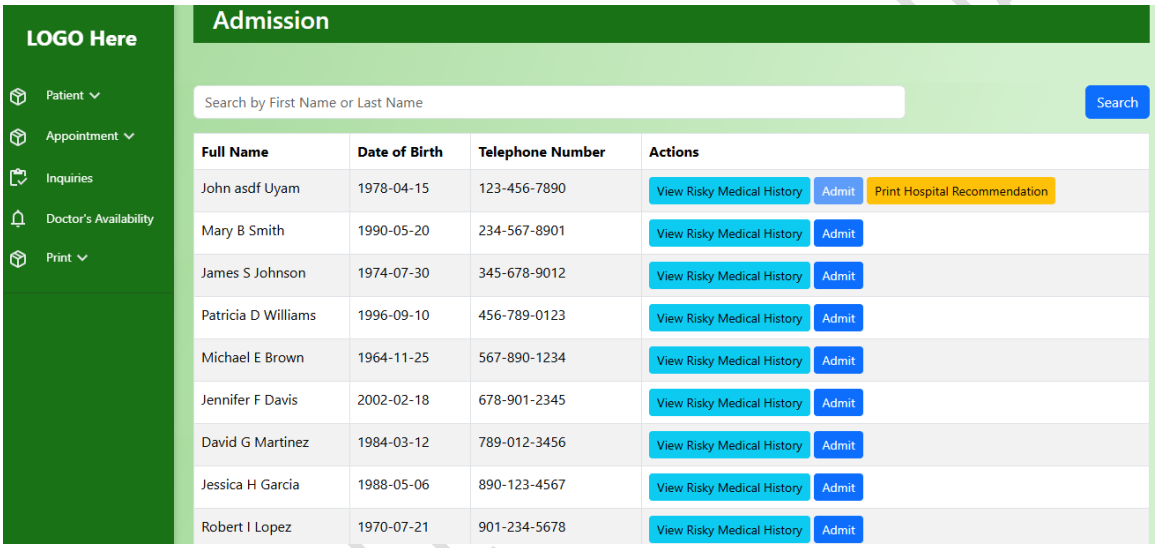
This section focuses on the structural and visual blueprint of the Lying-In Clinic Information Management System for Buhi Municipality. It provides an overview of the system architecture, detailing how various components, such as the database, user interface, and processing modules, interact to deliver a seamless user experience. The design prioritizes simplicity and usability, ensuring that clinic staff can easily navigate the system without extensive technical training. Key elements include designing user-friendly dashboards for patient management, intuitive forms for data entry, and a streamlined process for generating reports. The database design is structured to securely store and retrieve patient information, medical records, and appointment schedules, ensuring data accuracy and integrity.

Development



The design of the View Patient Interface would likely prioritize clarity and efficiency, ensuring that healthcare providers can navigate through the patient's

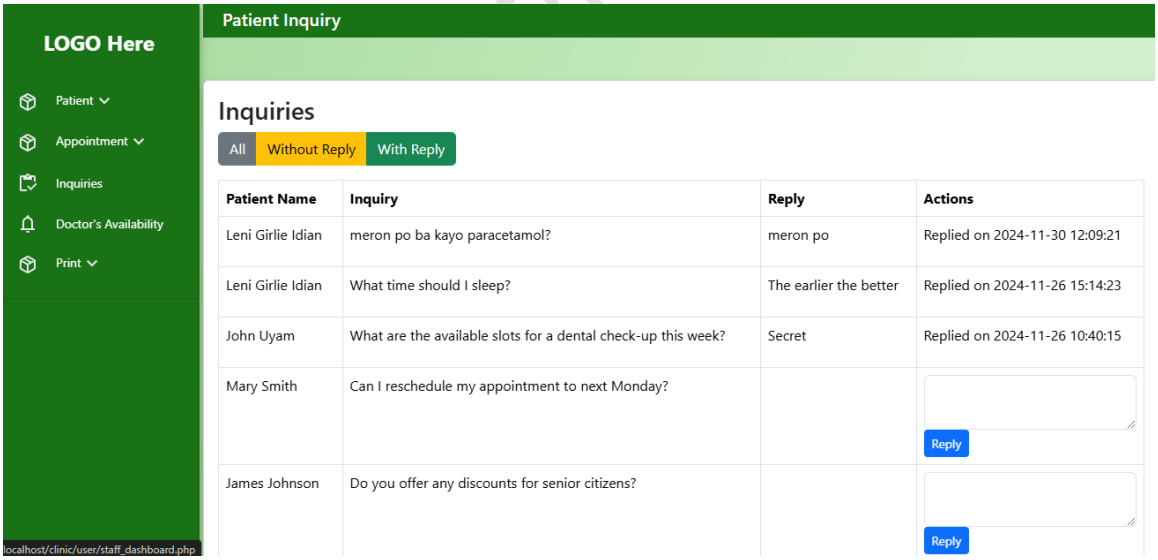
information seamlessly. Features such as search and filter options would allow staff to quickly locate specific data, such as a patient's recent test results or prescribed medications. Additionally, real-time updates would ensure that any changes to the patient's record - such as new test results or treatment plans—are immediately visible to the healthcare team, enhancing communication and coordination of care. This interface not only improves the accessibility of patient data but also supports timely and accurate clinical decision-making, ultimately contributing to better healthcare outcomes.



capture all relevant information necessary for patient admission, such as the reason for admission, medical condition, and any immediate care requirements. The Patient Admission Interface would also likely include functionalities for assigning patients to specific rooms or care units, tracking their progress throughout their stay, and linking them to the appropriate healthcare providers. Real-time updates would ensure that any changes in the patient's condition or treatment plan are immediately reflected in the system. Additionally, this interface would help reduce administrative workload by automating aspects of the admission process, ensuring smooth transitions for patients from registration to active care. This streamlined approach improves both the patient experience and the efficiency of the clinic's operations, allowing for timely interventions and optimal resource allocation.

Figure 4.7 – View Appointment List

Figure 4.7 – View Appointment List likely represents the feature in the Lying-In Clinic Information Management System for Buhi Municipality that allows healthcare providers to view and manage scheduled patient appointments. This interface would display a comprehensive list of upcoming appointments, including details such as patient names, appointment dates, times, and the nature of the visit. It helps clinic staff efficiently manage patient flow by providing a clear overview of the day's appointments and ensuring that no appointments are missed or overlooked.



Clinic Information Management System for Buhi Municipality that allows patients or healthcare providers to inquire about specific details related to patient records, appointments, or other healthcare services. This interface would enable users to quickly search for and retrieve information such as a patient's medical history, upcoming appointments, treatment plans, or test results. The interface would be designed to provide

an easy-to-navigate and intuitive platform for accessing essential patient data, streamlining communication between healthcare providers and patients.

Testing

The "Develop Phase" of the Lying-In Clinic Information Management System refers to the actual construction and coding of the system based on the design specifications established earlier in the project.

Table 4.1

Adjectival Interpretation

Rating	Verbal Interpretation
5	Far more than expected
4	More than expected
3	Meets expectations
2	Less than expected
1	Does not meet expectations

Table 4.2

System Functional Suitability Rates

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Completeness	3.2	3	3.1	Meets expectation
Correctness	4.0	3	3.5	Meets expectation
Appropriateness	4.8	4	4.4	More than expected
Suitability	3.8	4	3.9	Meets expectation
Accurateness	3.8	3	3.4	Meets expectation
Interoperability	3.4	4	3.7	Meets expectation
Security	4.0	4	4	More than expected
Average	**3.86**	**3.57**	**3.7**	**Meets expectation**

Table 4.2 evaluates the system's functional suitability based on seven sub-characteristics, rated by two groups: IT Experts and Beneficiaries. The ratings, along with the weighted mean and interpretations, provide insights into the system's overall performance. For completeness, IT Experts rated it 3.2, while Beneficiaries gave a slightly lower score of 3, resulting in a weighted mean of 3.1, interpreted as Meets expectation. This suggests the system fulfills its required functionalities but could benefit from further refinement to address user needs comprehensively.

Table 4. 3.

System Performance Efficiency Rates

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Time Behavior	3.33	3	3.26	Meets expectation
Resource Utilization	3.66	3	3.33	Meets expectation
Capacity	3.67	3	3.33	Meets expectation
Average	**3.55**	**3**	**3.27**	**Meets expectation**

Table 4.3 presents the evaluation of the system's performance efficiency based on three sub-characteristics: time behavior, resource utilization, and capacity. The ratings were provided by two groups: IT Experts and Beneficiaries, with weighted means calculated to determine the overall interpretation of each sub-characteristic.

Table 4.4

System Compatibility Rates

Sub-	IT	Beneficiaries	Weighted	Interpretation

Characteristic	Experts (10)	(2)	Mean	
Co-Existence	3	4	3.5	Meets expectation
Interoperability	3	4	3.5	Meets expectation
Average	**3**	**4**	**3.5**	**Meets expectation**

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Table 4.5

System Usability Rates

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Appropriateness recognizability	3.56	4	3.78	Meets expectation
Learnability	3.56	4	3.78	Meets expectation
Operability	3.22	4	3.61	Meets expectation
User error protection	3.11	3	3.055	Meets expectation
User interface aesthetics	3.11	3	3.055	Meets expectation
Accessibility	3.67	4	3.84	Meets expectation
Average	**3.37**	**3.66**	**3.5**	**Meets expectation**

352

353 **Table 4.6**

354 **System Reliability Rates**

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Maturity	3.4	3.3	3.5	Meets expectation
Availability	3.3	3.3	3.3	Meets expectation

Fault Tolerance	3.4	3.3	3.35	Meets expectation
Recoverability	3.4	3.5	3.45	Meets expectation
Average	**3.37**	**3.35**	**3.36**	**Meets expectation**

Table 4.7

System Security Rates

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Confidentiality	4.1	4	4.05	More than expected
Integrity	4	4	4	More than expected
Non-repudiation	3.8	4	3.9	Meets expectation
Accountability	3.7	4	3.85	Meets expectation
Authenticity	3.7	4	3.85	Meets expectation
Average	**3.86**	**4**	**3.92**	**Meets expectation**

Table 4.7 evaluates the system's security based on five sub-characteristics: confidentiality, integrity, non-repudiation, accountability, and authenticity, as rated by IT Experts and Beneficiaries. The highest-rated aspects are confidentiality and integrity, with weighted means of 4.05 and 4, respectively, both interpreted as More than expected. These ratings indicate strong measures to ensure data privacy and accuracy within the system. Meanwhile, non-repudiation, accountability, and authenticity scored slightly lower, with weighted means ranging from 3.85 to 3.9, interpreted as Meets expectation. These results reflect that the system adequately tracks user actions and ensures trustworthiness but may benefit from minor improvements in these areas. The overall average weighted mean of 3.92 confirms that the system delivers reliable security features, effectively protecting sensitive information while meeting user expectations.

Table 4.8

System Maintainability Rates

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Modularity	3.7	4	3.85	Meets expectation
Reusability	3.7	4	3.85	Meets expectation
Analyzability	3.7	4	3.85	Meets expectation
Modifiability	3.2	4	3.6	Meets expectation
Testability	3.7	4	3.85	Meets expectation
Average	**3.6**	**4**	**3.6**	**Meets expectation**

Table 4.8 evaluates the system's maintainability based on five sub-characteristics: modularity, reusability, analyzability, modifiability, and testability, as assessed by IT Experts and Beneficiaries. Most sub-characteristics, including modularity, reusability, analyzability, and testability, received consistent ratings, with weighted means of 3.85, interpreted as Meets expectation. This indicates that the system is well-structured, adaptable for reuse, easy to analyze for issues, and supports effective testing. Modifiability, which measures how easily the system can accommodate changes, scored slightly lower with a weighted mean of 3.6 but still Meets expectation.

Table 4.11

System Portability Rates

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Adaptability	4	4	4	More than expected
Reusability	4	4	4	More than expected
Analyzability	4	4	4	More than expected

Modifiability	3	4	3.5	Meets expectation
Testability	4	4	4	More than expected
Average	**3.6**	**4**	**3.9**	**Meets expectation**

Table 4.11 evaluates the system's portability based on five sub-characteristics: adaptability, reusability, analyzability, modifiability, and testability, as rated by IT Experts and Beneficiaries. The system received high ratings of 4 for adaptability, reusability, analyzability, and testability, with these sub-characteristics interpreted as More than expected. This indicates that the system effectively adapts to different environments, supports component reuse, is easy to analyze, and can be efficiently tested across platforms.

Table 4. 12

Overall Evaluation of the Developed System

Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Functional Suitability	3.86	3.57	3.7	Meets expectation
Performance Efficiency	3.55	3	3.27	Meets expectation
Compatibility	3.0	4	3.5	Meets expectation
Usability	3.37	3.66	3.5	Meets expectation
Reliability	3.37	3.66	3.5	Meets expectation
Security	3.86	4	3.92	Meets expectation
Maintainability	3.6	4	3.6	Meets expectation
Portability	3.6	4	3.9	Meets expectation
Over All Average	**3.53**	**3.74**	**3.61**	**Meets expectation**

Table 4.12 presents the overall evaluation of the developed system, summarizing its performance across eight key quality characteristics: functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability, as rated by IT Experts and Beneficiaries. The weighted means for each characteristic range from 3.27 to 3.92, all interpreted as Meets expectation.

Deployment

The Deployment Phase of the Lying-In Clinic Information Management System for Buhi Municipality focuses on delivering the completed system to its intended environment for actual use. This phase involves critical activities such as system installation, configuration, data migration, and initial testing in the live environment. The deployment process ensures that the system is fully functional and integrates seamlessly with the clinic's existing workflows. Key stakeholders, including IT experts and clinic staff, play an active role in overseeing the transition and verifying that all features operate as intended. User accounts are created, access privileges are assigned, and real-world scenarios are tested to ensure that the system supports essential operations, such as patient record management, appointment scheduling, and data security.

CONCLUSIONS

Based on the findings of this study the following conclusions were formulated:

1. The study successfully developed an Enhanced Patient Care System that integrates comprehensive patient records with real-time updates, ensuring accurate and accessible information for improved healthcare delivery.
2. The system successfully enhanced workflow efficiency by automating tasks like appointment scheduling and patient documentation, leading to streamlined operations and reduced manual administrative work.
3. The system improved the inventory management system by incorporating real-time tracking and automated alerts, ensuring the availability of supplies and preventing shortages through timely reordering.

4. The developed a system that enhances clinical decision-making by utilizing decision support tools and predictive analytics to improve treatment accuracy, anticipate patient needs, and optimize resource allocation.
5. The system using ISO 25010 standards and confirmed that it meets expectations across all key quality characteristics, including functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability, with an overall rating of 3.61, indicating that the developed system meets expectations.

Recommendations

Based on the conclusions drawn from this study, the following recommendations were formulated:

1. Continually update and maintain the Enhanced Patient Care System while exploring further integration with other healthcare systems to enhance data sharing and interoperability.
2. Expand the automation features further by incorporating additional tasks and processes to maximize workflow efficiency and reduce administrative burden.
3. Continuously monitor inventory trends and refine the real-time tracking and automated alert system to further optimize supply levels and enhance the efficiency of reordering processes.
4. Further refine the decision support tools and predictive analytics to incorporate more diverse data sources, improving treatment accuracy and enhancing the system's ability to anticipate patient needs
5. Conduct regular evaluations based on ISO 25010 standards to ensure the system continues to meet expectations and to identify potential improvements in functionality, performance, and other key quality characteristics
6. Gather continuous feedback from end-users and stakeholders to identify any operational challenges or areas for enhancement, ensuring the system evolves to meet changing healthcare needs and technological advancements.
7.

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Curriculum Vitae

LENI GIRLIE M. IDIAN
Sta. Justina Buhi, Camarines Sur
lovemeeh.1682@gmail.com

PERSONAL INFORMATION

Gender	:	Female
Nationality	:	Filipino
Religion	:	Roman Catholic
Date of Birth	:	January 16, 1682
Parents	:	Mrs. Leticia D. Moralde and Mr.Nicanor A. Moralde
Children	:	Denise Leih M. Idian

WORK EXPERIENCES

- Instructor – Commission on Higher Education
  Camarines Sur Polytechnic Colleges (2022-present)
  Nabua, Camarines Sur

EDUCATION

Graduate Studies:

- **Aemilianum College Inc., 2025**
  Master in Information Technology
  Capstone Project: "Lying-In Clinic Information Management System for Buhi Municipality"

Tertiary:

- **Worldtech Resources Institute, 2006**
  BS in Computer Science, Graduate

Vocational:

- **Camarines Sur Polytechnic Colleges, 2001**
  Computer Programming

PROFESSIONAL DEVELOPMENT

- Upskilling of Teachers on Content, Pedagogy & Assessment of EPP/TLE/TVL Curriculum Implementation
  February 22, 2023
- Bula District ICT Coordinator Planning Conference
  October 13, 2022
- KabataangGuro Enhancement Program: Information Communication and Technology Competency Training for an Adaptive and Anticipatory Education Skills
  July 4-5, 2022
- Bula North District-Secondary Schools Orientation on Prime HRM
  March 9-11, 2022
- Project DRIVEN: Developing and Refining ICT Capabilities for Various Endeavors in the New Normal
  March 16, 2022

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