

Maternity Clinic Information System with SMS Support: A Repository System

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Abstract

In our daily lives, record keeping and data management are critical. Maternal records are essential for all pregnant women because they contain organized and accurate pregnancy information. The record helps detect and monitor pregnancy risks and complications. Existing systems continue to rely on hardcopy logbooks to record maternity data. As a result, this paper proposes a Maternity Clinic Information System with SMS Support: A Repository System to improve current maternity service handling and management. The primary goal of the developed system is to provide a simple method for managing maternity data while also improving the efficiency and effectiveness of existing services.

Keywords: *Maternity, Clinic, Information System, SMS, Repository System*

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I. INTRODUCTION

Pregnancy is a period of risk for both the mother and the fetus. The main goal of antenatal checkups is to predict and detect early complications of pregnancy for both parties. Antenatal checkups currently comprise monthly clinic visits (from the third month of pregnancy), laboratory tests, and obstetric ultrasounds [1]. According to [2] because of challenges involved in integrating new hospital information systems with old paper documentation and record systems, clinicians, and other health care practitioners may become encumbered with multiple and conflicting sources of patient information. In the study [3], the emergence of computer-based information systems has changed the world a great deal, both large and small systems have adopted the new methodology by use of personal computers, to fulfill the several roles of production of information, therefore computerizing the documentation of patients record enable easier manipulation of input process and output will bring us to this existing new world of information system.

Currently, a large number of private and public clinics keep their maternal records in paper books and manually store them. Maternal record is significant for every pregnant woman for it contains orderly and accurate information about pregnancy. The record helps in detecting and monitoring risks and complications during pregnancy. Conventionally, records of a pregnant woman are written on paper and are kept in a cabinet or any physical storage [4]. It is a very formal way of storing data and records; however, the disadvantage of storing data in this manner is that it is prone to human error, such as mistakes in writing accurate details and poor handling of the paper logbook, which may result in data loss; the records of maternity are not that secure and are easily perishable; additionally, maternal records have no backup and cannot be retrieved once lost. Because of the inefficiency of keeping records that can serve as a reference, the manual method is not ideal for managing maternal records. This has been a challenge for the clinic's recording process. Paper maternity records are still used by organizations today. Pregnant women and maternity clinics require an efficient system for managing maternal records.

The Maternity Clinic Information System with SMS Support: A Repository System is a web-based system that automates the registration, recording, and keeping of maternal records, as well as providing easy access to the individual's information. The system will be a useful tool for doctors, nurses, and midwives because it will allow them to easily encode, store, and manage maternal clinical records and prescribed medications. It will also keep track of and monitor their maternity clinic appointments, records, or regular checkups for easier access and reference.

The use of MCIS can improve the services and also the workflow of all activity that occurs in maternity clinics where it helps in reducing the amount of workload of clinic staff they tend to render on a day to day process, and it also makes clinic management more manageable and easier to control. By implementing this system, maternity clinics will be able to manage, ensure the accuracy and openness of the maternal's details / records, and even preserve the information for longer periods of time, as well as make access far simpler and easier. In addition, the Maternity Clinic Information System with SMS Support: A Repository System is an effective and dependable tool for managing pregnant women's records, and it has an SMS Support.

This paper, also determine the level of usability in terms of learnability, and operability. Evaluate the performance of the developed system in terms of time behavior and resource utilization.

1.1. Conceptual Framework

This paper was based on the concept of the Input-Process-Output (IPO) Model. The input-process-output (IPO) model is a widely used approach in systems analysis and software engineering for describing the structure of an information processing program or another process [5].

In this study, the inputs were the information of the maternal record, doctor's data, midwives' data, and clinical staff data. The process phase were encapsulated in the Maternity Clinic Information System with SMS Support: A Repository System. Finally, the output phase is the system's evaluation for the level of usability, and performance efficiency. Figure 1 shows the conceptual framework of the study.

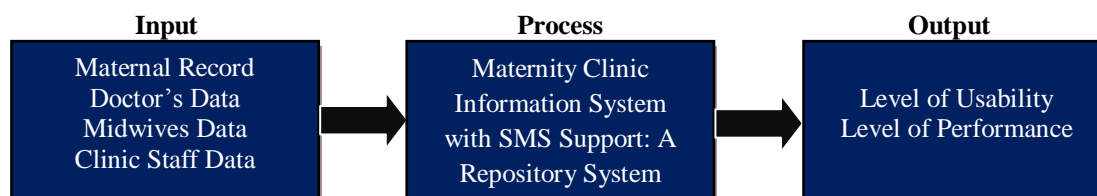


Figure 1. Conceptual Framework of the Study

II. METHODOLOGY

This chapter discussed the methodology used in this study. It includes the research design, software development model, and statistical treatment.

2.1. Research Design

A research design is an arrangement of settings for data collecting and analysis that seeks to balance relevance to the research goal with efficiency and method [6].

In this study, developmental and descriptive research designs were employed. Developmental research is a method of answering fundamental concerns such as why and how to educate what to whom. It entails a cyclical process of small-scale in-depth construction and evaluation of exemplary teaching-learning sequences on a content-specific level. Its goal is to offer an empirically validated rationale of how such a sequence works, which is said to be a significant contribution to teachers', curriculum makers', and educational researchers' competence [7].

Descriptive research is defined as large-scale, quantitative research that aims to "elucidate" a hypothesis (short of being able to confirm it). A descriptive finding could complement an insight gained from a more in-depth, open-ended approach in exploratory research. An organization can determine whether a concept is held by a few people and is irrelevant, or whether it is widespread and should be implemented. Credibility is established via descriptive research. However, the description cannot "prove" anything is true or false; with that level of assurance, an experiment is required [8].

2.2. Software Development Life Cycle

The software development life cycle (SDLC) is a strategy for developing software in a methodical manner, increasing the likelihood of finishing a software project on schedule and preserving the quality of the software product to industry standards. System designers and developers can use the System Development Life Cycle framework to follow a set of tasks when developing software. It's frequently thought of as a component of the system development life cycle. Any software development process is separated into logical stages that allow a software development company to efficiently arrange its work in order to generate a software product with the desired capabilities within a given time frame and budget. The phases are followed by all software projects [9].

The researchers used Rapid Application Development (RAD) as the software development life cycle for the software development. RAD Model or Rapid Application Development Model is similar to the incremental model and waterfall model. In RAD Model, development should be done in the specified time frame. RAD Model is suitable for the small project where all the requirements are gathered before starting development the project and no any concrete plan is required Development starts as soon as requirements are gathered and delivered initial working prototype to the client to get the feedback. Once client gives the feedback, based on the client's feedback other changes are done. This process goes parallel with co-operation with client and developers. Each prototype is delivered to the client with working functionality and changes made based on the client's feedback. Development moves faster in RAD Model with minimum errors. RAD

Model follows the incremental delivery of the modules. The main goal of RAD Model is to make the reusability of the developed components [10]. Figure 2 shows the Rapid Application Development Model.

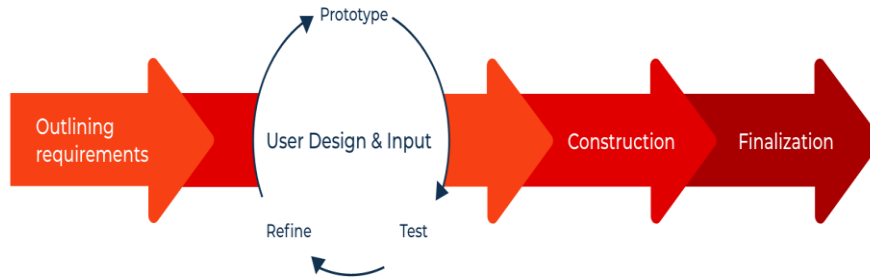


Figure 2. The RAD Model

2.3. Process Model

The process modeling is a technique for organizing and documenting the structure and flow of data through the systems processes and/or the logic, policies and procedures to be implemented by the system's processes [11]. The researcher used a context DFD to depict its logical design in this paper. A context data flow diagram is a high-level view of an information system that shows the boundaries and scope of the system. The Maternity Clinic Information System with SMS Support: A Repository System is depicted in the center of the diagram. There are three outside agents: administration, midwives, clinic staff, and pregnant women. Figure 3 depicting the context data flow diagram of the developed system.

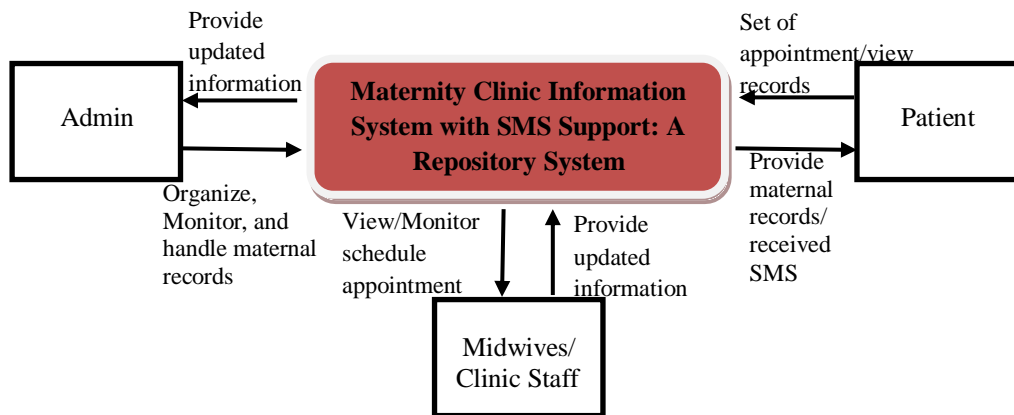


Figure 3. The Context Data Flow Diagram of the Developed System.

2.4. Logical Architectural Design

Logical architecture is the identification of the system component that provides the software services needed to meet the business goals/RFP requirements for deployment. Logical Architecture involve the process and documentation to derive a more precise, detailed and unambiguous depiction of the system components through the provision of well-defined interfaces and component specifications, and key architectural mechanisms [12]. In this study, the N-tier architecture were employed. N-tier is also called multi-tier architecture because the software is engineered to have the processing, data management, and presentation functions physically and logically separated [13]. Figure 4 shows the logical architecture of the developed system.

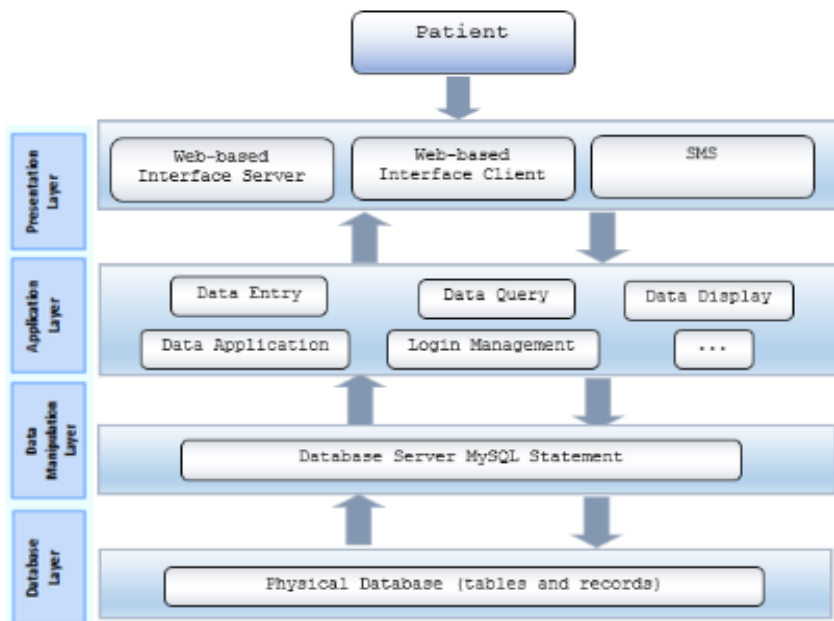


Figure 4. Logical Architectural Design

2.5. Testing and Evaluation

The system prototype's usability and performance were tested to complete the system development. The researcher asked the testers to complete a survey questionnaire in order to assess the system's level of usability and performance. The system prototype would be evaluated using a 5-point Likert scale, with 1 representing poor and 5 representing excellent. The Mean statistics would be used to determine whether the developed system met the evaluation criteria statistically. The mean is determined as follows:

$$\bar{X} = \frac{\sum X}{n}$$

where

\bar{x} is the mean

$\sum x$ is the summation of individual raw scores

n is the number of the population

The obtained mean score was interpreted using the following verbal description:

Mean Score	Descriptive
4.21 – 5.00	Very Good
3.41 – 4.20	Good
2.61 – 3.40	Average
1.81 – 2.60	Fair
1.0 – 1.80	Poor

III. RESULTS AND DISCUSSION

This chapter reported, analyzed, and interpreted findings that addressed the objectives. defined herein.

3.1. Level of Usability of the Developed System as Perceived by the End-User in Terms of Learnability, and Operability.

The mean result of the respondents' feedback on the usability of the developed system in terms of suitability and operability was presented in Table 1. The result showed that the usability of Maternity Clinic Information System with SMS Support: A Repository System was composed of an overall mean of 4.78 and

interpreted as “Very Good”. In terms of learnability (M=4.68) was interpreted as “Very Good”, operability (M=4.88) which was verbally interpreted as “Very Good”.

Table 1. Level of Usability of the Developed System in Terms of Learnability and Operability

Implementation Indicators	Mean	Verbal Interpretation
A. Level of Usability	4.78	Very Good
A1. Learnability	4.68	Very Good
A2. Operability	4.88	Very Good

Legend: 1.00 - 1.80 (Poor); 1.81 – 2.60 (Fair); 2.61 – 3.40 (Average); 3.41 – 4.20 (Good); 4.21 – 5.00 (Very Good)

3.2. Level of Performance of the Developed System in terms of Time Behavior and Resource Utilization

Table 2 revealed the overall mean for the level of performance of the developed system was composed with a mean of 4.82 being interpreted as “Very Good”, the time behavior (M = 4.78) was interpreted as “Very Good” while resource utilization (M = 4.85) was also interpreted as “Very Good”.

Table 2. Level of Performance of the Developed System in Terms of Time Behavior and Resource Utilization.

Implementation Indicators	Mean	Verbal Interpretation
B. Level of Performance	4.82	Very Good
B1. Time Behavior	4.78	Very Good
B2. Resource Utilization	4.85	Very Good

Legend: 1.00 - 1.80 (Poor); 1.81 – 2.60 (Fair); 2.61 – 3.40 (Average); 3.41 – 4.20 (Good); 4.21 – 5.00 (Very Good)

IV. CONCLUSION

Accurate information on the patient's pregnancy records will assist the assigned maternity care in monitoring the patient during pregnancy. Accurate and dependable record keeping is critical. The study's findings revealed that the Maternity Clinic Information System with SMS Support: A Repository System developed met the needs of the respondents and intended users. The majority of them saw the system's potential in assisting maternity clinics in managing maternal records. The system's implementation will improve the efficiency and effectiveness of managing maternal records.

In addition, the researchers concluded that the system is fully operational and usable based on the data collected. It will significantly improve the management of maternity clinic records. The system's implementation will eliminate all of the problems and difficulties encountered during the manual process. The developed system will make maintaining maternal records simple, quick, and convenient.

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