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Design and Quality Assessment of an Intelligent Electronic Health Record and Prescription System for Low-Resource Clinic Settings

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Abstract
In low-resource clinical environments, paper-based patient records and prescriptions are often the norm, resulting in fragmented documentation, inefficient work processes and that contribute to higher medication errors. This paper discusses the design and quality evaluation of an Intelligent EHR and Prescription System which has been developed for health units in General Tinio, Papaya, Nueva Ecija, Philippines. An Agile software development process was used to build the system, and its evaluation was carried out with ISO/IEC 25010 Software Product Quality Model.
A developmental descriptive design of research was used. The process included successive stages of requirement specifications, system and database design, sprints of development, user acceptance testing and pilot implementation. Reviewers were IT professionals and healthcare end users, such as nurses, pharmacists and administrative workers. Structured questionnaires were employed to measure eight software quality attributes functional adequacy, performance efficiency, compatibility, usability, reliability, security, maintainability and portability for overall system acceptability. Descriptive statistical analyses were employed.
The outcomes indicated that IT experts assessed the system as highly performant, efficient, reliable and secure in terms of all ISO/IEC 25010 factors. The acceptability for the end users was also high as reflected by faster patient record retrieval, improved workflow, shorter time to script, increased prescription accuracy and usability. These results suggest that using Agile and assessed with international software quality standards an AI-assisted EHR/ordering application is highly promising to improve healthcare documentation, operational efficiency and data security in low-resource clinical environments.

Keywords: Intelligent Electronic Health Records, Prescription System, Agile Model

Introduction

Rural health units (RHUs) in the municipalities of General Tinio and Papaya, Nueva Ecija continue to rely heavily on manual logbooks and handwritten medication records for patient documentation and prescription management. In such settings, patient information is frequently distributed across multiple paper-based records, making retrieval of past consultations, treatments, and prescriptions time-consuming and error-prone. These practices often result in lost or misfiled records, inconsistent documentation due to illegible handwriting, incomplete dosage information, drug duplication, and increased risk of prescription errors. Moreover, repetitive manual data entry creates bottlenecks in registration and consultation workflows, prolongs patient waiting times, and limits compliance with reporting requirements of local government units and the Department of Health. As local governments increasingly promote digital health initiatives, there is a growing demand for secure, efficient, and context-appropriate electronic health record (EHR) systems capable of supporting rural healthcare delivery.

The development of EHR systems has evolved over several decades, beginning with early electronic medical records in the 1960s that focused primarily on structured documentation and administrative support. By the 1990s and early 2000s, hospital information systems and standardized EHR frameworks expanded to address interoperability, safety, and privacy concerns. In low- and middle-income countries, digital health adoption accelerated through mobile health applications and portable EHR solutions designed to overcome infrastructure limitations. More recently, artificial intelligence (AI) has been introduced into health information systems, particularly in clinical documentation, record management, and prescription workflows,

demonstrating improvements in data completeness and clinician efficiency. However, existing evidence suggests that while AI-assisted systems reduce documentation burden and administrative workload, their effects on patient safety and clinical outcomes remain inconsistent, particularly in rural and resource-limited settings.

Electronic prescribing systems have been widely recognized for reducing transcription and handwriting-related errors, yet studies also report persistent challenges such as missing dosage instructions, workflow mismatches, and system usability issues. Clinical decision support systems integrated into EHRs show promise in improving prescribing processes, but evidence of long-term impact on medication safety remains mixed due to contextual variability and methodological limitations. These findings emphasize that the effectiveness of AI-enabled record management and prescription systems depends not only on perceived usefulness but also on software quality attributes such as usability, performance efficiency, reliability, security, maintainability, and portability.

The ISO/IEC 25010:2011 Software Product Quality Model provides a comprehensive framework for evaluating these critical quality characteristics, encompassing functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. Previous studies have demonstrated that healthcare information systems assessed using ISO/IEC 25010 exhibit higher acceptability, sustainability, and user satisfaction. Despite these advances, intelligent EHR and prescription systems remain underexplored in rural Philippine healthcare contexts, where challenges such as limited infrastructure, unstable internet connectivity, and minimal technical support persist.

Given these gaps, there is a clear need for the design and systematic evaluation of an AI-driven electronic health record and prescription system tailored for low-resource clinic environments. This study addresses this need by developing and assessing an intelligent EHR and prescription system for RHUs in General Tinio and Papaya, Nueva Ecija, using the ISO/IEC 25010 Software Product Quality Model. By integrating international software quality standards with local healthcare workflows, the study aims to determine whether such a system can improve documentation accuracy, reduce prescription errors, enhance workflow efficiency, and support sustainable digital transformation in rural healthcare settings.

Research Problem

This study aimed to design and assess the quality of an Intelligent Electronic Health Record and Prescription System for health facilities in General Tinio and Papaya, Nueva Ecija, in accordance with ISO/IEC 25010.

Specifically, it sought answers to the following questions:

1. How may the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings **be** *designed and developed* **following the phases of the Agile Model in terms of the following:**

1.1 defining functional and technical requirements;
1.2 system and database design;
1.3 iterative development and sprint implementation;
1.4 user acceptance testing with healthcare workers; and
1.5 deployment in the pilot RHU?

2. How may the IT experts evaluate the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings **based on the ISO/IEC 25010 software quality characteristics:**

2.1 functional suitability;
2.2 performance efficiency;
2.3 compatibility;
2.4 usability;
2.5 reliability;
2.6 security;
2.7 maintainability; and
2.8 portability?

3. How may the end-users evaluate the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings based on the selected ISO/IEC 20510 standards:

3.1 Functional Suitability
3.2 improved record retrieval time, and
3.3 enhanced workflow efficiency?

4. How may the end-users evaluate the acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of the following:

4.1 reliability;
4.2 security;
4.3 ease of use; and
4.4 satisfaction?

Research Methodology

This study employed a developmental–descriptive research design utilizing the Agile model of system development with quantitative evaluation based on the ISO/IEC 25010:2011 Software Product Quality Model. The developmental component supported iterative system design, prototyping, testing, and refinement of an AI-driven electronic health record and prescription system intended for low-resource clinic settings, while the descriptive component measured system quality, performance, and user acceptance among IT experts and end users. Agile development enabled flexible and continuous improvement through short cycles of requirements analysis, system design, development sprints, testing, deployment, and user feedback, ensuring alignment with real-world healthcare workflows and the operational needs of Rural Health Units (RHUs) in General Tinio and Papaya, Nueva Ecija.

The study was conducted in selected health facilities in the municipalities of General Tinio and Papaya, Nueva Ecija, Philippines, which represent typical rural healthcare environments undergoing gradual digital transformation. These sites were purposively selected due to their limited resources, varying infrastructure conditions, and support from local health authorities, providing a realistic setting for evaluating system functionality, usability, reliability, security, and efficiency. Respondents included 50 health personnel, comprising doctors, nurses, midwives, pharmacists, medical technologists, administrative staff, and IT experts, who were purposively sampled as end users and evaluators of the system's quality across the eight ISO/IEC 25010 characteristics.

Data were collected using a structured questionnaire based on the ISO/IEC 25010 model, employing a 4-point Likert scale to assess Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. Data gathering involved ethical clearance, coordination with health administrators, participant orientation, survey distribution, and system log analysis, with all data processed using descriptive statistical techniques such as weighted mean and standard deviation. Ethical principles were strictly observed through informed consent, confidentiality, voluntary participation, and compliance with the Philippine Health Research Ethics Board guidelines and the Data Privacy Act of 2012 (RA 10173), ensuring the protection of respondent rights and data integrity throughout the study.

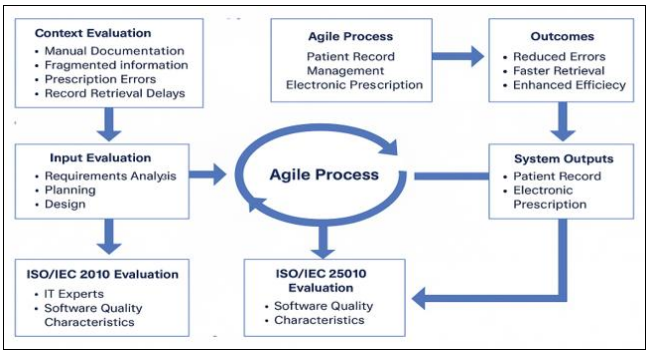

Fig 2: Agile Development Model

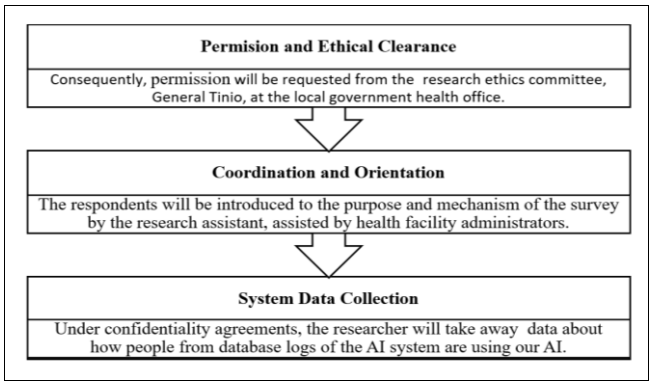

Fig 4: Data Gathering Procedure

Results and Discussion

1. Design and Development of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings

This section explains the development of the proposed system using Agile Model, Research Problem 1. The design phase included all stages of planning, requirement definition, system and database modelling and graphic user interface prototyping. The task could be done instantly by facilitating the users to make changes without spending much time on designing. The whole time, feedback from healthcare providers, administration, and IT personnel was included to ensure that real clinic workflow problems, such as manual record handling, delayed access to patient history, or prescription errors for handwritten notes, were addressed by the system.

1.1 Defining Planning and Requirements Gathering Phase

The planning and user need analysis have been the first building blocks in the design of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics. In this phase, which was the needs assessment, actual needs and difficulties encountered in the rural health units of General Tinio, Papaya, Nueva Ecija were determined. The aim was to have the system requirements result from actual clinic needs, not assumed technological available solution.

Data for this phase was collected through informal conversations and discussions with medical personnel consisting of doctors, nurses, administrative staff and some IT experts. This sharing of information revealed similarities in pain points, such as, manual and scattered patient records that made it hard to refer back to patient histories medication errors resulting from handwriting too many logs when nurses are in a rush waiting for hours during busy clinic hours needing secure and safe data storage. The study also scrutinized applicable Department of Health (DOH) policies and the Data Privacy Act of 2012 (RA 10173) to establish adherence with local standards.

Based on these inputs, the major system requirements were developed. These were a centralized electronic patient record system, AI supported prescription assistance to decrease medication errors, role-based access controls to secure sensitive information and a plain, user-friendly UI meant for low resource clinic places. The identified features were then structured based on types of requirements input, process, and output operating needs if you will that could be easily translated into system capabilities. This phase maximized the degree of "real world" user needs and manual healthcare task-based system development guidance.

Fig 5: Gantt Chart of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics

The researcher made use of a Gantt Chart to plan and control the creation of the Intelligent Electronic Health Records and Prescription System for Low Resource Clinics. The Gantt Chart model was used to visualize when and for how long implementation activities took place during the Agile stages planning requirements, iterative design and prototyping, development cycles, as well as testing, deployment and feedback.

Using these means of scheduling also helped to manage time effectively, maintain tracking on progress and coordinate development tasks appropriately within the project. It also made itself compatible with Agile Development Model as the timelines could be altered to match the system requirements that changed, ever so often.

The planning created an organized, user driven, standards aligned basis for subsequent system design, development and evaluation such that the end system would meet the real operational needs of low resource clinical settings.

1.2 System and Database Design Phase

After analysis and requirement, the study moved to system and database design as per SOP 1.2. This phase modeled the approved requirements into system structures example, context diagram, data flow diagrams and database structures in Table 2, entities relationships table design, for correct record storage, access security and processing of prescriptions in a reliable manner. Iterative prototyping was performed in the design phase to verify workflow, screen design and user interaction before full sprint development.

Data Flow Diagram

At that point, a Context Diagram (DFD Level 0) was created to illustrate the Intelligent Electronic Heath Records and Prescription System for Low Resource Clinics at higher level. The diagram shows the system as one unified process and it stakes out its territory by identifying the principal external entities that interact with it. These entities are as follows, Doctors, Healthcare Staff, Administrative Workers and IT Personnel.

The diagram identifies the main data exchanges between the system and such entities. These data flows are, Patient registration information Reception record Prescription entry AI assist with e-prescription Request to access System report Audit trail Presenting these interactions at a conceptual level enables us to easily see how information is input into, processed by and output from systems. This mockup helped ensure that all critical system interactions were identified and mapped onto real world clinical processes in low-resource healthcare facilities.

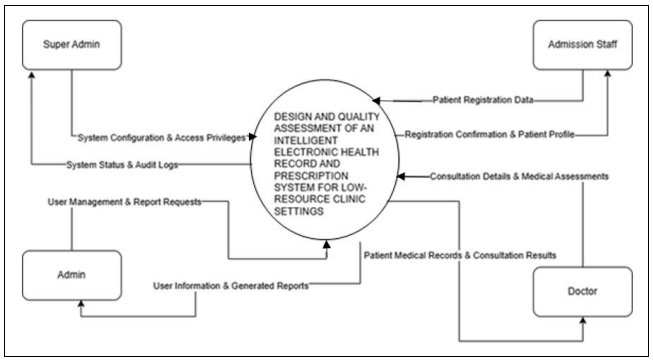

Fig 6: Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics – Context Diagram

The Context Diagram has been an important tool in the model prototyping by detailing all interactions of the users and system outputs associated to electronic record management and prescription processing. The diagram, by presenting the system at an abstract level without showing internal processing details, enabled stakeholders to reach consensus on the scope of the system, the roles played by users and what data is externalized in early design. This early testing was important to assure integration with clinical practice and reduce the chances of scope and functionality problems later in the development process.

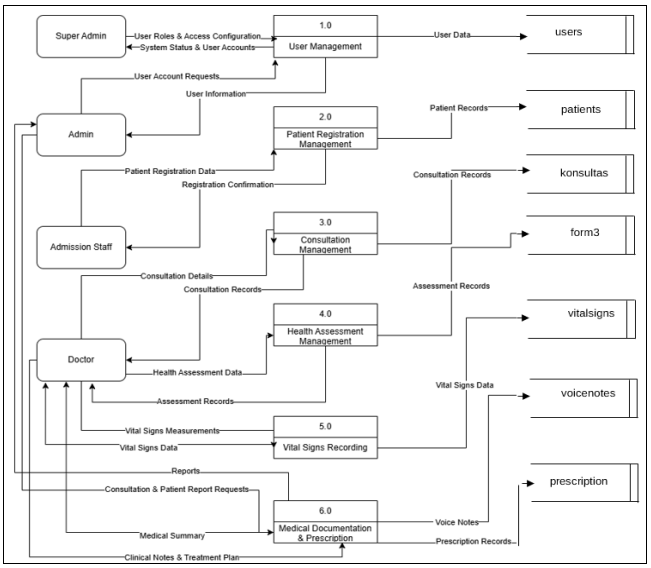

Fig 7: Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics – Data Flow Diagram Level 1

Based on the Context Diagram, the system design was refined by designing DFD Level 1. This diagram is an elaboration of the single process in the context diagram into several primary processes related to the intelligent EHR and prescription system for LRHC. This layer is to gain an inside understanding of data within the system and contribution of each process for executing electronic record management and prescription handling.

The Level 1 diagram divides system into the following six main processes: User Authentication and Access Control, Patient Registration and Record Management Clinical Consultation and Documentation Prescription Generation and Validation AI Assisted Prescription Support Report page & System Administration. Every process sends and retrieves to the appropriate datastores specified, User Accounts, Patient Data, consult onto Prescription Records and Audit Logs, ensuring that data is stored /retrieved accurately and managed within the system integrity.

The diagram also shows the communications with the system from its external entities like Doctors, Healthcare Staff, Administrative Personnel and IT Administrators. Inputs The inputs to our workflow are entered by doctors and healthcare workers, such as login credentials, patient details, consultation notes or a list of prescription entries; the outputs they receive in return are full patient history, AI based prescription recommendations, prescribed medication lists and clinical summaries. Clerks use patient registration, scheduling and report requests systems in interaction with PAS for outputs such as operational reports and manifest results. User accesses, system settings, access to IT Administrators regulate and see log of systems audit report and system performances.

By showing the internal functions and their related data transfers, the DFD Level 1 aligns with Context Diagram and balances according to a set rule in data flow modeling. This structured framework for representation also supports an iterative design process, allowing upfront validation of system operations, correctness of data, and alignment of workflows before transitioning to detailed development or prototype phases.

Entity Relationship Diagram

The database organization was projected from the Data Flow Diagram to the system's database with an Entity Relationships Analysis.

Figure 8 represents the logical structure of the data needed to implement core functions in the Intelligent Electronic Health Records and Prescription System for Low Resource Clinics. The main goal of the design is to provide a best approach for data storage, consistency and integrity in all operations performed by the system on patient record keeping and prescription processing.

The overall system has several entities, though the most important ones include User Accounts, Patients, Consultations, Medical Records, Prescriptions / Medications Details, Audit Logs and System Reports. Each object represents a particular piece of data that the system wants to track and carries along with it attributes, which describe its various essential characteristics. The system creates relationships between these entities using unique ID fields, so that the system for example can tie healthcare providers to patient records, or consultations with prescriptions, and the activities in the system are associated with tracking information for audit/reporting purposes.

Users are described in reference to the User Accounts entity, which is used for authentication and access control based on roles. Patient data is managed by means of patient and medical record entities, that lead to accurate recording of demographic information, history of consults dates as well as treatment history.

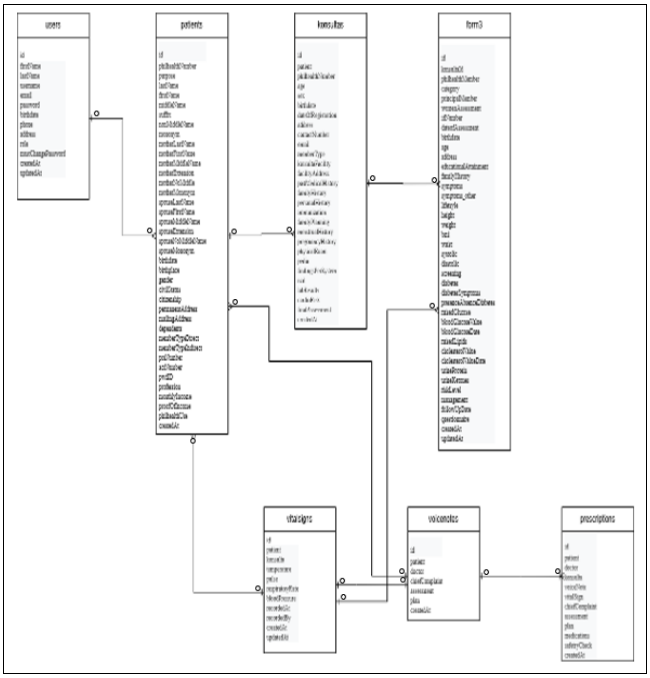

Fig 8: Entity Relationship Diagram of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics

Prescription-relevant information is stored as prescription and drug items are linked so that it can be clearly traced which drugs have been prescribed by a physician in what doses. System tracking and audit are enabled for through log entities that track what users do and how the system behaves. Reporting organizations aggregate appropriate data for purposes of managing an administration and decision process.

This design is followed Normalization Technique to reduce Space Redundancy and to maintain meaningful relationship between various entities. The structured schema means that data is stored, retrieved and analyzed correctly when using the system. Map to DFD By mapping the database design to our Data Flow Diagrams and identified system requirements, ERD provides a solid footing for implementation of the system in resource challenged clinical settings and for maintaining and extending it in the future.

Data Dictionary

The database structure of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics is described in detail in the Data Dictionary. It specifies the characteristics, type of data, size of fields and purposes of each table in the system. This documentation promotes consistency in defining and storing data and helping developers understand what's being used in the system.

The Data Dictionary is generated from the Entity Relationship Diagram and used as a quick reference for programmers who are involved with system building, updating or "fixing". It is a norm to specify each datum as it aids you to preserve the integrity of the data and ensure both your system updates are updated accurately over time.

Table 3: Users

Field Name	Data Type	Description
Id	INT	Unique identifier of the user
firstName	VARCHAR	User first name
lastName	VARCHAR	User last name
username	VARCHAR	Login username
email	VARCHAR	User email address
password	VARCHAR	Encrypted password
birthdate	DATE	User birthdate
phone	VARCHAR	Contact number
address	TEXT	User address
Role	VARCHAR	User role (SuperAdmin, Admin, Admission, Doctor)
mustChangePassword	BOOLEAN	Forces password change on first login
createdAt	DATETIME	Date created
updatedAt	DATETIME	Last update timestamp

Table 4: Patients

Field Name	Data Type	Description
Id	INT	Unique patient ID
philhealthNumber	VARCHAR	PhilHealth number
purpose	VARCHAR	Purpose of consultation
lastName	VARCHAR	Patient last name
firstName	VARCHAR	Patient first name
middleName	VARCHAR	Patient middle name
suffix	VARCHAR	Name suffix
noMiddleName	BOOLEAN	Indicates no middle name
mononym	VARCHAR	Single-name patient
motherLastName	VARCHAR	Mother's last name
motherFirstName	VARCHAR	Mother's first name
motherMiddleName	VARCHAR	Mother's middle name
motherExtension	VARCHAR	Mother's suffix
motherNoMiddle	BOOLEAN	No mother middle name
motherMononym	VARCHAR	Mother mononym
spouseLastName	VARCHAR	Spouse last name
spouseFirstName	VARCHAR	Spouse first name
spouseMiddleName	VARCHAR	Spouse middle name
spouseExtension	VARCHAR	Spouse suffix
spouseNoMiddleName	BOOLEAN	No spouse middle name
spouseMononym	VARCHAR	Spouse mononym

birthdate	DATE	Patient birthdate
birthplace	VARCHAR	Place of birth
gender	VARCHAR	Gender
civilStatus	VARCHAR	Civil status
citizenship	VARCHAR	Citizenship
permanentAddress	TEXT	Permanent address
mailingAddress	TEXT	Mailing address
dependents	INT	Number of dependents
memberTypeDirect	BOOLEAN	Direct PhilHealth member
memberTypeIndirect	BOOLEAN	Indirect PhilHealth member
praNumber	VARCHAR	PRA number
acrNumber	VARCHAR	ACR number
pwdID	VARCHAR	PWD ID number
profession	VARCHAR	Profession
monthlyIncome	DECIMAL	Monthly income
proofOfIncome	VARCHAR	Income document
philhealthUse	BOOLEAN	PhilHealth usage
createdAt	DATETIME	Date registered

Table 5: Konsultas

Field Name	Data Type	Description
Id	INT	Konsulta record ID
patient	INT	Patient ID
philhealthNumber	VARCHAR	PhilHealth number
Age	INT	Patient age
Sex	VARCHAR	Patient sex
birthdate	DATE	Birthdate
dateOfRegistration	DATE	Registration date
address	TEXT	Patient address
contactNumber	VARCHAR	Contact number
email	VARCHAR	Email address
memberType	VARCHAR	Membership type
konsultaFacility	VARCHAR	Facility name
facilityAddress	TEXT	Facility address
pastMedicalHistory	TEXT	Past medical history
familyHistory	TEXT	Family medical history
personalHistory	TEXT	Personal health history
immunization	TEXT	Immunization history
familyPlanning	TEXT	Family planning data
menstrualHistory	TEXT	Menstrual history
pregnancyHistory	TEXT	Pregnancy history
physicalExam	TEXT	Physical exam findings
pedia	TEXT	Pediatric data
findingsPerSystem	TEXT	System findings
Ncd	TEXT	Non-communicable diseases
labResults	TEXT	Laboratory results
cardioRisk	TEXT	Cardio risk assessment
finalAssessment	TEXT	Final medical assessment
createdAt	DATETIME	Record creation date

Table 6: Form3

Field Name	Data Type	Description
id	INT	Form 3 ID
konsultaId	INT	Konsulta ID
philhealthMember	VARCHAR	PhilHealth member name
category	VARCHAR	Assessment category
principalMember	VARCHAR	Principal member name
womenAssessment	TEXT	Women health assessment
idNumber	VARCHAR	ID number
dateOfAssessment	DATE	Assessment date
Birthdate	DATE	Birthdate
Age	INT	Age
Address	TEXT	Address
educationalAttainment	VARCHAR	Education level
familyHistory	TEXT	Family history
Symptoms	TEXT	Reported symptoms
symptoms_other	TEXT	Other symptoms
Lifestyle	TEXT	Lifestyle data
Height	DECIMAL	Height
Weight	DECIMAL	Weight
Bmi	DECIMAL	BMI
Waist	DECIMAL	Waist circumference
Systolic	INT	Systolic BP
Diastolic	INT	Diastolic BP
Screening	TEXT	Screening results
Diabetes	BOOLEAN	Diabetes indicator
diabetesSymptoms	TEXT	Diabetes symptoms
presenceAbsenceDiabetes	BOOLEAN	Diabetes presence
raisedGlucose	BOOLEAN	Raised glucose
bloodGlucoseValue	DECIMAL	Glucose value
bloodGlucoseDate	DATE	Glucose test date
raisedLipids	BOOLEAN	Raised lipids
cholesterolValue	DECIMAL	Cholesterol value
cholesterolValueDate	DATE	Cholesterol test date
urineProtein	BOOLEAN	Urine protein
urineKetones	BOOLEAN	Urine ketones
riskLevel	VARCHAR	Risk level
management	TEXT	Management plan
followUpDate	DATE	Follow-up date
questionnaire	TEXT	Questionnaire result
createdAt	DATETIME	Date created
updatedAt	DATETIME	Last update

Table 7: Vitalsigns

Field Name	Data Type	Description
Id	INT	Vital signs ID
patient	INT	Patient ID
konsulta	INT	Konsulta ID
temperature	DECIMAL	Body temperature
pulse	INT	Pulse rate
respiratoryRate	INT	Respiratory rate
bloodPressure	VARCHAR	Blood pressure
recordedAt	DATETIME	Date recorded
recordedBy	INT	Recorded by user
createdAt	DATETIME	Created date
updatedAt	DATETIME	Updated date

Table 8: Voicenotes

Field Name	Data Type	Description
Id	INT	Voice note ID
patient	INT	Patient ID
doctor	INT	Doctor ID
chiefComplaint	TEXT	Chief complaint
assessment	TEXT	Medical assessment
Plan	TEXT	Treatment plan
createdAt	DATETIME	Date recorded

Table 9: Prescriptions

Field Name	Data Type	Description
Id	INT	Prescription ID
patient	INT	Patient ID
doctor	INT	Doctor ID
konsulta	INT	Konsulta ID
voiceNote	INT	Voice note reference
vitalSign	INT	Vital signs reference
chiefComplaint	TEXT	Chief complaint
assessment	TEXT	Diagnosis
Plan	TEXT	Treatment plan
medications	TEXT	Prescribed medicines
safetyCheck	TEXT	Safety checks
createdAt	DATETIME	Date issued

Used-Case Diagram

Functional interactions between users and the Intelligent Electronic Health Records and Prescription System for Low

Resource Clinics, are shown in the Use Case Diagram. It shows the users perspective of how they interact with the system and who can do what.

This figure helps provide definition of the system scope, organization and articulation of users' roles and tasks, and contributions to identifying functional requirements before any development or implementation.

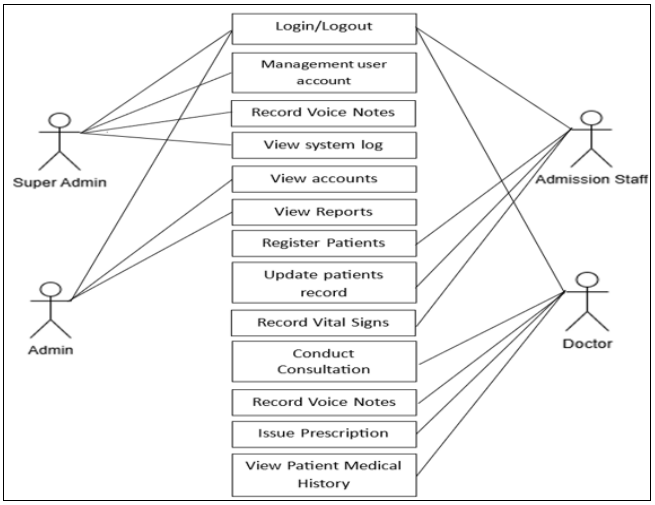

Fig 9: Use Case Diagram of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics

The Use Case Diagram of the Intelligent Electronic Health Records and Prescription System for Low Resource Clinics will provide a simple looking to the functional aspects of our system by showing how users in their different roles Actors will use our system. It characterizes the main actors, Super Admin, Admin, Admission Staff and Doctor, and describes system functions supported by them. Standard actions such as login and logout are built in and shared by all users to provide secure and role-based access.

In this diagram, administrative users are presented as dealing with accounts, roles, system logs, and reports, prescription history. The Use Case Diagram assists in the validation of system requirements by defining user responsibilities who/what interacts with the system and enforced boundaries between systems throughout the design phase, shaping processes from early stages and through to implementation & access control across the life cycle of a system.

System Architecture

The system was developed under structured web-based system architecture to address streamlined clinical service provision, secured data management and precise clinical diagnosis. The architecture specifies how the system is structured in terms of components and describes how users, system services, and data are related to support management of patient records and processing of prescriptions in resource constrained clinical settings.

With this architecture, the system facilitates a seamless interaction between healthcare personnel and digital services and provides real time access to the patient information, secure processing of medical data, and responsive performance of the system. In rural/underserved healthcare contexts, the structured approach can serve as anchor to incorporate intelligent elements and enhance process efficiency and data enabled decision making.

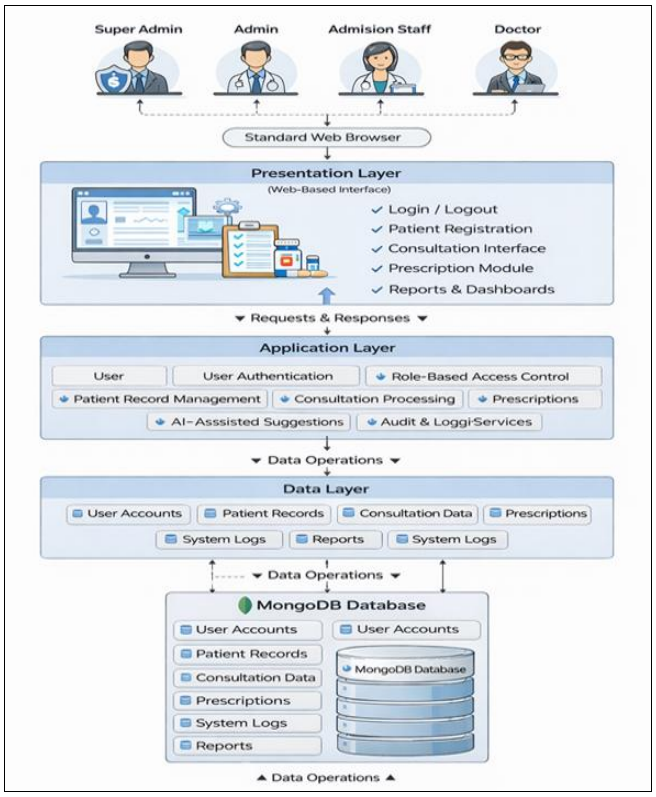

Fig 10: System Architecture of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinics

The structure of the Intelligent Electronic Health Records and Prescription System for Low Resource Clinics is designed in layers, namely, the presentation layer, application layer, and data layer. The architecture supports scalability, maintainability, and flexibility required for a health system developed using Agile Model. By decoupling system concerns into layers, improvements to functionality such as electronic records management, prescription processing, security controls and AI enabled decision support can be added without destabilizing the whole.

The presentation layer is the user interface of the system and it can be accessed by Super Admins, Admins, Admission Staff and Doctors using any popular web browsers. This layer offers user-specific interfaces for roles such as patients, prescriptions, consultation records, and viewing reports. The end-user interfaces are kept minimalistic and self-explanatory, so as to be usable for healthcare workers with limited technical skills. Drill down templates, organized screens and guided navigation help minimize data entry errors and promote efficient use when clinics are most busy especially in low-resource settings.

The application layer is the main controller of the system which contains the business logic and operational rules. This layer manages user authorization, patient management, consultation workflows, prescription approval cycle and auditing. It takes information such as patient details, vital signs, consultation notes and prescriptions as input and thus makes sure that what is done is in line with predefined workflows and access rights. The AI supported prescription layer of the system will work within this plane by presenting decision-support recommendations according to the available patient information alongside retaining clinician control over ultimate treatment decisions. Log and monitor services also work at this level to hold accountable and trace the system.

Data tier serves as a central location for all system information and is applied using document-based database software. And, it incorporates user accounts, patient records, consultation data, prescription records, system logs and reports. The flexible structure of data supports the volatility in healthcare information, as records may be modified time to time according to patients' revisits. The integrity and consistency of the data is guaranteed by solid relationships between entities man, patient, consultation, prescription in accordance to the standards set forth by the Entity Relationship Diagram/ Data Dictionary.

The application layer interface can be separated in two different directions: from the Presentation Layer to Application Layer structured web requests and from the Data Layer to Application Layer controlled data operations. This layer of interaction model guarantees that such patient private information is tread with proper security in relation to the Data Privacy Act of 2012 (RA 10173). Real time updating of patient profile and prescriptions, reports features in the architectural design thus facilitating quicker clinical decisions and faster service delivery.

In summary, the system architecture lays a strong and feasible groundwork for developing an intelligent electronic health records and prescription application in under resourced clinical settings. Through such an approach that integrates technical design with the needs of healthcare workflow and Agile software development, the architecture enables enabling accurate documentation, secure access of data, efficient prescription processing and improved operational efficiency which all in turn contribute to an overall improvement in care delivery, particularly among rural or underserved communities.

System Module

The Developed System the Intelligent Electronic Health Records and Prescription System for Low Resource Clinics consists of a number of connected modules that inter operate to enable efficient recording and retrieval of patient records as well as security in handling data and prescription issuance. Each module is crafted to serve in a capacity and yet not impede upon the external part of the device architecture.

Together, these modules streamline clinical workflows, minimize errors in manual documentation and enable data informed practice in resource limited healthcare services. Instead of leading to monolithic applications, the system is designed as a number of clear modules where functions are concentrated it is thus flexible, maintainable and able to evolve.

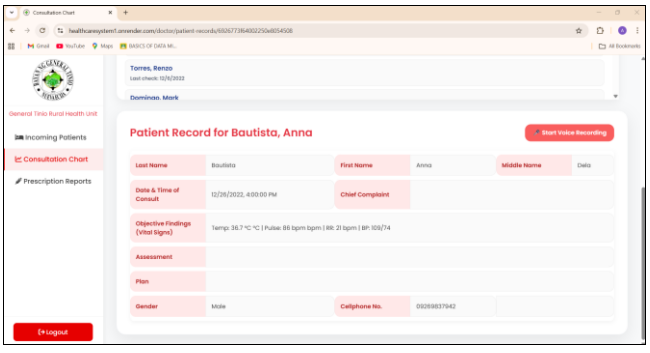

Fig 11: Consultation Chart / Patient Record Module

Consultation Chart and Patient Record Management Module of General Tinio Rural Health Unit is simply a software geared to assist the Doctor in patient consultation keeping, review and management. The digital module allows including patient history, clinical consult records and findings, medical assessments and treatment plans to be captured in a single location for accurate, well organized and reliable reference of healthcare within the RHU.

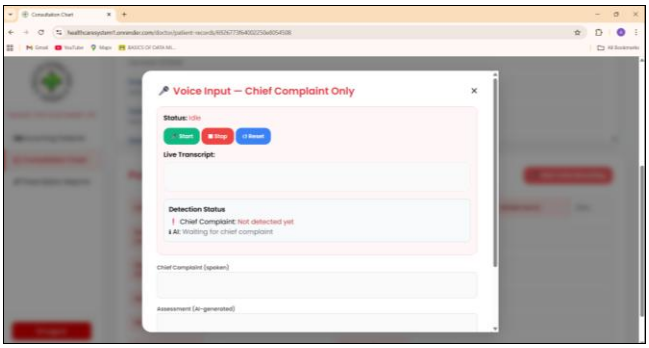

Fig 12: AI Voice-Assisted Consultation Module

The AI Voice-Assisted Consultation Module, of General Tinio Rural Health Unit, is developed to assist the Doctor by facilitating hands-free documentation during patient consultation. In this module, the Doctor vocalizes the chief complaint and Artificial Intelligence in the system automatically processes that spoken input to come up with a suggested assessment and plan. This function is facilitated by providing useful consultation and an accurate and organized clinical record.

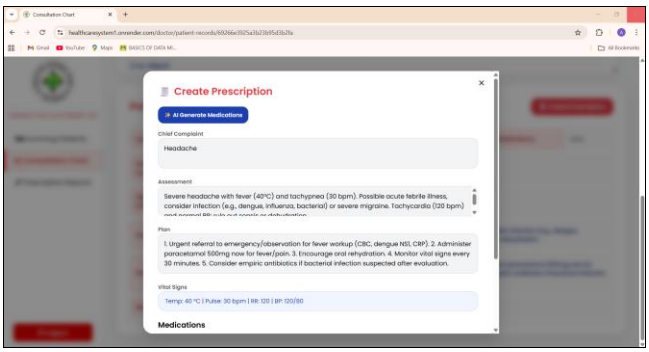

Fig 13: AI-Generated Prescription Module

The AI Generated Prescription Module of the General Tinio Rural Health Unit. So that The Doctor can generate A Reliable and Standardized Prescription, Fast Recommended medications are subsequently auto populated based on the entered chief complaint, computer assisted physician documentation; Vital signs and AI generated assessment, plan of care. The Doctor checks amends if necessary and signs off the prescription when it is complete, then saves it as a PDF to print for the patient.

2. IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings

The following discussions present the data gathered in terms of the evaluation of the IT experts regarding the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings **based on the ISO/IEC 25010**

software quality characteristics in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

2.1 Functional Suitability

Table 10 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of functional suitability.

Table 10: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Functional Suitability

S. No	Functional Suitability	Mean	Verbal Description
1	**Functional completeness.** Set of functions covers all the specified tasks and user objectives.	4.00	Highly Functional
2	**Functional correctness.** Provides the correct results with the needed degree of precision.	4.00	Highly Functional
3	**Functional appropriateness.** The functions facilitate the accomplishment of specified tasks and objectives.	4.00	Highly Functional
	Overall Mean	**4.00**	**Highly Functional**

Table 10 shows the IT experts' evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of functional suitability. As shown, item 1 "Functional completeness - Set of functions covers all the specified tasks and user objectives", item 2 "Functional correctness - Provides the correct results with the needed degree of precision" and item 3 "Functional appropriateness - The functions facilitate the accomplishment of specified tasks and objectives" all obtained a mean of 4.00 verbally described as highly functional.

Thus, the IT experts evaluated the functional suitability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings with an overall mean of 4.00 verbally described as highly functional which is verbally interpreted that the system has fully met the stated and implied needs and no weaknesses were found.

The system fully satisfied its users' and technical requirements, with no functional limitations expressed by the IT specialists, consistent with recent studies that emphasize the necessity for complete and accurate functioning of medical information systems (Danso & Lasim, 2024) [15].

2.2 Performance Efficiency

Table 11 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of performance efficiency.

Table 11: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Performance Efficiency

S. No	Performance Efficiency	Mean	Verbal Description
1	**Time behavior**. The response and processing time and throughput rate of the system meet the requirements when it functions.	4.00	Highly Efficient
2	**Resource utilization.** The amount and type of resources used by the system meet the requirements when it functions.	3.80	Highly Efficient
3	**Capacity.** The maximum parameter limits of the Design and Quality Assessment of an Intelligent EHR And Prescription System For Low-Resource Clinic Settings developed meet requirements.	4.00	Highly Efficient
	Overall Mean	**3.93**	**Highly Efficient**

Table 11 presents the IT experts' assessment of the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of performance efficiency. The system obtains a mean average score of 3.93 and it is judged to be Highly Efficient from the spoken term which shows good performance for low-resource clinical usages. For the indicators, best time behavior and capacity (mean 4.00) was achieved, portraying a responsive system that uses data optimization to minimize IH degradation due to predictable loads. The findings are in line with the recommendations of ISO/IEC 25010 that, for health information systems to adequately support clinical workflows, there must be optimal response time and enough capacity. Resource utilization, however, was rated worst at a mean rating of 3.80 and labeled verbally as Highly Efficient.

This means the system already makes good use of hardware, software resources and that has limited room for future improvements.

In conclusion, the findings support that this system can perform real-time patient record management and prescription processing in low-resource clinics. Fast and reliable, the system optimizes clinical flow by reducing time delays in documentation and prescribing during clinic hours (Kimiafar *et al*., 2025) [25].

2.3 Compatibility

Table 12 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of compatibility.

Table 12: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Compatibility

S. No	Compatibility	Mean	Verbal Description
1	**Co-existence.** The system can efficiently perform its functions while sharing common environment and resources with other products. It has no detrimental impact on any other product.	4.00	Highly Compatible
2	**Inter-operability**. Two or more system components can exchange information and use the information that has been exchanged.	3.80	Highly Compatible
	Overall Mean	**3.90**	**Highly Compatible**

An average of 3.90 appears in Table 12, this can be interpreted as Highly Compatible. The average item coexistence with another application under the same environment was 4.00 which is high enough to not have

conflict and/or finally lead to performance decreases on the system level when it works side by side with other applications in the same environment. This is especially important for rural health facilities where digital tools typically have to compete with restricted infrastructure. It was unsurprisingly, therefore, the lowest mean score in ease of interoperability means, 3.80, suggesting that while it transfers and utilizes information in another system new developments could further support data integration.

These findings are consistent with other studies that have identified system interoperability as a systemic dimension of digital health systems, and in particular in relation to service coordination and continuity of care.

Enhancing interoperability is crucial for health information systems, as standards-based data sharing ensures continuity of care and supports informed decision-making when patients access services across various facilities and settings (Lee *et al*., 2025) [27].

2.4 Usability

Table 13 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of utility.

Table 13: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Usability

S. No	Usability	Mean	Verbal Description
1	**Appropriateness recognizability.** Users can recognize whether the system is appropriate for their needs.	4.00	Highly Usable
2	**Learnability**. The system can be used by specified users to achieve specified goals of learning: to use the system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.	4.00	Highly Usable
3	**Operability.** The system has attributes that make it easy to operate and control.	4.00	Highly Usable
4	**User error protection.** The system protects users against making errors.	4.00	Highly Usable
5	**User interface aesthetics.** User interface of the system enables pleasing and satisfying interaction for the user.	4.00	Highly Usable
6	**Accessibility.** The system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.	3.20	Usable
	Overall Mean	**3.87**	**Highly Usable**

Table 13 presents the IT experts' scores for usability of the system, yielding a global average of 3.87, which is labeled as "Highly Usable" in words. All five indicators, relevance, recognizability, learnability, operability, protections against errors, and user interface aesthetics, obtained a maximum mean of four; this means that the system is easy to use, intuitive, and also aesthetically pleasing, thereby decreasing users' poor operations. These findings indicate that the implemented system design caters proficiently to users with different levels of technical experience. The mean score for accessibility was 3.20, this is worded as Usable which means that although the system can be generally accessed by most people, there are factors impeding access which restrict this to support users over a broader spectrum of physical, technical and context capability. One reason is that the system was initially developed for standard desktop and web use at rural health units, for which interface optimization for assistive technologies like screen readers, keyboard based navigation or adjustable text size was not much of a focus.

Variation in the digital literacy of users and hardware resources available to low-resource clinics might have also contributed to this rating. There are health workers using older equipment, smaller screens, poor network which may affect the ease of access and interaction with the system. The software can be adapted for users with visual or motor control impairments, as well as those unused to digital systems.

The lack of advanced localization and personalization features including multi contrast support, translation services and role-tailored interfaces stands also for the lower accessibility score. Within a rural healthcare setting where staffing roles, workloads, and technical expertise are very different across employee groups, such as the facility in which this study took place, these characteristics have specific relevance.

In summary, the accessibility score of 3.20 suggests that the system is sufficiently functional for most daily clinical tasks and yet also identifies areas where improved performance may be achieved. Addressing these accessibility concerns through subsequent iterations of the system would increase inclusivity, promote broader user acceptance and normalize the system against ISO/IEC 25010 usability and accessibility guidelines.

Emerging evidence from hospital information systems research indicates that the usability is positively related to efficiency, user satisfaction and error avoidance and is a necessity for successful health IT implementations (Kimiafar *et al*., 2025) [25].

2.5 Reliability

Table 14 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of reliability.

Table 14: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Reliability

S. No	Reliability	Mean	Verbal Description
1	**Maturity**. The system meets needs for reliability under normal operation.	3.80	Highly Reliable
2	**Availability**. It is operational and accessible when required for use.	4.00	Highly Reliable
3	**Fault tolerance**. It operates as intended despite the presence of hardware or software faults.	4.00	Highly Reliable
4	**Recoverability**. In the event of an interruption or a failure, the system can recover the data directly affected and re-establish the desired state of the system.	4.00	Highly Reliable
	Overall Mean	**3.95**	**Highly Reliable**

Table 14 provided the IT experts' judgment about system reliability average value 3.95 and verbally equal to highly reliable. The provision of cues such as availability, fault

tolerance and recoverability scored the highest mean value of 4.00, indicating that even in the face of a failure, the system is still available for end users to access resources and data has is recovered after an interruption. These features are important in the health care area where operability is mandatory for patient safety. The ACP was the most immature most unstable, with a mean of 3.80, but still very reliable, meaning that, although under extreme circumstances the system behaves poorly or distantly from the reference could show signs of instability in long-term operation such monitoring would probably consolidate its reliability.

These findings align with the current Health IT program requirements: Dependability is viewed as a precondition to build clinical confidence a system continuity. Such systems, as they are implemented in electronic health records and electronic prescribing, depend on reliability, since even a small amount of downtime or failure results in disrupted care, delays in documentation, and compromised patient safety (Torab-Miandoab *et al*., 2024).

2.6 Security

Table 15 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of security.

Table 15: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Security

S. No	Security	Mean	Verbal Description
1	**Confidentiality.** The system ensures that data are accessible only to those authorized to have access.	3.80	Highly Secured
2	**Integrity.** It prevents unauthorized access to, or modification of, computer programs or data.	4.00	Highly Secured
3	**Non-repudiation**. Its actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later.	4.00	Highly Secured
4	**Accountability**. Actions of the entity can be traced uniquely to the entity.	4.00	Highly Secured
5	**Authenticity**. It can prove that the identity of a subject or resource is the one claimed.	3.80	Highly Secured
	Overall Mean	**3.92**	**Highly Secured**

Table 15 The average value of security dimension. As appraised by IT experts, it stands at Mean, 3.92 generally interpreted as Highly Secured. It was also observed that integrity, non-repudiation, and accountability had the highest means of 4.00 which reveals that in any case a very high levels of preventive measures are available to keep out unauthorized data alteration, traceable system operations and verify transactions. This turns out to be very important in safeguarding your most sensitive medical data. On the contrary end of the spectrum, from a trust point of view, access control and authenticity also had an average of 3.80 and were considered very secure, such indicating that their protocols for authentication were technically correct but there still exists room for improvement to further develop more effective methods.

In general, the results demonstrated adherence to established data security principles, as guided by healthcare security models and the Philippine Data Privacy Act.

Furthermore, in the Philippine setting, it is necessary for privacy and security to implement data controls in healthcare, as this involves sensitive personal information that needs to be protected under the framework of the Data Privacy Act and other issuances of the NPC (National Privacy Commission, 2024) [33].

2.7 Maintainability

Table 16 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of maintainability.

Table 16: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Maintainability

S. No	Maintainability	Mean	Verbal Description
1	**Modularity.** The system is composed of distinct components such that a change to one component has minimal impact on other components.	4.00	Highly Maintainable
2	**Reusability.** The asset can be used in more than one system, or in building other assets.	4.00	Highly Maintainable
3	**Analyzability.** It is possible to assess the impact of the Design and Quality Assessment of an Intelligent EHR And Prescription System For Low-Resource Clinic Settings System on an intended change to one or more of its parts, or to diagnose the system for deficiencies or causes of failures, or to identify parts to be modified.	4.00	Highly Maintainable
4	**Modifiability.** The system can be effectively and efficiently modified without introducing defects or degrading existing product quality.	4.00	Highly Maintainable
	Overall Mean	**4.00**	**Highly Maintainable**

Table 16 presents the IT experts' evaluation of maintainability, where each criterion, structural Modularity, Reusability, Analyzability, and Modifiability, has resulted in a mean of 4.00, leading to an overall estimate of an equivalent mean, which corresponds to "Highly Maintainable."

This implies that the system is well organized and analyzable, and changes or extensions can be made without errors. Those are important features for healthcare systems operating in changing clinical environments where updates and improvements are often necessary.

This observation is consistent with the state of the art in software engineering, which emphasizes "modularity" and "analyzability" as driving factors for sustainability in long-lived systems. Sustainable health software solutions ensure better quality improvement, more rapid defect corrections, and safer deployment of updates, which are critical for systems evolving with changing clinical and reporting needs (Gobov & Zuieva, 2025) [22].

2.8 Portability

Table 17 presents the IT Experts' Evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of portability.

Table 17: IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Portability

S. No	Portability	Mean	Verbal Description
1	**Adaptability**. The system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.	3.80	Highly Portable
2	**Installability.** Effectiveness and efficiency with which the system can be successfully installed and/or uninstalled in a specified environment.	4.00	Highly Portable
3	**Replaceability**. The system can replace another specified software product for the same purpose in the same environment.	3.80	Highly Portable
	Overall Mean	**3.87**	**Highly Portable**

Table 17 illustrates the IT experts' assessment of portability, resulting in an average of 3.87, which is verbally represented as Highly Portable. Installability, as an indicator, received a maximum mean of 4.00, which means that it is easy to install or uninstall the system in various contexts. Both adaptability and replaceability scored the lowest mean of 3.80, demonstrating that with the potential for adaptation to other platforms and replacement for equivalent software, additional modifications could be made to make it more flexible.

These findings highlight the importance of portability in order for digital health to operate across heterogeneous technological environments, most notably in low-resource settings. In the next 5 years, "portability could help scale digital health solutions across rural health care settings by lowering barriers to deploying and upgrading technology" (Lee et al., 2025) [27].

Table 18: Summary of the IT Experts' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings

Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings	Overall Mean	Verbal Description
Functional Suitability	4.00	Highly Functional
Performance Efficiency	3.93	Highly Efficient
Compatibility	3.90	Highly Compatible
Usability	3.87	Highly Usable
Reliability	3.95	Highly Reliable
Security	3.92	Highly Secured
Maintainability	4.00	Highly Maintainable
Portability	3.87	Highly Portable
Grand Mean	3.93	Excellent System Quality

Table 18 presents the IT experts' ratings on the Intelligent Electronic Health Records and Prescription system for Low Resource Clinic settings, where a grand mean score of 3.93 is interpreted as 'Excellent System Quality'. The features assessed displayed mean general values of 4.00 for functional suitability and maintainability, and a minimum value of 3.87 for usability and portability, which were also highly evaluated.

Overall, our results suggest that the system is compliant with international standards and can be deployed in resource constrained health care settings.

The use of ISO/IEC 25010 as a framework for the reference model facilitates the systematic specification, measurement, and evaluation of non-functional requirements in relation to the characteristic quality of software products, particularly those considered critical and complex, such as health information systems platforms (ISO/IEC, 2023).

3. End-Users' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings

Presented in the following discussions are the data gathered in terms of the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings based on the selected ISO/IEC 20510 standards in terms of Functional Suitability, improved record retrieval time, and enhanced workflow efficiency.

3.1 Functional Suitability

Table 19 presents the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of functional suitability.

Table 19: End-Users' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Functional Suitability

S. No	Functional Suitability	Mean	Verbal Description
1	The system enables me to document patient information more precisely.	3.96	Highly Functional
2	The prescribing tool helps me with my daily prescribing.	3.93	Highly Functional
3	The device facilitates increased accuracy and consistency in patient charting.	3.98	Highly Functional
4	The system functionalities correspond to the real RHU working process.	3.93	Highly Functional
5	The system generates high-quality presentations and prescriptions.	3.91	Highly Functional
	Overall Mean	**3.94**	**Highly Functional**

Table 19 presents the end-users' opinions regarding functional suitability, with an overall average rating of 3.94, which corresponds to 'High Functional'. The indicator showing that the system improves the accuracy and consistency of patient charting had a highest mean value of 3.98, indicating that it supported clinical documentation quite well. Meaning compared with other features was lowest in generating a good-quality presentation and prescription, 3.91, but it is also beneficial.

These results indicate the system's good fit with actual RHU team practices and workflows/workflows and its value-add for everyday clinical work, echoing studies that stress functionality as a driver of health IT uptake.

The functional fit of the professional use of EHR and prescriber tool facilitates safer documentation and better clinical decision making, as complete and correct

information is available for continuity of care (Lee *et al*., 2025) [27].

3.2 Performance Efficiency

Table 20 presents the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of performance efficiency.

Table 20: End-Users' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Performance Efficiency

S. No	Performance Efficiency	Mean	Verbal Description
1	The system helps me access patient files more quickly than before.	3.95	Highly Efficient
2	Navigation and loading times are acceptable during peak clinic hours.	3.89	Highly Efficient
3	The system does not hang when used regularly.	3.91	Highly Efficient
4	Several maintenance operations can be performed effectively without delay.	3.95	Highly Efficient
5	Performance remains consistent, even with a high number of queued patients.	3.95	Highly Efficient
	Overall Mean	**3.93**	**Highly Efficient**

Table 20 shows the end users perception of the system performance efficiency which resulted to an overall mean value of 3.93. The verbal interpretation given to this score is Highly Efficient. The maximum mean 3.95 occurred in the "rapid file access" and consistently rapid performance even under heavy patient load sub-indices. The least mean value 3.89 was for peak hour navigation & loading times, which are however considered as very efficient.

These findings suggest that the system is well-suited to time-sensitive clinical operations, highlighting the critical role of system responsiveness in patient care.

This means that the users have a fast access to records and an overall stable performance although during peak hour loadings further optimization is needed, which is related with the time behavior as we expect under ISO/IEC 25010 (ISO/IECD, 2023).

3.3 Usability

Table 21 presents the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of performance usability.

Table 21: End-Users' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Usability

S. No	Usability	Mean	Verbal Description
1	The interface is simple to use.	3.98	Highly Usable
2	Even I, with only average computer skills, can work the system.	3.95	Highly Usable
3	Buttons, menus, and labels are displayed clearly and legibly.	4.00	Highly Usable
4	I can process things faster on this system than using handwritten logs.	3.98	Highly Usable
5	In general, the system is straightforward to use.	4.00	Highly Usable
	Overall Mean	**3.98**	**Highly Usable**

Table 21 shows the Users' Ratings towards Usability which reflects 3.98 with Verbal Interpretation of Highly Usable. The cleanness of buttons, bars, and labels and overall ease of use had the highest means 4.00. On average computer skilled, users had the lowest mean 3.95 suggesting that both passive and advanced users are able to access the system.

These results reinforce the idea that making an interface more intuitive to use and easier to learn will increase user acceptance in medical environments. Problems of usability and performance may well be magnified under peak work demands in the health care setting.

Therefore, tracking response times and streamlining processes can help enhance user perceived efficiency while decreasing staff frustration (Kimiafar *et al*., 2025) [25].

Table 22: Summary of the End-Users' Evaluation of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings

Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings	Overall Mean	Verbal Description
Functional Suitability	3.94	Highly Functional
Performance Efficiency	3.93	Highly Efficient
Usability	3.98	Highly Usable
Grand Mean	**3.95**	**Excellent System Quality**

Table 22 presents the end-users' evaluation, with a grand mean of 3.95, which is verbally interpreted as Excellent System Quality. The highest overall mean was achieved by usability, while the lowest, however, was scored in a highly rated manner by functional suitability.

In general, the findings confirm that the system successfully facilitates end-users' operational goals and enhances healthcare service provision. Indeed, reports of recent studies that examined the usability of hospital information systems suggest that intuitiveness in interfaces and prevention of errors are often associated with improved task completion rates and user satisfaction (Kimiafar *et al*., 2025) [25].

4. End-Users' Evaluation of the Acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings

Presented in the following discussions are the end-users' evaluation on the acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of the reliability, security, ease of use, and satisfaction.

4.1 Reliability

Table 23 presents the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of reliability.

Table 23: End-Users' Evaluation of the Acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Reliability

S. No	Reliability	Mean	Verbal Description
1	The system functions stably in the daily operation of RHU.	3.91	Highly Acceptable
2	I can rely on the system for accurate clinic hours.	3.91	Highly Acceptable

3	Information on the system has been maintained as current and accurate.	3.91	Highly Acceptable
4	System functions rarely fail.	3.91	Highly Acceptable
5	The system supports the reliability of clinical documentation.	3.93	Highly Acceptable
	Overall Mean	**3.91**	**Highly Acceptable**

Table 23 shows a mean score of 3.91, verbally rated as "Highly Acceptable" from the end-users' perspective. All measurements yielded nearly the same means, confirming stable place performance during daily operations in RHU.

These results indicate that users can rely on the system to provide consistent and accurate clinical documentation. High user ratings for ease of use and fit for purpose are key because they predict continued adoption and successful usage of digital documentation and prescribing tools in everyday practice (Kimiafar *et al*., 2025) [25].

4.2 Security

Table 24 presents the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of security.

Table 24: End-Users' Evaluation of the Acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Security

S. No	Security	Mean	Verbal Description
1	I have confidence that the medical data is secure.	3.95	Highly Acceptable
2	Only those who have been specifically authorized to access the information can view it.	3.96	Highly Acceptable
3	The apparatus prevents inadvertent alteration of prescription information.	3.96	Highly Acceptable
4	Privacy measures are clearly implemented.	3.96	Highly Acceptable
5	It complies with the Data Privacy Act RA 10173.	3.98	Highly Acceptable
	Overall Mean	**3.96**	**Highly Acceptable**

Table 24, highly appeared in "It complies with the Data Privacy Act RA 10173" having mean score of 3.98 is described as Highly Acceptable. This means that AEC end-users are most reliable in terms of legal and regulatory data privacy compliance by the system.

On the contrary, the item with lowest mean is "I have confidence that the medical data is secure", which reached a mean of 3.95 even being verbally interpreted as Highly Acceptable. This implies that while users somewhat trust the security of the system as a whole, they are a little more skeptical on overall data security assurance than other areas.

The average Global perception mean for security is 3.96 which is translated as High Acceptable This indicates that the IEHR-PS system perceived from end-users point of view as being secure and dependable and sufficient to meet basic privacy, confidentiality, and security attitudes on low resource clinic settings.

The stated trust levels can be interpreted as the extent to which users count on the system to work well and behave correctly in their day-to-day RHU related activities, which reveals how important reliability can be for a patient record system (Torab-Miandoab *et al*., 2024).

4.3 Ease of Use

Table 25 presents the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of ease of use.

Table 25: End-Users' Evaluation of the Acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Ease of Use

S. No	Ease of Use	Mean	Verbal Description
1	I personally find it easy to use.	3.91	Highly Acceptable
2	I can get it done without micromanaging me.	3.93	Highly Acceptable
3	The system is guiding me through as I enter data.	3.93	Highly Acceptable
4	If I make a mistake, I can easily adjust it within the system.	3.95	Highly Acceptable
5	In general, the system is easy to use.	3.96	Highly Acceptable
	Overall Mean	**3.93**	**Highly Acceptable**

Table 25 subjective evaluation on ease of use from the end users. In particular, the mean value for verbal judgment was Highly Acceptable with a general 3.93. It was the highest average due to ease of error correction and flexibility, and user interactivity during acquisition. These statements reflect in the notion of robustness pitted against compliance and security deployments, with health data privacy's quest for transparency and visibility (National Privacy Commission, 2024) [33].

4.4 Satisfaction

Table 26 presents the end-users' evaluation on the Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in terms of satisfaction.

Table 26: End-Users' Evaluation of the Acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings in Terms of Satisfaction

S. No	Satisfaction	Mean	Verbal Description
1	I am satisfied with the system's overall performance.	3.95	Highly Acceptable
2	This system enhances my work as a healthcare provider.	3.95	Highly Acceptable
3	The system meets my expectations.	3.95	Highly Acceptable
4	I would endorse the system for regular use in our RHU.	3.96	Highly Acceptable
5	These are a valuable bet for enhancing care.	3.96	Highly Acceptable
	Overall Mean	**3.95**	**Highly Acceptable**

Table 26 Mean values reflect that it is acceptable at all, with a general mean value of 3.95, interpreted as: Highly Acceptable. A high average was also given to the endorsement for regular use, which indicates strong user approval and perceived utility of the system. This indicates

that users find the workflow to be overall negotiable and self-correctable, a factor conducive to consistent use and successful implementation in resource limited health systems (Kimiafar *et al*., 2025) [25].

Table 27: Summary of the End-Users' Evaluation of the Acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings

Acceptability of Intelligent Electronic Health Records and Prescription System for Low-Resource Clinic Settings	Overall Mean	Verbal Description
Reliability	3.91	Highly Acceptable
Security	3.96	Highly Acceptable
Ease of Use	3.93	Highly Acceptable
Satisfaction	3.95	Highly Acceptable
Grand Mean	**3.94**	**Highly Acceptable**

Table 27 presents an acceptability test, with a grand mean of 3.94, which is verbally interpreted as Highly Acceptable. Satisfaction showed the highest mean overall, and reliability the lowest, but at a level well above acceptability. Generally, there is high-end user acceptance and preparedness for continued use of the system. User satisfaction is often correlated with both system usability and perceived usefulness in clinical workflow, and it may be considered a determinant for the continued adoption of HIS (Kimiafar *et al*., 2025) [25].

Conclusions

1. The Agile Model yielded a viable and secure system that satisfied the users' needs of low resource rural health units, which is called Intelligent Electronic Health Record and Prescription System.
2. The developed system complied with all the ISO/IEC 25010 software quality characteristics, according to expert assessment by IT professionals, and exhibited adequate performance efficiency, high levels of compatibility and functionality, usability, reliability, security as well as good levels of maintainability and portability.
3. The system was well accepted by the end-users regarding prescription results and security, patient record retrieval time and efficiency of daily clinic operation.
4. Reliability, security, ease of use and overall user satisfaction were reported as high for the system coverage pointing to its potential implementability in low resource clinical environments.

Recommendations

1. For Healthcare Professionals (Physicians, Nurses, and Administrative Staff). Due to the very high scores in functional appropriateness, usability, performance efficiency and reliability, it is recommended that the Intelligent Electronic Health Record and Prescription System may be initiated for routine use among health practitioners. With routine use, the system will help to increase clinical documentation precision, diminish prescription errors and streamline workflow. Ongoing user engagement and periodic training for skills upgrading may be promoted to better optimize systems use with reliable application of the standardized digital documentation practice in rural health facilities.
2. For Healthcare Institutions and Administrators. Given the very good overall system quality, its high maintainability and a convincing security conformity we recommend healthcare institutions to institutionalize the system as part of their official health information infrastructure. Administrative personnel should budget for routine monitoring of the system, periodic maintenance, and incremental updates to keep performance capability and future reliability. Furthermore, institutions are advised to consider system interoperability with local government and Department of Health databases for integrated reporting, continuity of care, and health-managed data.
3. For Local Government Units and the Department of Health (DOH). At both the system level via conformance to ISO/IEC 25010 standards, and law through the Data Privacy Act of 2012, local government units LGUs and health department offices may utilize our system as a cost-effective scalable innovation in health intervention tools suitable for use within similar resource limited rural healthcare environments. The portability and security rating of the system also substantiate its possible use as a part of broader eHealth interventions that are in line with DOH eHealth Strategic Framework and Plan 2023–2028. Policy implications the results of this study can be a testament for policy makers to create standards that would guarantee safety, security and interoperability of digital health systems in the country.
4. For System Developers and IT Practitioners. This system is well rated with respect to all quality attributes of software, but further concentration should be made on improvement in low rated, although high interoperability and accessibility categories. Developers can follow standardized protocols for health data exchange with or without applying Universal Accessibility solutions to make their application available to a wide variety of users burdened by physical, socio technical and infrastructural barriers. Continued iterative refinement with the input of both user feedback and system performance will be needed to maintain system fitness for use amidst dynamic health care settings.
5. For Patients and the Local Community**.** Given the high levels in security, reliability and user satisfaction found across the end user studies although patients and lay community members will be able to make a contribution to or follow on this march toward digital health record systems. Increased understanding of how data privacy is safeguarded versus the benefits a system like this could bring may help raise public confidence and acceptance. Community outreach programs might be planned to inform patients on how digital health systems improve continuity of care, precision of information and effectiveness in service delivery in rural health care.
6. For Academic Institutions and Future Researchers. This analysis could be duplicated and expanded in the future, using the ISO/IEC 25010 Software Quality Model with other digital health systems, different clinical contexts or other geographical locations. Longitudinal research can be implemented to examine longitudinal patterns for healthcare outcomes, system sustainability and cost utility. This study could also

serve as a reference model for academia in terms of the incorporation of software quality assessment into research programs of health informatics, information technology, and healthcare management.

In general, the intelligent electronic health record and prescription systems deployments have to be gradually expanded, monitored and actively integrated in rural care delivery. By working together, clinical staff, administrators, policymakers and technologists can create an effective and safe system that adapts to the dynamic needs of low resource clinic settings and has a greater impact on healthcare quality and service delivery.

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