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Web-Based Medical Record Management System of Bambang National High School

A Capstone Project Proposal

Presented to the

Faculty of the School of Engineering, Architecture and Information Technology

Saint Mary's University

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CHAPTER I

PROBLEM AND REVIEW LITERATURE

Introduction

The World Health Organization (WHO) advised its member nations to develop long-strategic plans for eHealth or the use of ICT for health in 2005 after realizing the potential of leveraging information and communication technology (ICT) to improve the delivery of health services and systems. A national health information system strategy was adopted in the Philippines in 2007 (Claro-Acacio et.al, 2022).

The corona virus disease 2019 (Covid-19) has a great effect on the educational system in the Philippines. All colleges, universities, and schools have been ordered to close due to the epidemic. The entire system of education is being affected by this. Making decisions about the educational system's policy is difficult for policymakers. Online and offline teaching are both happening (Tarkar, 2020). Online platforms are utilized for teaching like Google Classrooms, WebQuest, and other online resources, yet the majority of teachers lack the necessary skills to deal with online education (Toquero, 2020). Teachers and students used smartphones to communicate messages, notes, and resources via text messaging, e-mail, Facebook Messenger, and Twitter because they had limited access to personal computers or unstable internet connectivity (Simbulan, 2020).

To monitor and safeguard the spread of Covid-19 in schools and in other institutions, pen and paper have traditionally been used to manually record medical

information, and this method has proven to be reliable. Contrarily, paper deteriorates over time and pen-written records fade, compromising the long-term viability of record-keeping, regardless of how secure the filing storage is. In the healthcare industry, consistency in documentation is highly appreciated since it enables the monitoring of patients' health, which may help to avoid more serious issues later in their life. Furthermore, a paper archive might be completely destroyed by fire, insects, and even water (Almacen & Cabaluna, 2021). A complete collection of patients' medical records stored in a computer system known as an electronic medical record (EMR) system offers vital clinical information about patients (Shahmoradi et al., 2017).

The importance of medical record management in preventing Covid-19 in school is to record and manage the medical records of the students with the use of computer technology without physical interactions made with the patients and/or students. A web-based medical record management for schools are relevant to prevent the spread of Covid-19. Moreover, it can also store the data faster in the system database without the use of the pen and paper.

Medical Record System

Health systems depended primarily on clinic information systems and international governmental organizations in reaction to Covid-19 (Reeves et al.,2019). The healthcare sector has experienced a massive improvement in how it operates and engages with patients and healthcare providers. Information digitization and a variety of processes becoming automated (Williams, 2022).

Modern developments in the technology era include web-based applications (WBA). WBA enables users to communicate with a distant server through a web browser interface(lvivity.com).

The said WBA are a key tool for replacing desktop programs, having a significant impact on both small and large organizations. Web-based applications had limited capabilities in the past, but as technology advanced, the system's potential improved. Web-based software therefore provides significant benefits over conventional methods and favors different enterprises (aezion.com)

The development of a web-based clinical data management system aims to support and automate clinic everyday operations. A system called the Clinic Management System can assist the clinic in managing its everyday operations. The medical record system primarily keeps all the patient records of those who have received treatment from a hospital that employs this system (Tergundi et al., 2017). Without a completely integrated system, it can be difficult to exchange patient records, such as prescription information, referral information, diagnosis status, and appointment schedules, between different clinic units when patient medical records grow in size. Access to patient records also needs to be private. Numerous studies on healthcare services have been undertaken to solve difficulties such as inconsistent medical records, slow record storage and retrieval, and paper-based methods (Muhammad & Garba, 2019).

A reliable and accurate health report can be described in a good medical record file. Medical records play a significant role in the collection, processing, and display of health information. This can be done manually or electronically (Nuryati & Widayanti, 2015).

Numerous elements play a role in the success of the implementing electronic medical records requires careful preparation, a committed team, and backing from facility management, financiers, and computer system developers (Mashoka et al., 2019).

Here in the Philippines particularly in Nueva Vizcaya, one of the biggest secondary schools in the province is the Bambang National High School (BNHS). One of the challenges set by the Department of Education is the opening of classes this November, 2022. However, it seems the said school is not yet ready to monitor and prevent spread of the said Covid-19 disease in school premises. The BNHS has a clinic that currently uses the traditional paper-based system and folders to store all the pertinent medical information. This will be a great challenge for the school nurse and health workers because the school has a big population that includes 3,923 students for both junior and senior high school, and 127 teachers and employees for the school year 2020-2021. The use of the conventional manual or paper-based record management system has a number of drawbacks which include inefficiency, accuracy, time consumption, inconvenience, hard, and slow-moving pace for medical service. Given this context, there is a need to automate the current manual systems (Agu, et al., 2016).

At BNHS, the clinic's current system is less effective because all of its medical data are kept on paper and stored in folders. For instance, it is more difficult to make various changes to medical records, such as staff information, because paper labor is required (Adebisi, et al. 2015). Moreover, it is time-consuming for the clinic staff because they need to organize the medical records from time to time (Adebisi, et al. 2015). To manage the clinic services and deal with the lengthy, traditional clinic process, a web-based application

will be created in the school clinic to be more efficient, organized, protected and less time consumed by the school nurses in managing the records (Jibrin & Salisu, 2019).

RAD Model

One of the famous applications used in medical record management system is the Rapid Application Design (RAD) because it is now the best strategy for system development. Due to its rapid deployment, RAD is preferred by the majority of people especially in the medical field, hospitals, and clinics (Delima et al, 2017; Lacar & Maribao, 2020; Pratiwi et al., 2022). In comparison to other approaches, RAD can offer higher-quality outcomes more quickly, satisfies the demand for a tight schedule (Kwan, 2015), and it results in an accurate system and minimizes error rates in medical record system (Pratiwi et al., 2022). Moreover, RAD is useful in monitoring the productivity and performance of each member of the system in order to gain optimal development process (Delima et al., 2017).

According to James Martin, the Rapid Application Development (RAD) paradigm provides quick creation of high-quality systems at a low cost and is more adaptable to changing customer needs (Fatima et al., 2014). It is a quick process which consists of development, testing, and feedback (Despa, 2014). Software development is done using the RAD technique because can speed up the software development process (Delima et al., 2017) and also the stages are structured (Widiyanto, 2018). Moreover, employing the RAD method in software development is required in order for clinical operations to function successfully at the Clinic Systems (Pratiwi et al., 2022).

To describe and assess software quality such as those for medical record management system, the International Organization for Standardization (ISO) has created software models and standards (Hussain & Mkpojiogu 2015). Software quality is governed by two ISO frameworks and standards: ISO 9126-1 (SO/IEC9126-1 2001) and as well as its replacement ISO 25010 (ISO/IC 250 10 2011). The ISO views software quality from various angles, including internal and external quality as well as quality in usage (Herrera et a1., 2010). Furthermore, the ISO/IEC 25010 refers to the product's usability as "the extent to which a product is utilized by specific users satisfies their needs to achieve specified goals with effectiveness, efficiency, safety, and satisfaction in certain contexts of usage" (Bevan, 2010)

Hence, with the pressing needs to automate the medical record management system at Bambang National High School, the researchers plan to work on a research on the development of a web-based medical record management system of BNHS based on the conceptual framework outline and discussed below.

Conceptual Framework

Every research paper is anchored on concepts or theories that serve as the foundation or backbone for the paper. Below presents the Input-Process-Output (IPO) model of the study.

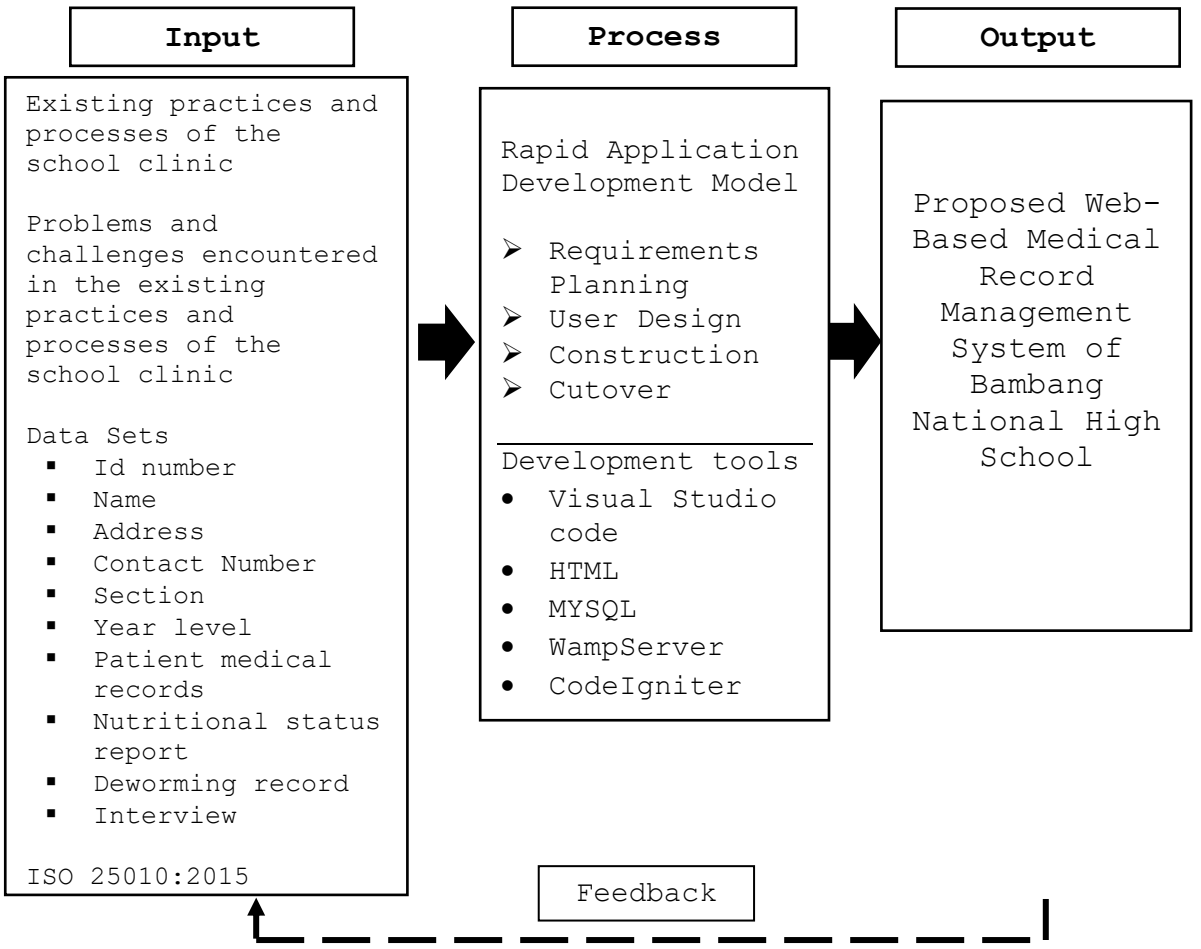

Figure 1. Conceptual Framework

The researchers will use IPO model to easily visualize the structure and effectively analyze the processes needed for the proposed system. It provides a roadmap in the development and implementation of the Web-Based System for the Record management of Bambang National High School. The IPO model consists of three stages with a feedback mechanism.

The INPUT presents the variables needed for the development of the proposed system. This includes the manual of operations, existing practices and processes of the

clinic of Bambang National High School as well as the problems encountered in the school clinic. Other inputs include the data sets for the patients and students. The ISO 25010:2015 will be used in the development and evaluation of the proposed system.

The PROCESS presents the different phases in developing the proposed system. In this stage, inputs will be analyzed, processed and evaluated. This includes interviews, document analysis and observations to analyze the practices and problems of the clinic of Bambang National High School. The researchers will be using Rapid Application Development (RAD) Model in developing the proposed system.

The OUTPUT will be a Web-Based Medical Record Management System of Bambang National High School. The feedback mechanism will help the researchers to gather suggestions and comments from nurse, health workers and, IT experts to further improve the proposed system.

Statement of the Problem

1. What are the existing practices and processes of the school clinic in terms of?
    1.1. Recording patient information
    1.2. Nutritional status and deworming records
    1.3. Updating the check-up records of patients
    1.4. Appointment and scheduling of check-up of patients
    1.5. Generating patient's reports
2. What are the problems and challenges encountered in the existing practices and processes of the school clinic in terms of?

2.1. Recording patient information

2.2. Nutritional status and deworming records

2.3. Updating the check-up records of patients

2.4. Appointment and scheduling of check-up of patients

2.5. Generating patients' reports

3. What system can be developed to support the management of the school clinic?

4. What is the extent of compliance of the proposed system with ISO 25010:2015 Software Quality Standards as assessed by the user-participants and IT expert-participants in terms of the following?

4.1 Functional Suitability,

4.2. Performance Efficiency,

4.3. Compatibility,

4.4. Usability,

4.5. Reliability,

4.6. Security,

4.7. Maintainability, and

4.8. Portability?

Significance of the Study

With the development of a web-based medical record management system at Bambang National High School, the said system can help bring the patients' data into the school's database. This could help the administrator's task to be easier, accurate, and

reliable in processing, storing, and generating patient medical reports. Specifically, the said project could be significant in one way or another to the following:

Clinic. The suggested approach could make things more systematic and organized in the clinic. Moreover, this could help the clinic maximize the time spent with their clients, and make the clinic more profitable. Hence, with this project clinic routines will be simplified and automated.

Nurse. The suggested solution will make managing the clinic simpler and practical for the nurses and health workers when it comes to accessing, storing, and generating patients' medical records.

Patients. The patients which include the teachers and the students could easily provide and retrieve their past and current medical records with ease and convenience. With the aid of the said system, the patients will be served faster and better due to the advent of technological advancement in the medical record system.

School Administrators. The school administrators will be benefited as they will be easily checked, monitor, and evaluate the data records of both the teachers and the students. The said web-based record management system could assist school administrators to plan and proposed guidelines, policies, and actions related to the prevention of the spread of Covid-19 in the school and in the community.

Future Researcher. The result of this study could benefit future researchers as baseline information to better improve the proposed project. Moreover, this could help them to

benchmark on the other applications of the said project in other situations that has something to do with web-based medical record management system.

Scope and Limitations

This study will focus on developing a software application for the medical record management system of Bambang National High School (BNHS). This includes the management of patient's medical records with the help of the database system. Since the school use manual or traditional way of storing patient's medical clinic records like envelopes and folders for medical files, the proposed application will be used within the premise of the BNHS's clinic. The proposed project includes the features of the web-based medical record management system such as recording patient information, nutritional status and deworming records, updating the check-up records of patients, appointment and scheduling of check-up of patients, and in generating patient's reports.

The patients in this study includes all employees and students of the said school. The respondents of the study will be limited to the school administrators, teachers, non-teaching staff, and students of BNHS. It also includes IT experts in the field as respondents.

The proposed system/application will be developed using PHP Code Igniter framework, SQLyog, and WampServer that runs on a Local Area Network (LAN) of BNHS. The system can only be accessed within the local area network of BNHS which is located at the school clinic. The school Principal and the clinic staff could focused on real-time monitoring of patient's health records based on the system database.

Definitions of Terms

- Information System – A system that is used for personal records of the users within the database.
- Medical Record System – A system that is used for medical records of the patients within the database.
- Web Based - Users can communicate with a distant server using a web browser interface by using applications, a specific kind of software.
- Rapid Application Development (RAD) – A development model that uses prototyping and fast feedback by the clients are given in the process.
- Patient – A person undergoing medical treatment or registered to do so.
- Nurse – A person that is authorized to give medical treatment to the patient.
- Clinic – A place where a patient goes to check up on their health or sickness.
- School Administrator – A person who manages all of the school operations, from establishing a secure learning environment to controlling school spending.
- School – A place where students study, and learn with the guidance of the teachers.

Chapter II

METHODOLOGY

This chapter discusses the study's instrumentation, research design, data collection process, and data analysis methods. This sections also include the data collection and analysis techniques used by the researcher in gathering the necessary information for the development of the said project.

Research Design

The developmental research design will be employed to produce a data-based understanding of the systematic results of practices in school clinics. This pragmatic form of research is a strategy for developing new practices, methods, and tools based on a thorough examination of certain instances. Hence, the developmental research can have the purpose of either producing generalized judgments or legal declarations or creating information that is specific to a situation for issue solving function (Richey & Klein, 2005).

Research Locale

Figure 2. School Campus of Bambang National High School

The campus of Bambang National High School is a public high school which offers Junior High and Senior High School. The campus is located in particularly in Boyie Street, Buag, Bambang, Nueva Vizcaya. The gathering of data will be done in the campus of Bambang National High School.

The Software Development

The development of the medical record management system of Bambang National High School will be based on Rapid Application Development (RAD) model process. Some of the reasons for employing the RAD in the development of the web-based medical

record system of BNHS includes the following: the RAD method will be used because the steps are structured (Widiyanto, 2018) and it is an efficient approach to software development (Irfan et al., 2020). The system development happens more quickly and in shorter cycles (Putra & Lolly, 2021). Due to the method being broken down into modules and being applicable to small-scale systems, the generated software can be seen without having to wait a long time (Hasanudin et al., 2019; Sintawati, 2018). This is because software development eliminates the requirement for original design (Kusmiati & Ansori, 2015; Suryanto & Maliki, 2022).

The RAD Model Cycle as shown in Figure 3 will be patterned from Ismail et al. (2016).

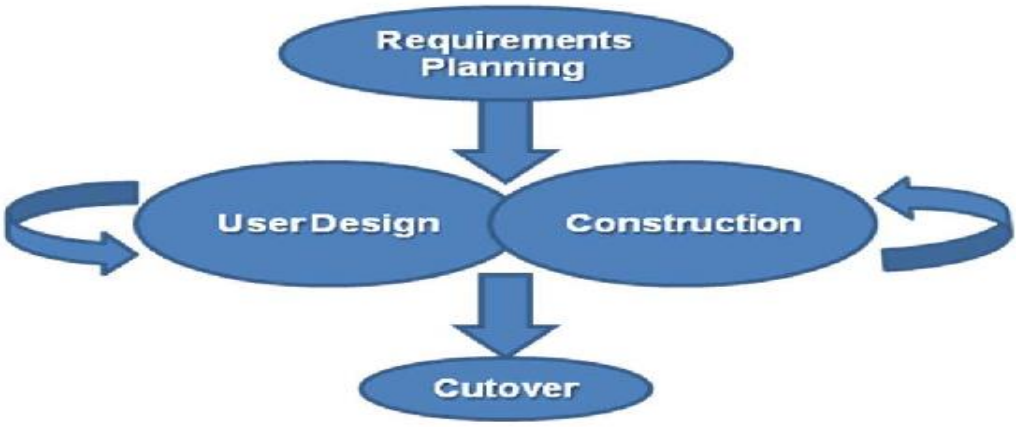

Figure 3. The RAD Model Cycle (Ismail A., et al, 2016)

The following are the phases of the RAD model will be adapted from (Ismail A., et al, 2016):

Requirements Planning. During this stage, the current situations, practices, and problems will be studied. Moreover, in this first phase of the study, the researchers will conduct interviews and data gathering procedures on the participants of the study to know the practices, processes, and problems/challenges for the needed data information in the project. Planning for the development of the project will be done to know what will be applicable to the system and how it will function in the system. The researcher will also identify the existing strengths and weaknesses of the clinic and what are things to be improved. Hence, this phase will establish the blueprint of the whole project system.

User Design. After the first phase of planning and having pointed out the requirements, user design will be done. In this phase, the clients and the developers will be interacting to find out the design process of the system that will be developed. Data flow and the process will be pointed out in detail for a precise result that will be considered. The prototype will be done in this stage to test the program. In each prototype, the client will test each one to provide feedback to refine the functionalities of the system until it reached the satisfaction of the client and the user's needs.

Construction. In this third phase, construction will be done when all requirements and user design have been completed and incorporated in the the first and second phases. During this stage, the processes such as designing, coding, testing, and modifying the system will be done to developed the web-based medical record management system.

Cutover. In this stage, implementation and installation of the medical record management system of BNHS will be done. During this stage, the users such as the school administrators, nurse, health workers, teachers, employees, and the students will be trained

on how to operate and test the developed medical record management system. The evaluation of the system will be conducted using the ISO 25010 Software Quality Standard evaluation questionnaire that will be evaluated by the users and the IT experts.

Development Tools

The researchers will use the following tools to fully develop the system primarily.

HTML

Information obtained from the Internet will be formatted using HTML, or hypertext markup language. It will serve as a fundamental building component to specify the web structure.

CSS

Websites will be styled and laid out using CSS, or Cascading Style Sheets. It can also be used to add decorative elements like animations and the division of text into columns, as well as alter the size, spacing, color, and font of the contents.

JavaScript

JavaScript is a dynamic programming language often used in the Web. It is used to enhance web pages; it also helps interact with the users and create dynamic web sites.

Visual Studio Code

The debugging, task execution, and model control functions of Visual Studio Code make use of a condensed version of the code editor. It will offer the tools developers require in a speedy cycle of code-build-debug, leaving more complex workflows to IDEs with greater functionality.

WAMPServer

A virtual computer server that acts to connect computer locally or the used of LAN connection. WAMP also stands for Windows, Apache, MySql, PHP.

Code Igniter

A computer software that used for web development. It is the backbone and serves as the framework of the web development process for building the web site with the PHP programming language.

SQLyog

A GUI software that helps organized and store data with the used of the its built-in database software.

Web-based - Medical Record Management System Architecture

The web-based medical management system (WB - MRS) architecture will be used as the basis in the development of the said project. Moreover, the WB-MRS architecture as shown in Figure 4 was designed by the researchers. This will facilitate and assist the researchers in the developmental process that will be employed in this study.

The processes that will be implemented in this are described as follows. First, the patient shall need to fill up their own school medical record using a portable computer near the school clinic. The accomplished medical record will be submitted to the school nurse through the system server. The school nurse can input and edit additional information, and/or delete unnecessary information from the patients. This information will be stored in the hub, file server and clinic record database.

The entire system will be running with the use of Local Area Network (LAN), which does not need to use an internet connection. The system will rely on the installed server on the computer terminal that will act as the server for the said system and its database.

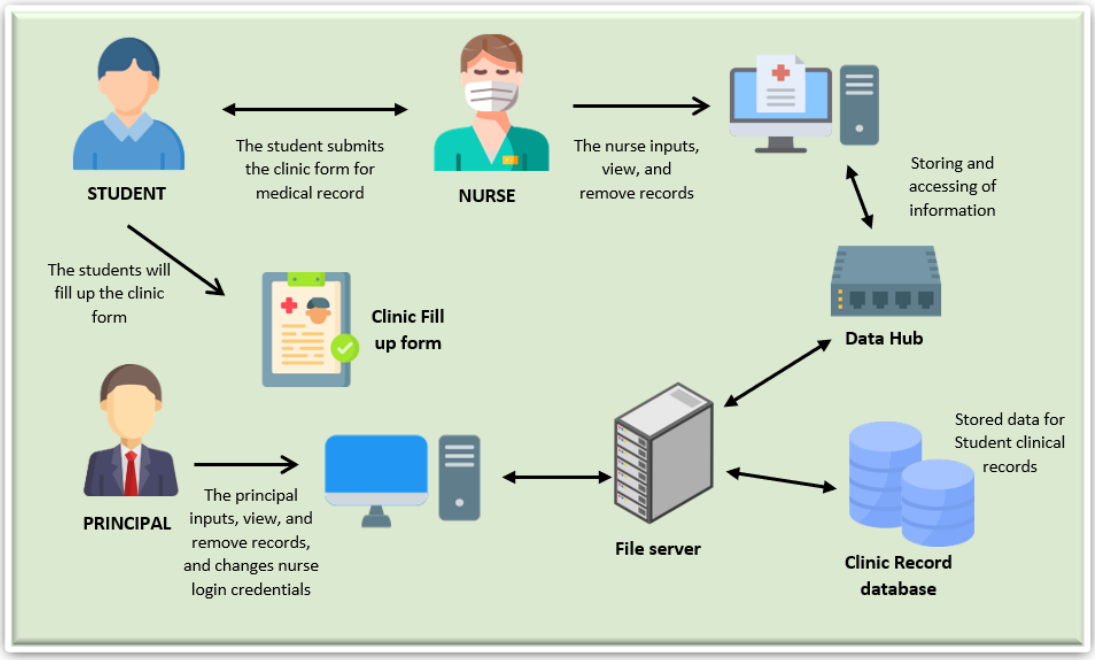

Figure 4. WB-MRS System Architecture

Participants and Sources of Data

The participants of this study will have a population size of 4. However, the 1 participant which is the nurse, will be selected to obtain the necessary data for the development of the web-based record management system of the school. The distribution of the respondents is presented in Table 1.

Table 1. Participants of the Study

Respondents	Population	Percentage
Nurse/Health workers	1	25
IT Specialists	3	75
Total	**4**	**100**

The study will involve 1 Nuse/Health workers (25%) and 3 IT Specialist (75%). Direct interview will be done to obtain the relevant and necessary information in the design and development of the said system. The direct end users of the said project who are also the respondents of this study include the school nurse/health workers and the Information Technology (IT) specialists will be selected to obtain relevant information for the development the web-based medical records management system of the target school.

The school nurse or healthcare professionals who work in the clinic will be selected because they will be providing important information on the technical aspects of recording, organizing, updating, and generating patient information and medicine history of patients. Conversely, the IT specialist will be chosen as participants due to their technical expertise, excellent knowledge, innovative ideas, and objective judgment in the development and improvement of web-based medical records management system of the school.

Instrumentation

Interview Guide

With the use of an interview guide, the researchers will conduct interviews with the school nurse/health workers in order to have a better understanding of the clinic's processes and methods. The school nurse will provide all of the required information that is deemed necessary in the development of the said proposed web-based medical record management system. The interview guide include questions on how the nurse and health workers they perform processes such as recording patient information, nutritional status and deworming records, updating the check-up records of patients, appointment and scheduling of check-up of patients, and in generating patients' reports.

Document Review

The researchers will look over the documents kept by the school nurse which contains the data about medical records of the patients. The data that will be gathered will include the patient's medical records, nutritional status report and deworming records which are the important components of the development of the web-based medical record management system.

Observation

The researchers will use direct observation in the clinic in obtaining the knowledge on the processes and methods of the school clinic operations. The observation that will be performed will help the researchers about the manual recording and storing of patient's

data. Moreover, the researchers will also observe how the nurse and health workers update their patients' medical records as well as on how they generate medical reports that are submitted to their school administrators and to other concerned end users.

Data-Gathering Procedure

To develop the proposed project, the researchers will follow the following data gathering procedure. The researchers will seek approval from the school principal for the conduct of the study in their school. Once the school Principal grants the request, the researchers will conduct interviews to the respondents such as the school nurse/health workers. This process will help the researchers determine the existing practices, processes, problems, and challenges in managing the medical clinic record of the school.

After all, the information was gathered from the interview, the researchers will design and develop the project on the web-based medical record management system of the school.

Treatment of Data

Ethical Consideration

This study was submitted for ethics review/assessment and approval to Saint Mary's University Research Ethics Board (SMUREB), headed by Engr. Teofilo Sagabaen (email: reb@smu.edu.ph; mobile: 09177053041), A218, Second Floor, Fr. Godfrey Lambrecht Building; SMU Main Campus, Ponce Street, Don Mariano Marcos; Bayombong, 3700 Nueva Vizcaya, Philippines.

The study will be carried out in an orderly and convenient way for the participants. Before conducting the interview, we ask permission to the principal to conduct data with the particular participants needed in our study. A brief consent form was given to the principals and participants which are the school nurse/health worker that will be interviewed. All information asked by the researchers was provided by those who consented to participate. In exchange for their time and effort, the study participants received compensation for the data connection used during the data collection sessions. The researchers have guaranteed the participants that any data collected in exchange for compensation will be kept private and confidential.

Only the researchers had access to the participant data, which was kept strictly confidential. Data and participant information were restricted to the researchers alone. The researchers' computers were used to save all the obtained data, which would not be shared with anybody else. To protect participant identities and maintain the confidentiality of the information, the researchers will disseminate the data they have collected to others. Once the research was concluded, the researchers will be removing and deleting all the participant's data information that was obtained, to protect their confidentiality. And those deleted files will be gone and never will be recovered be anyone. The study is expected to provide an important asset or role in the school clinic with their record management which entitled Web base medical record management system of Bambang National High School. Throughout the essay, references to data and opinions presented by diverse authors have been documented using APA style citations. The integrity of the acquired data and findings was not compromised by the researchers' receipt of any benefit from this study. This paper does not disclose any declared conflicts of interest.

Data Analysis

Statistical tools such as frequency, percentage, and mean will be employed in this study. Moreover, the degree of compliance of the proposed system with ISO 25010:2015

Software Quality Standards will be assessed using the weighted mean. The Likert scale that will be used to score the system's level of compliance according to ISO 25010:2015 software quality standards is presented in Table 2.

Table 1. Measurement of the Extent of Compliance with ISO 25010:2015 Software Quality Standards

Mean Range	Developmental Equivalent	Interpretation
4.50 – 5.00	OUTSTANDING or the measure developed in the item is compliant to a very great extent.	Very High degree of compliance.
3.50 – 4.49	VERY SATISFACTORY or the measure developed in the item is compliant to a great extent.	High degree of compliance
2.50 – 3.49	SATISFACTORY or the measure developed in the item is compliant to a moderate extent.	Moderate degree of compliance
1.50 – 2.49	FAIR or the measure developed in the item is compliant to a little extent.	Low degree of compliance
1.00 – 1.49	POOR or the measure developed in the item is compliant to a very little extent.	Very Low degree of compliance

Software Requirements

The computer programs that will be used in developing the system includes the PHP, CSS, HTML, JAVASCRIPT, and MYSQL (Sqlyog) for database management is shown in Table 3.

Table 3. Software Specifications

Component	Specifications
Operating System	Windows 7 and above
Database Application	MySQL (SQLyog v.10)
Software Development	Visual Studio Code

Hardware Requirements

To implement the proposed project, the school needs to conform to the suggested hardware requirements as presented in Table 4. These hardware requirements include the Slog computer hardware, peripherals, and system requirements.

Table 4. Recommended Hardware Specifications

Component	Specifications
CPU	Intel Core i3
Memory	4GB
Hard Disk Space	1TB
Monitor	14" LCD
Keyboard	101/102 Keyboard
Mouse	Microsoft USB
Printer	Epson 2100

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APPENDIX A

EVALUATION FORM

A Proposed Web Based Medical Record Management System of Bambang National High School EVALUATION using ISO/IEC 25010 Software Quality Standards

(This survey questionnaire is designed to determine the status and performance of the A Proposed Web-Based Medical Record Management System of Bambang National High School*)*

Dear Respondent,

We are currently undertaking our Capstone Project which is A Proposed Web Based Medical Record Management System of Bambang National High School. With this, we respectfully ask for your help in giving the information requested below for assessment reasons. The information will be very helpful for us as we finish our final capstone project paper and complete the prerequisites for the Bachelor of Science in Information Technology degree.

Thank you very much.

Fabelico, Fitzfedrix

Olpindo, Brent Joshua

Please check the box that best represents your assessment on the extent of compliance to ISO 25010:2015 of the developed Web based medical record system of Bambang National High School in terms of Functionality, Efficiency, Usability, Reliability, Portability, and Maintainability and using the following scale:

5 – Outstanding or to a very great extent
4 – Very Satisfactory or to a great extent
3 – Satisfactory or to a moderate extent
2 – Fair or to a little extent
1 – Poor or to a very little extent

25010 Software Quality Standards					
Functional Suitability					
Functional completeness It covers all the specified tasks and user objectives					
Functional correctness It provides the correct results with the needed degree of precision					
Functional appropriateness Facilitate the accomplishment of specified tasks and objectives					
2. Performance Efficiency					
Time behavior Meet the requirements in the response and processing time when performing its functions					
Resource utilization Meet the requirements in the amounts and types of resources used when performing its functions					
Capacity Meet the requirements in the maximum limits					
3. Compatibility	**5**	**4**	**3**	**2**	**1**
Co-existence Can perform its required functions efficiently while sharing a common environment and resources					

Interoperability Components can exchange information and use the information that has been exchanged					
4. Usability	**5**	**4**	**3**	**2**	**1**
Appropriateness recognizability					

It is appropriate to the needs of the users.					
Learnability Can be used to achieve specified goals of learning with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use					
Operability It is easy to operate and control					
User error protection Protects users against making errors					
User interface aesthetics Its interface enables pleasing and satisfying interaction for the user					
Accessibility Can be used to a widest range of characteristics and capabilities to achieve a specified goal in a specified context of use					
5. Reliability	**5**	**4**	**3**	**2**	**1**
Maturity Meets the need for reliability under normal operation					
Availability It is operational and accessible when required for use					
Fault tolerance It operates as intended despite the presence of hardware or software faults					

Recoverability Can recover the data directly affected and re-establish the desired state.					
6. Security	**5**	**4**	**3**	**2**	**1**
Confidentiality Ensures that the data are accessible only to those authorized to have access					
Integrity Prevents unauthorized access to, or modification of programs or data					
Non-repudiation Can be proven to have taken place, so that it cannot be repudiated later					

Accountability Actions of an entity can be traced uniquely to the entity					
Authenticity The identity of a subject can be proved to be the one claimed					
7. Maintainability	**5**	**4**	**3**	**2**	**1**
Modularity Composed of discrete components such that a change to one component has minimal impact on other components					
Reusability Assets can be used in more than one system, or in building other assets					
Analyzability It is possible to assess the impact of an intended change to one or more of its parts, or to diagnose deficiencies or cause of failures					
Modifiability Can be effectively and efficiently modified without introducing defects or degrading existing product quality					
Testability Test Criteria can be established and can be performed to determine whether those criteria have been met					
8. Portability	**5**	**4**	**3**	**2**	**1**
Adaptability Effectively and efficiently be adapted for evolving hardware, software, or other usage environments					
Install ability Can be successfully installed and/or uninstalled in a specified environment					
Replaceability Can replace another specified software product for the same purpose in the same environment.					

System Enhancement: Question:

What are your suggestions and comments to further enhance the proposed system?

_____

_____

_____

_____

APPENDIX B

WEB BASED – MEDICAL RECORD SYSTEM
Interview Guide

Duration in Minutes	Task
3	Greetings and explain purpose
20	Questions to determine the existing practices and processes as well as the problems encountered in managing student medical information such as obtaining, storing, searching, consolidating and report generation.

DETAILED INTERVIEW

Demographics/Profile of School Nurse/Heath Worker

1. Name: (What is your name?) _____
2. Age: (How old are you?) _____
3. Length of Service: (How long have you been working in BNHS?) _____
4. Job Description: (What is/are your functions and responsibilities in this school?)

_____
_____
_____

Existing Practices and Process of School Clinic

5. What are the existing practices and processes of the school clinic?

_____
_____
_____
_____

6. Are the students required to register or have their own clinic medical record when they enroll?

_____
_____
_____

7. Where are you keeping the medical records? How do you manage these medical records?

_____
_____
_____

8. How do you update the check-up records of your patients?

_____
_____
_____

9. How do your record and update the nutritional status and deworming records of your patients?

_____
_____
_____

10. How do you update the check-up records of your patients?

_____
_____
_____

11. How do you schedule appointments and check-up of your patients?

_____
_____
_____

12. How do you generate or produce patient's reports to be submitted to the School Principal or to any concerned end-user?

_____
_____
_____

13. What practices are done in disposing of your medical records? How long do you keep your medical records?

_____
_____
_____
_____

14. What happen if emergency occurred? What are the practices done?

_____
_____
_____

15. Do the school use or have a LAN connection? What offices use these LAN? Who is the administrator of this LAN?

_____
_____
_____

Problems and Challenges Encountered in the Existing Practices and Processes in the School Clinic

16. What are the problems and challenges encountered in the existing practices and processes of the school clinic?

_____
_____

_____
_____

17. What are the problems or challenges that you experience in recording the medical information of your patients? How did you manage to solve this problem?
_____
_____
_____

18. What are the problems or challenges that you experience in updating the check-up records of your patients? How did you manage to solve this problem?
_____
_____
_____

19. What are the problems or challenges that you experience in recording and updating the nutritional status and deworming records of your patients? How did you manage to solve this problem?
_____
_____
_____

20. What are the problems or challenges that you experience in updating the check-up records of your patients? How did you manage to solve this problem?
_____
_____
_____

21. What are the problems or challenges that you experience in scheduling appointments and check-up of your patients? How did you manage to solve this problem?
_____
_____
_____

22. What are the problems or challenges that you experience in generating or producing patient's reports to be submitted to the School Principal or to any concerned end-user? How did you manage to solve this problem?
_____
_____
_____

23. Do you want to improve your medical record management system?
_____

24. Would you like to have a medical record management system of BNHS linked to your LAN?
    _____

25. What are your suggestions to improve your medical record management system in your clinic?
    _____
    _____
    _____
    _____

OFFICIAL CO-CURRICULAR TRANSCRIPT

Name: Fabelico, Fitzfedrix E.
Address: Buag, Bambang, Nueva Vizcaya 3702
Email address: drixzfabelico@gmail.com
Contact number: 09533005300

PERSONAL INFORMATION

Age: 22
Civil Status: Single
Religion: Roman Catholic

Date of Birth: June 4, 2000
Place of Birth: Bambang, Nueva Vizcaya
Father's name: Fitzgerald L. Fabelico
Mother's name: Livinia E. Fabelico

EDUCATIONAL BACKGROUND

	Name of school	Date completed
Tertiary	Saint Mary's University, Bayombong, N.V.	August 2018 – Current
Secondary	Saint Mary's University, Bayombong, N.V.	August 2016 – May 2018
Elementary	Saint Catherine's School, Bambang N.V.	June 2006 – April 2012

MARIAN CORE VALUES

EXCELLENCE (It refers to academic/ scholastic accomplishments and involvement in non-academic activities wherein the students develop knowledge, competencies, and skills)

Award	**Event / Competition**	**Date**

Involvement	**Seminar / Convention**	**Date**
Participant	Network Security and Cryptography	11/20/19
Participant	Y4IT (Youth for IT)	8/20/21

INNOVATION (It refers to creative output such as research papers, capstone projects, systems developed, and students' involvement in literary, arts and visual performances)

COMMUNION (It refers to students' involvement in school and community activities and leadership / trainings attended / conducted)

A. SCHOOL INVOLVEMENT

Designation	**Organization**	**Date**

B. LEADERSHIP TRAININGS/SEMINARS

Involvement	Seminar / Training	Date

PASSION FOR CHRIST'S MISSION (It refers to students' involvement in spiritual and pastoral activities)

Involvement	Event	Date
Participant	Year of the Youth 2019	2019

TECHNICAL SKILLS / COMPETENCIES

- Basic Knowledge about Android Studio, Visual Studio and Adobe Xd.
- Basic Knowledge of WonderShare Filmora, Adobe PhotoShop, Video editing and Photo editing.
- Knowledgeable in SQL, Java, HTML and XML.

OFFICIAL CO-CURRICULAR TRANSCRIPT

Name: Olpindo, Brent Joshua A.
Bascaran, Solano, Nueva Vizcaya
Email address: brentolpindo@gmail.com
Contact number: 09503390225

PERSONAL INFORMATION

Age: 22
Civil Status: Single
Religion: Roman Catholic

Date of Birth: July 31, 2000
Place of Birth: Bayombong, Nueva Vizcaya
Father's name: Jehova L. Olpindo
Mother's name: Anna Liza A. Olpindo

EDUCATIONAL BACKGROUND

	Name of school	Date completed
Tertiary	Saint Mary's University, Bayombong, N.V.	August 2019 – Current
Secondary	Saint Mary's University, Bayombong, N.V.	August 2016 – May 2018
Elementary	Isaiah Christian Academy, Solano, N.V.	June 2006 – April 2012

MARIAN CORE VALUES

EXCELLENCE (It refers to academic/ scholastic accomplishments and involvement in non-academic activities wherein the students develop knowledge, competencies, and skills)

Award	**Event / Competition**	**Date**

Involvement	**Seminar / Convention**	**Date**

INNOVATION (It refers to creative output such as research papers, capstone projects, systems developed, and students' involvement in literary, arts and visual performances)

COMMUNION (It refers to students' involvement in school and community activities and leadership / trainings attended / conducted)

C. SCHOOL INVOLVEMENT

Designation	**Organization**	**Date**
Business Manager	MICRO	S.Y. 2021-2022

D. LEADERSHIP TRAININGS/SEMINARS

Involvement	Seminar / Training	Date

PASSION FOR CHRIST'S MISSION (It refers to students' involvement in spiritual and pastoral activities)

Involvement	Event	Date

TECHNICAL SKILLS / COMPETENCIES

- Basic Knowledge about Android Studio, Visual Studio and Adobe Xd.
- Knowledgeable in SQL, Java, HTML and XML.