DESIGN A MONITORING AND EVALUATION STRATEGY FOR EFFECTIVE

OPTIMIZED ONLINE PATIENT RECORD HANDLING SYSTEM

CASE STUDY: MUHIMBILI NATIONAL HOSPITAL

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Declaration

We, Neema Ahmed Mwinge and Gitau Henry Waiti hereby declare that this graduation proposal is our original work and has never been presented to any award of degree or certificate whatsoever.

The literature and citation from other scholars have been duly referenced and acknowledged in the text and bibliography.

Signed..

Gitau Henry Waiti (Student)

Signed..

Neema Ahmed Mwinge (Student)

Date.....30th / 05 / 2011...

Supervisor Approval

I approve that this project report was conducted and report written under my supervision

Signed..

Ms. Pauline Kabanda (Supervisor)

Date.......30/5/2011...........

Dedication

We dedicate this work to our beloved parents Mr & Mrs A.Mwinge and Mr & Mrs Gitau.

Acknowledgement

First and foremost, our heart-felt gratitude goes to The Almighty God, without Him, the journey would not have been a success.

Our sincere gratitude also goes to our beloved parents, Mr. & Mrs. Mwinge and Mr. & Mrs. Gitau for their support, both, financial and moral. But above all, their encouragement and a sense of responsibility they nurtured into us that made us believe in our abilities which greatly contributed to our achievements. We thank you, and we love you.

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Lastly but not the least, to the BBC Class of August 2008 and our countless beloved friends and dear ones for their encouragement, care and positive critics which contributed much to our intellectual growth.

Thank you and God bless.

Acronyms

ISP	Information System Planning
IDS	Integrated Delivery Systems
NCQA	National Committee for Quality Assurance
HEDIS	Health plan Employer Data and Information Set
IS	Information Systems
MDT	Medics Digital Tool
ICS	Integrated Computer Systems
DA	Data Analysis
OS	Operating System
RDBMS	Relational Database Management Systems
SQL	Structured Query Language
PHP	Hypertext Preprocessor
ADM	Administrator
LAB	Laboratory
Dr	Doctor
LAB TECH	Lab Technician

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Abstract

Information technology is now a basic part of the fabric of every institution/organization. It is almost impossible to find any area of the organization customer service, distribution, finance, marketing or production where strategy, planning and operation do not depend heavily on some aspect of information technology as either a competitive necessity or an opportunity.

Designing an Online Patient Record Handling System will improve the general management of Muhimbili National Hospital in which it can be networked for easy use in different departments

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This Chapter will cover the following into more detailed perspective:- Background of the Study, Problem description, Study objective including main and specific, Research question, Scope of the study, Significance of the study, Study justification, Conceptual frame work and the conclusion which is the summary of what is entailed in the Chapter.

The project, after its completion, will enable fast, secured and efficient storage, retrieval and use of patients medical records of a public hospital i.e. Muhimbili National Hospital. Often, government-owned institutions ignore the application of new technologies in their daily activities so as to maintain the huge numbers of labor i.e. so as to provide job opportunities to the society. A job that is currently performed by three to four members of staff could be performed by one person when technology is applied.

Access to the system will be allowed to specified members of staff including Doctors, Nurses, Database Manager and his/her crew and any other party that the Hospital recognizes their importance in having access to the system.

The procedural building components of this System is discussed in more details both theoretical and Data Flow Diagrams (DFD). The system executes services like: Storing of Medical Records of both returning and new patients to the hospital, the details of the doctor that attended to the patient and the laboratory investigations done on the patient. Data stored further specify whether the patient was admitted into the hospital or not.

1.1 Background of the study

Muhimbili hospital is the main public hospital in Tanzania. With its services to the employees and facilities to patients, coming from in and around the country are needed for the efficient functioning of the institution. The hospital has more than five hundred and thirty five beds and equipped with modern facilities and catering all specialties. Computerization at Muhimbili started long way back when standalone systems were introduced to take care of routine Local area needs, the emphasis then was mainly on book-keeping activities. Medicare areas were not computerized. A need for an integrated patient management system was felt and an Information System Planning (ISP) study was conducted in the areas of Pathology, Radiology, Medical Research, Medical Stores & Pharmacy, and Inpatient Admissions & Billing. Due to some loop holes in the system the project is going to put more emphasis on On-line sharing of information to Intensive Care Unit and wards (ICU), Pathology test result information, staff appointment scheduling Inventory maintenance of medicines& other appliances, online prescriptions, Communications with external world using E-mail and web technology Patient billing, whereby test results can be made available on-line enabling prompt remedial action by staff. Therefore, an Optimized Online Patient Record handling System that enables patient and the doctor to avail records to the users will be designed.

1.2 Problem Identification

The main challenges faced by the current Patient-Record-Handling System, is the tediousness involved in the whole process of paper work when tracing, inserting or

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editing medical records of both new and returning patients. Too much paper-work might lead to loss of important medical records of the patients (due to large numbers of patients attending the hospital for services), therefore reduce safety of such records and efficiency in the whole process of Patient-Records handling and management.

The tediousness and too much paper work involved consume too much time un-necessarily because daily, hundreds of patients attend the hospital since it is a Public facility. At times patients have to queue-up for hours just to wait for a file to be located from the cabinets carrying thousands of manual files. Whereas the patients (some) might be too ill and need to get some urgent treatment or consultancy from the doctors. And as the procedures go, the doctor will only see a patient when he/she has the file on hand so as to get to know the patient's medical history for him/her to give the appropriate treatment.

Moreover, the bureaucracy involved in the current system adds on to low efficiency in the operations of the system, whereas with the new system to be developed, all Patients' Records would be computerized. There would be no need to store manual files in the cabinets, and the doctors would view patients' medical histories and add more into them by using computers within a secured Patient-Record-Handling System.

1.3 Research Questions

I. Will a database system capture Patients' Records conveniently; provide a safe storage facility and a fast way of tracing, retrieving and updating records?

II. Will User Interfaces be graphical and user-friendly so as to provide convenience to the intended system users when operating with the system?

III. Will frequent training assist the intended system users to familiarize with the system on how to operate and interact with it so as to increase efficiency, minimize time consumed and speed-up the whole process of Patient-Record-Handling?

1.4 Study Objective

1.4.1 Main Objective

To design, create and implement a Computerized Patient-Medical-Records-Handling System that would be fast, secured and increase efficiency in the whole process of tracing, updating and inserting Patients' Records into Computerized files. Such system is expected to consume too little time when locating Patient's Records and reduce if not eliminate the bureaucracy in the whole process.

1.4.2 Specific Objectives

I.   To gather information about the existing system which highlight the problems.

II. Analyze and present the findings about the existing system as well as its users.

III. Develop a database system that would capture Patients' Records and provide a safe storage facility by issuing User-names and Passwords and an easy and fast way of retrieving records when needed and all necessary User Interfaces that would be graphical and user friendly. Then to link the User Interfaces to the database.

IV. Test the system on a stand-line machine to ensure that the problems are solved.

1.5 Conceptual Framework

Data that would assist the designing and building of the new system was gathered from existing sources, libraries and existing resources.

Such data enlighten on the correct entities and field names for the database to be created, required medical information of the patients, available treatments (e.g. X-rays, Ultrasound, Drugs etc), medical staff information etc.

The data was analyzed and processed into information with the help of the Medical staff because they are more familiar with the information required when dealing with patients and other related tasks in the hospital environment.

With such assistance, we were able to come up with the relevant field names and entities for the database to be created.

Furthermore, we had relevant information to feed into the new system.

The following diagram illustrates the data flow of the system to be created;
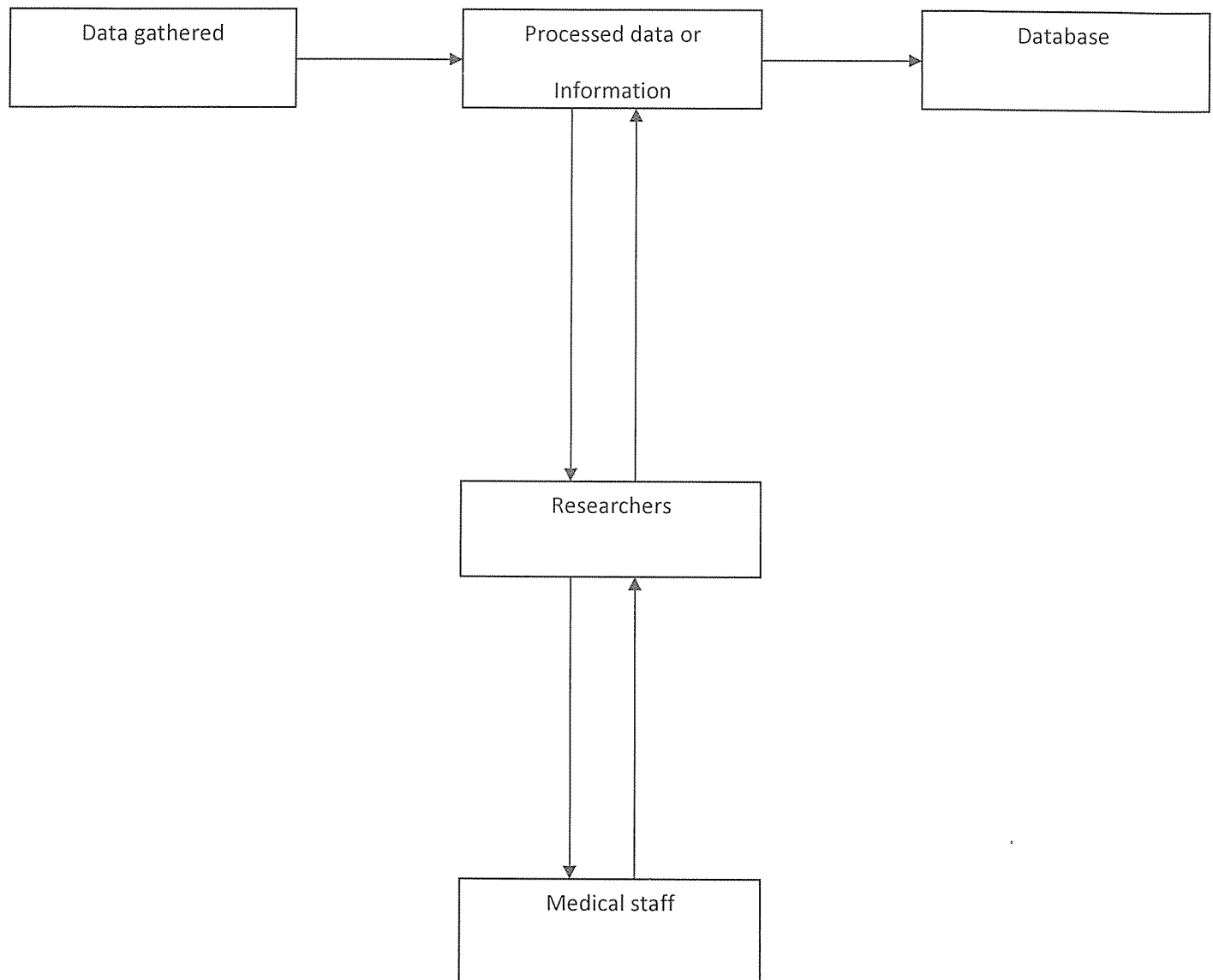
Fig 1: Data flow diagram of the new system

In addition to that, the expected operation of the system is as illustrated below;
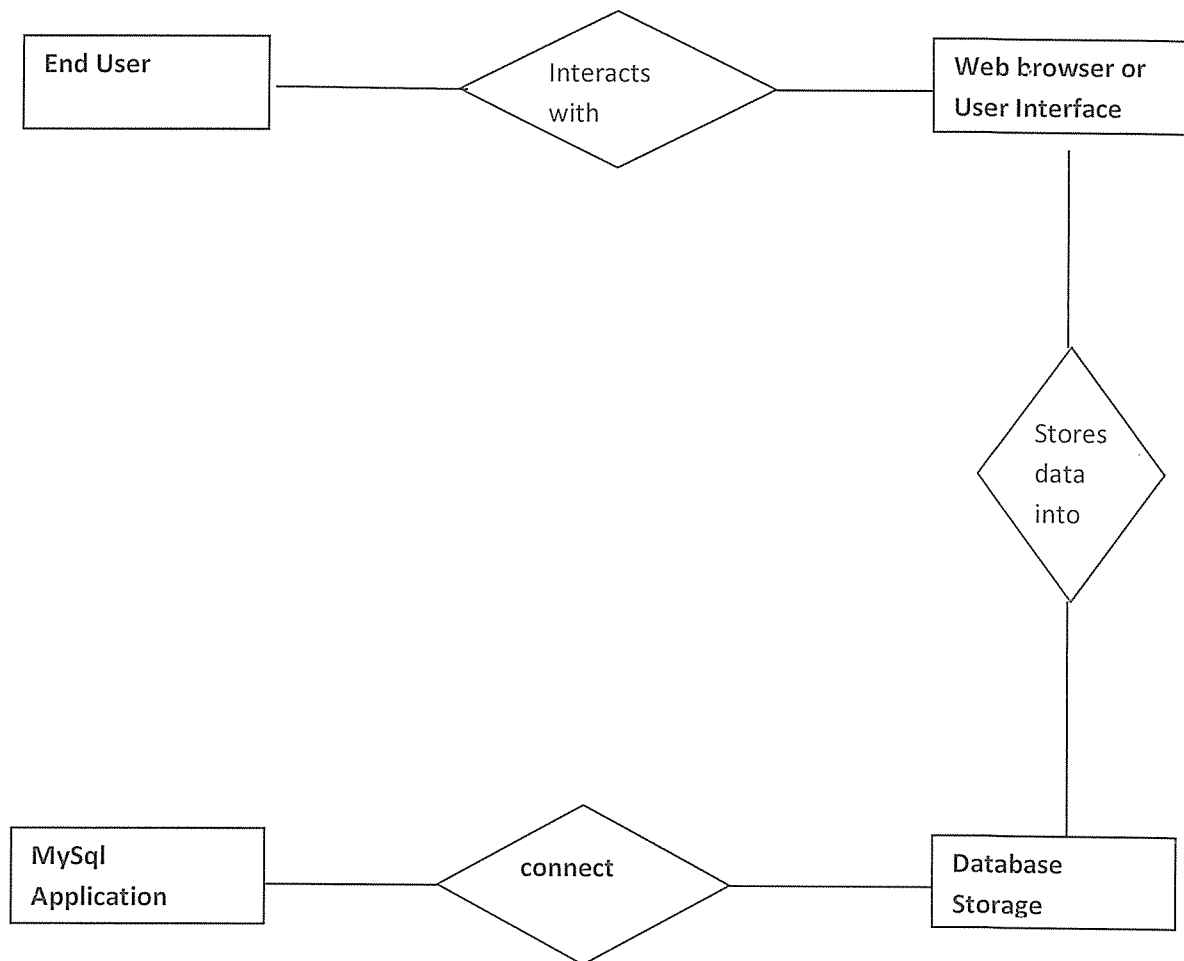
Fig 2 Entity-Relationship diagram for the system

Nevertheless the expected output is:-

i.   Access allowed to the system by the medical staff after log in.

ii.   Information about the patient

iii.   Information about the examination, details of the sickness, due date of treatment and return dates.

iv.   Drugs available in the Muhimbili National Hospital in general.

v.   Enquiries, Comments, Suggestions from the Users who access the website since the Muhimbili National Hospital will be online and the page interactive.

1.6 Scope of the Study

This study focuses mainly on the Patients (both out-patients and admitted patients) since they are the main character to whom the system focuses so as to provide some efficient services to. Moreover, the staff (the Administration and Customer Services department especially) at the Muhimbili National Hospital would be a great focus since they are also directly engaged in the whole process of record handling.

And lastly but not the least, the Ministry of Health Tanzania to whom all the responsibilities in regard of Management and Decision Making of the Muhimbili Hospital are under the control of.

1.7 Significance of the Study

This study will benefit the staff of Muhimbili National Hospital since manual paper-work will be reduced and there will be no need in looking for each patient's records within cabinets carrying thousands of files which tends to be tedious and tiresome. The staff will be relieved of too much work and time will be saved with the use of computerized system thus increasing speed and efficiency in the operation of activities at the hospital.

In addition to that, Patients will be provided with satisfactory services since they won't be forced to queue-up in long queues and for a long time just waiting for their manual

files to be located from the file cabinets. Computerized file system will serve the Patients well in regard to reduced amount of time spent waiting for their files to be located. This means that the staff will be able to serve more patients at a very short time and conveniently. This will result to attracting more new customers/patients and returning of old customers in satisfaction leading to the success of the organization.

Moreover, the authorized personnel will be provided with User-names and Passwords so as to enhance the security of the vital Medical Records so as to reduce or eliminate any losses or malicious activities.

1.8 Study Justification

The importance of the research is to design, create and implement a Patient Medical Record Handling System that would capture Medical Records, store the records into a safe database and ensure further security of such information by issuing User-names and Passwords to the authorized personnel of the organization. The system is expected to reduce the time it takes to locate the medical files and increase efficiency, this is so because with computerized file management system, all is needed is for the patient to provide his/her ID number or Names and then the file is located from the system.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

According to Taruna (2009), the cyber-optimists believe that e-Government holds great promise for the delivery of many types of public services from education and welfare benefits to community health care. The Internet can serve multiple functions: disseminating information about the operation of the hospital as well as public services, facilitating public feedback mechanisms. enabling more direct participation into the decision making process including consultation exercises at local level, and providing direct support for the treatment process, Internet can potentially help with the multiple challenges facing the effective delivery and administration of basic hospital services such as health and prescription.

The ability to control electron flow is usually applied to information handling or device control (Kaylor, 2001).an optimized online patient record handling system is an information system that involves creating a comfortable, transparent, and cheap interaction between hospital(doc) and patient

2.1 Database

Database is a logical collection of interrelated information, managed and stored as a unit, usually on some form of mass-storage system such as magnetic tape or disk. (Kroenke, 2002)

Database are designed to manage large bodies of information and provide mechanism for the manipulation of information addition, the database system ensures the safety of the information stored (Silberschatz, 2002)

Information is so important in most organization and therefore there is great need of developing large body of concepts and techniques for managing data

2.2 Database Management System

Database management system (DBMS) is a set of computer programs used for organizing the information in a database. A DBMS support the structuring of the database in a standard format and provides tools for data input, verification, storage, retrieval, query and manipulation (Kroenke, 2002).

2.3 Procedure

A procedure is a series of documented actions taken to achieve something. A procedure is more than a single simple task; it can be quite complex and involved such as performing a backup, shutting a system down patching software (lane, 2006)

2.4 Data resources

The raw, unorganized, discrete (separate, isolated) potentially useful facts and figure that are later processed (manipulated) to produce information (lane, 2006). Data has to be processed to be meaningful to the end user by the processor of the information system (Beynon, 2002)

2.5 Information System

Information system is described as any organized combination of people, hardware, software, communication network and data resources that collects, transforms, and disseminates information in an organization.

In broader sense information system is a set of inter-related component working together to collect, process, store and disseminate information to support decision making, co-ordination, control, analysis and visualization of activities in organization. Post, (2002).

2.6 Type of information system

For most organization, there are verities of requirements for information. Senior managers need information to help with their hospital planning. Middle management needs more detailed information to help monitor and control hospital activities. Employees with their operation role need information to help them carry out their duties. A hospital may have several systems operating at the same time. The following are types of information systems according to O' Brien, (2004).

2.6.1 Management Information System

Management information systems are system mainly concerned with internal of information. MIS usually take date from the transaction processing system within the organization. MIS report tends to be used by middle management and operation supervisors. Management information system it used to serve manager with weekly, monthly and yearly reports.

2.6.2 Knowledge Management System (KMS)

Knowledge management System is built around system which allows categorization and distribution of knowledge. For example, the knowledge in word processing, spreadsheets,

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PowerPoint presentation, internet page and so. Can be shared through group collaboration system such as an intranet. Such system share new knowledge among the employees/people in the organization. Examples are, ward processing, desktop publishing, document imaging system and so on

2.6.3 Office Automation System

Office Automation Systems are systems that try to improve the productivity of employees who need to process data and information. Perhaps the best example is the wide range of software systems that exist to improve the productivity of employees working in an office (e.g. Microsoft Office XP) or systems that allow employees to work from home or whilst on the move.

2.7 System related to Hospital

There are several kinds of system in hospital as described by Anderson, (2002). According to O' Brien, (2005), a typical organization has operational, management knowledge and strategic- level systems for each this functional area thus spelling out its application in the business.

2.7.1 Subject-based System

The most well-known type of health information system is the electronic medical record (EMR) or electronic health record (EHR), which is the electronic equivalent of a patient's paper chart. The EHR is a subject-based system that captures and stores information based on a patient's name or medical record number. It may also display information based on a physician's name. For example, a physician can view lists of all her patients who are currently in the hospital

2.7.2 A Hospital Information System

A hospital information system (HIS), variously also called clinical information system (CIS) is a comprehensive, integrated information system designed to manage the administrative, financial and clinical aspects of a hospital. This encompasses paper-based information processing as well as data processing machines.

It can be composed of one or a few software components with specialty-specific extensions as well as of a large variety of sub-systems in medical specialties (e.g. Laboratory Information System, Radiology Information System).

CISs are sometimes separated from HISs in that the former concentrate on patient-related and clinical-state-related data (electronic patient record) whereas against a consistent use of both terms. The latter keeps track of administrative issues. The distinction is not always clear and there is contradictory evidence.

2.7.2.1 Benefits of HIS

Easy Access to Patient Data to generate varied records, including classification based on demographic, gender, age, and so on. It is especially beneficial at ambulatory (out-patient) point, hence enhancing continuity of care. As well as, Internet-based access improves the ability to remotely access such data

It helps as a decision support system for the hospital authorities for developing comprehensive health care policies.

Efficient and accurate administration of finance, diet of patient, engineering, and distribution of medical aid

Improved monitoring of drug usage, and study of effectiveness. This leads to the reduction of adverse drug interactions while promoting more appropriate pharmaceutical utilization.

Enhances information integrity, reduces transcription errors, and reduces duplication of information entries

2.7.3 Integrated Delivery System

Another foundation concept that heightens the need for CRP systems is that of an integrated delivery system (IDS). An ID is composed of health care providers, and facilities organized to provide a continuum of health care services to a defined population. These systems of health care were created in response to payers' desire to contract with single entities that provide comprehensive health care services for their client. To manage the delivery of care in IDS, a health system must have efficient and accurate ways of capturing, managing, and analyzing clinical data collected at all the different sites where care is provided. In addition, payers and regulators are requesting "report cards" on quality, outcomes and costs of care provided b the integrated delivery system. For example, the national committee for Quality Assurance (NCQA) developed the Health Plan Employer Data and Information Set (HEDIS) as a standard report card to help employers evaluate different health plans. Initially focused more on administrative data, the evolving HEDIS criteria are increasingly targeting clinical processes and outcome. Gathering the data to prepare these reports can be immensely time-consuming

and costly when they are manually abstracted from paper records, but with a CPR, reporting on aggregate data can be a byproduct of capturing data electronically. NCQA advised health plans to "move to fully implement the information framework, including the automated patient record" in order to meet the clinical reporting requirements of forthcoming regulations (NCQA, 1997). As outcomes reporting requirements become more sophisticated and deal with complex, multifaceted diseases, it will be essential to have electronic access to the record and tools to efficiently analyze practice patient outcomes. NCQA will develop HEDIS measures that assume health plans and providers organizations use.Dick, E.B Steen, D.E Detmen (1997)

2.7.4 Hospital Information System

Information systems can help the medical profession in improving its quality of service and thus automatically increasing the preparedness and defensiveness. Of course, it is of vital importance that the software must have the right type of modularity and openness so that it is manageable, maintainable and upgradeable. The hardware should also be reliable, available and have the necessary performance capacity. Certainly, computers with their intrinsic power can play a major role in a hospital. Computers can act as a communication link between departments and allows the common database to be shared by them. They can perform the complex task of matching, tabulating, calculating, retrieving, printing and securing the data as required. Well designed, integrated computer system can be a great tool in the hands of the Hospital management in improving services, controlling cost, and ensuring optimal utilization of facilities. Prabhakar A & Visweswara GH: Datanet Corp Ltd., (1997).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter will include research techniques, targeted population, sampling techniques, data collection techniques and data analysis in regards to the research objectives.

3.1 Research Technique

The research employed both quantitative and qualitative techniques .The quantitative technique will expert descriptive and inferential statistic to prevent the data collection and qualitative technique will describe the distribute the design online scheduling appointment

3.2 Data collection techniques

The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, to pass information on to others. Both primary and secondary data were collected, namely: Interview, questionnaires, observation, and document review.

The research focused on the current system in place at Muhimbili Hospital, in the administrative level that uses the system to keep track of database records and communication as well as online collaboration with other departments and organizing references.

3.2.1 Target Population

The target population was the doctors, patient, nurses, and subordinate workers. Apart from the staff other targeted populations are student doctors and nurses.

3.2.2 Sampling Techniques

Random sampling was applied in collecting data from correspondents this method ensured that all the respondents were given equal and fair chances on the study.

3.2.3 Observation

Observation is either an activity of a living being (such as a human), consisting of receiving knowledge of the outside world through the senses citation needed, or the recording of data using scientific instrument. We the researchers are going to observe the activity and the systems that are currently in use in the hospital.

We observed from the first stages whereby a Patient submits his file number at the reception area, when the personnel goes to search the file until it is located and so on. Moreover, we noted the time it takes for the manual files to be located until they reach the doctor's room.

3.2.4 Document analysis

The existing record and document which relate to Muhimbili national hospital will often prove to be useful starting point for analyst's fact finding work. The purpose of searching through existing records is to establish quantitative information about the data and procedures in existing system.

3.2.5 Questionnaires

It is a special purpose document sent out to respondents that allows the analyst to collect information and opinions from the respondents. Questionnaires allow collection of data from a large number of people and then wide distribution ensures that some things remain anonymous leading to more honest answers. The use of standard question format can

yield more reliable data than any other technique. We will use Questionnaires to uncover sensitive information that staff respondents may not feel comfortable revealing to interviewers.

3.2.6 Interview

Interviews are completed by the interviewer based on the feedback of the responder and they are more personal than self-directed questionnaires. Examples include personal, telephone and key informant interview. The face to face interviews will also be used to the employees and employers to identify how it is important to use the system. This method will help to get some facts as it more accurate and cheaper than the other methods of data collection like questionnaires. Therefore this will be done through the help of the interview guide.

3.2.7 Prototyping

This is the process of quickly putting up a working model in order to test various aspect of the design, illustrate ideas or features and gather early user feedback. It's often treated as an integral part of the of the system design process where it's believed to reduce the projects risk and cost. This will bring together the workers and the employers, employees and we the researchers in order we can develop a working model of the system to be designed.

3.3 Data analysis

After gathering the data using data collection techniques explained above, the following stage is to analyze such data into useful information.

Data flow diagrams and Entity-Relationship diagrams will be used to present some information on how the data will move in the system and the relationships between different entities.

3.4 System design

Basically, the system will include User Interfaces that captures data from the user and the user directly interacts with, and the Database that mainly stores the data captured by the User Interface. Thereafter, the database and the User interface will be linked.

The User interfaces will be created by using a software named Dream-Weaver, the database will be created by a software named MySql. And finally, the connection of the User interface to the Database will be done by a language called PHP (WampServer).

3.5 Testing and Implementation

In testing and implementation, the system was built using the above mentioned software tools and later on tested to find out whether it works as anticipated or not.

If the system will work as expected, then it would enter the operation stage where it will be installed in the organization (in this case the organization is Muhimbili hospital).

If the system fails to work as anticipated, we will have to go back to the first stage The Feasibility study.

Below is a diagram that illustrates the System Development Life Cycle

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                              ┌─────────────────────────┐
          ┌──────────────────►│  The feasibility study  │
          │                   │                         │
          │                   └───────────┬─────────────┘
          │                               │
          │                               ▼
          │                   ┌─────────────────────────┐
          │                   │ Detailed systems analysis│
          │                   │                         │
          │                   └───────────┬─────────────┘
          │                               │
  ┌───────┴──────────┐                    │
  │  Maintenance     │                    ▼
  │                  │        ┌─────────────────────────┐
  └──────────────────┘        │ Detailed systems design │
          │                   │                         │
          │                   ├─────────────────────────┤
          │                   │ Specification           │
          │                   └───────────┬─────────────┘
          │                               │
          │                               ▼
          │                   ┌─────────────────────────┐
          │                   │ Implementation:         │
          └──────────────────◄│                         │
                              │ Physical system testing and │
                              │ changeover              │
                              └─────────────────────────┘
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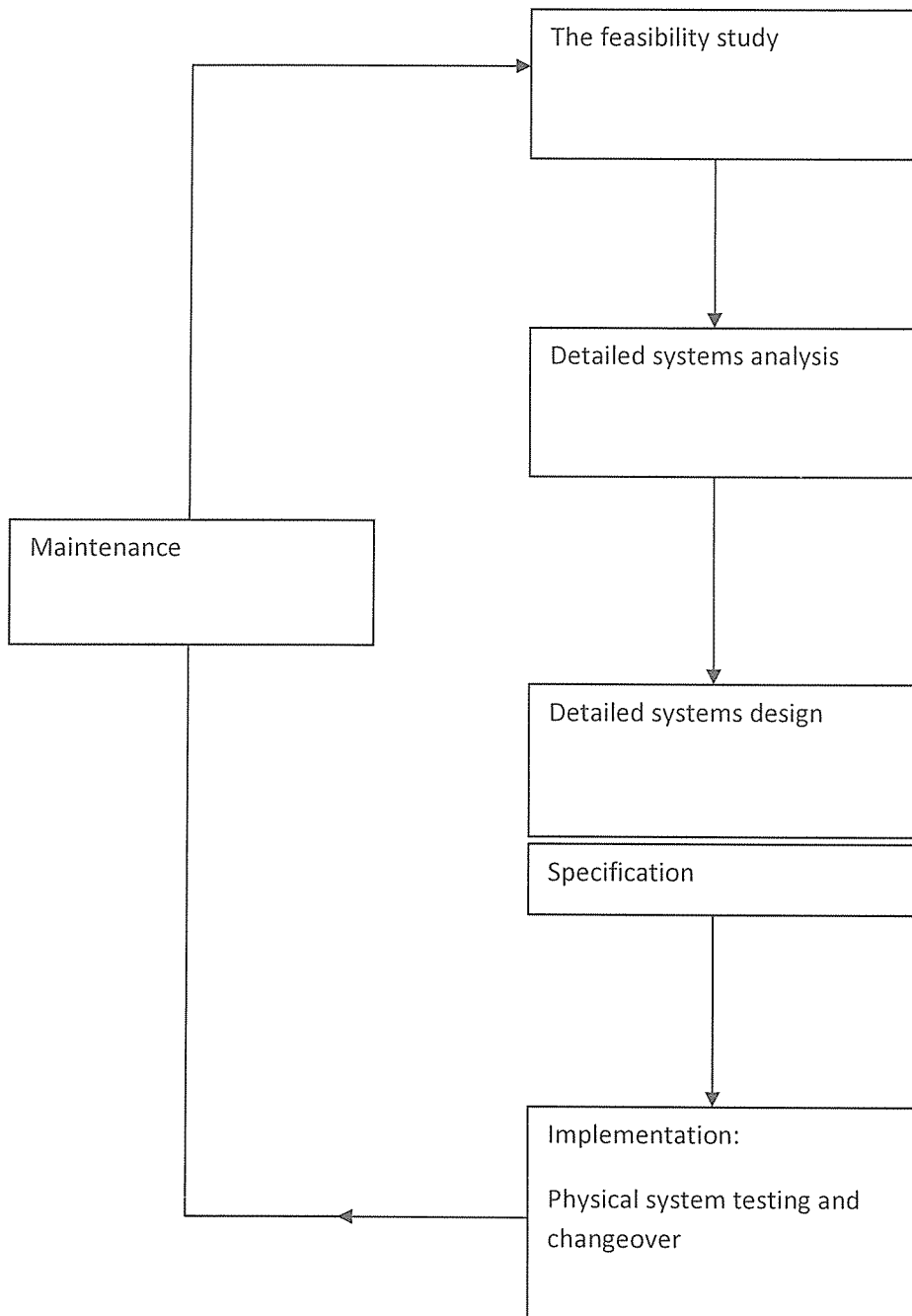
Fig 3: System Development Life Cycle

CHAPTER FOUR

SYSTEM ANALYSIS, DESIGN AND IMPLEMENTATION

4.0 Introduction

This phase involved modeling the logical and physical design of the system, so that the system can manage and handle records in the hospital. The data flow charts illustrate data input and the out put of information for the system.

In the designed, development and implementation, the system was developed using SQL server, JavaScript, HTML and CSS (cascading style sheet), dream weaver and windows operating system to provide a seamless environment for cross sharing of information. There are some data flow diagrams and entity relation diagram illustrate the information flow of the system. A sequence diagram shows different processes or object that live simultaneously where arrows shows the flow of information from one point to another and the order in which events occur.

4.1 System analysis

4.1.1 Responses

Responses were tabulated basing on the judgment of each and every question that was provided by the respondents.

Title	Frequency	Percentage %
Doctors	7	14
Nurses	7	14
Support staff	6	12

Patients	30	60
Total	**50**	**100**

Table 4.1 Responses

Among the questionnaire-respondents, 14 percent where doctors, 14 percent nurse, 6 percent support staffs who are concerned with medical files handling.
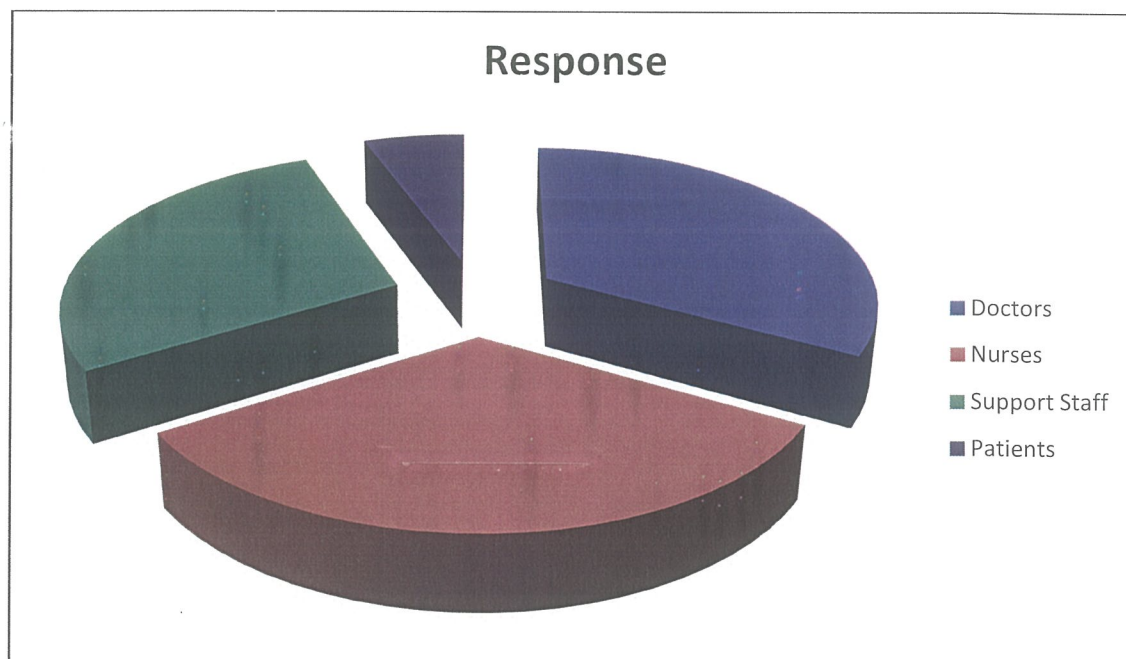
4.1.2 Years served

The following is a table showing the number of years served by the staff and the number of years the patients were served.

Years	Frequency	Percentage %
1-3	12	24
4-6	15	30

7-11	16	32
12-above	7	14

Table 4.2
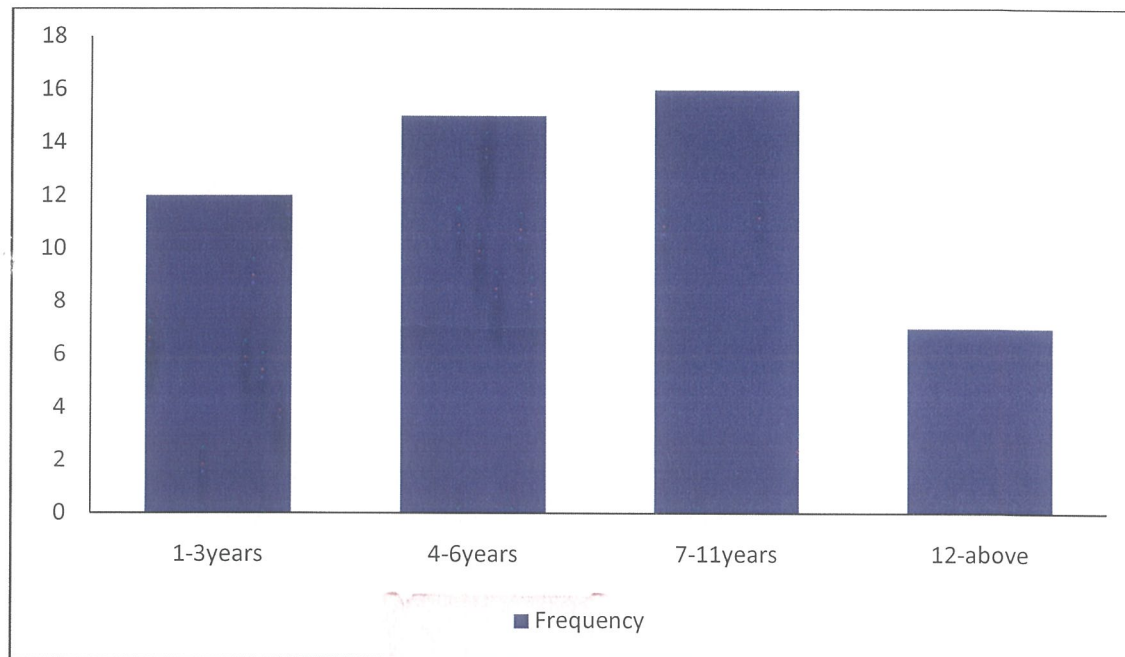
4.1.3 Responses from questions

Table 4.3 Is the current monitoring and evaluation system effective?

Responses	Frequency	Percentage %
Yes	5	10
No	45	90

Response

Yes
No
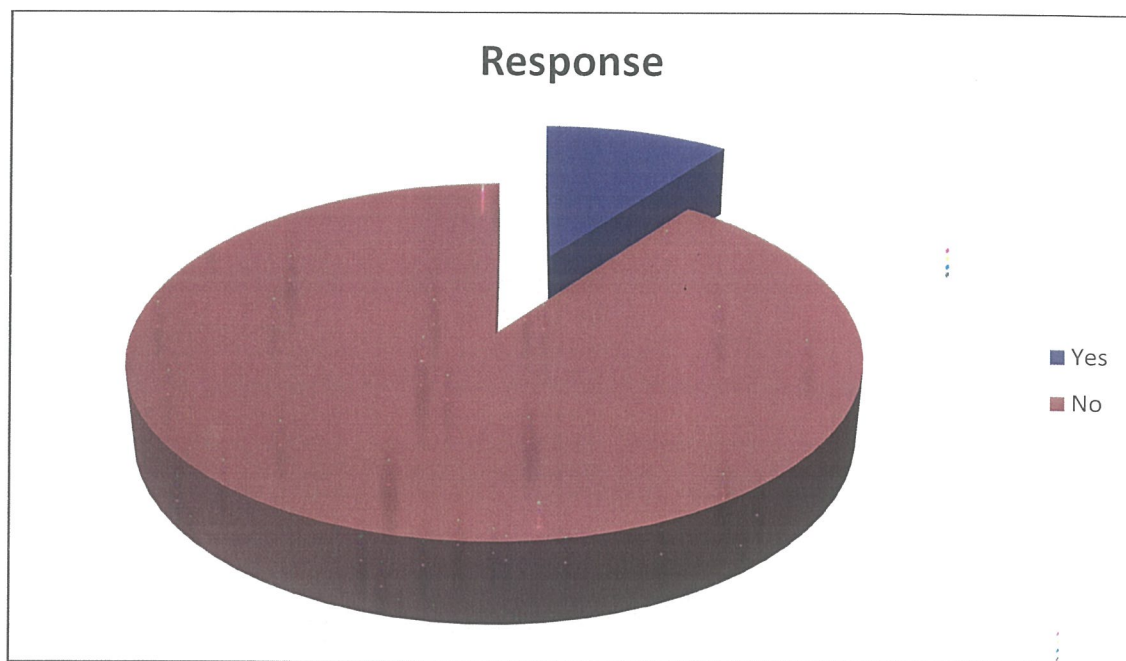
Table 4.4 Do you support the development of online optimize record handling system?

Responses	Frequency	Percentage %
Yes	46	92
No	4	8
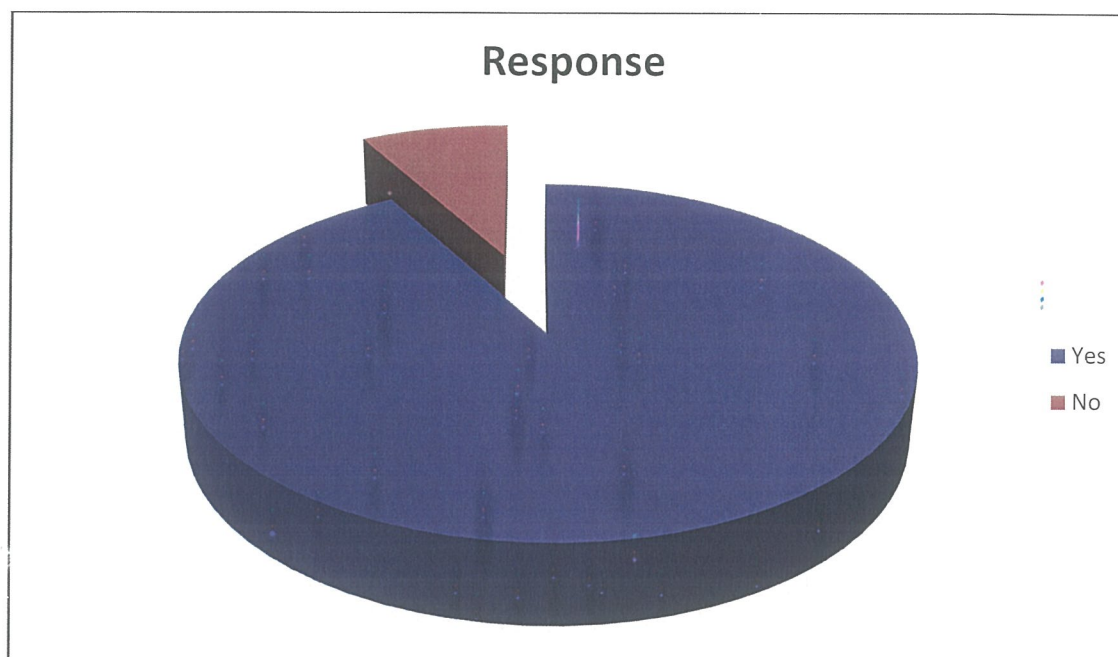
Response

Table 4.5 Does the current system provide adequate accountability on the part of the Hospital.

Responses	Frequency	Percentage %
Yes	20	40
No	30	60

Response

Yes
No
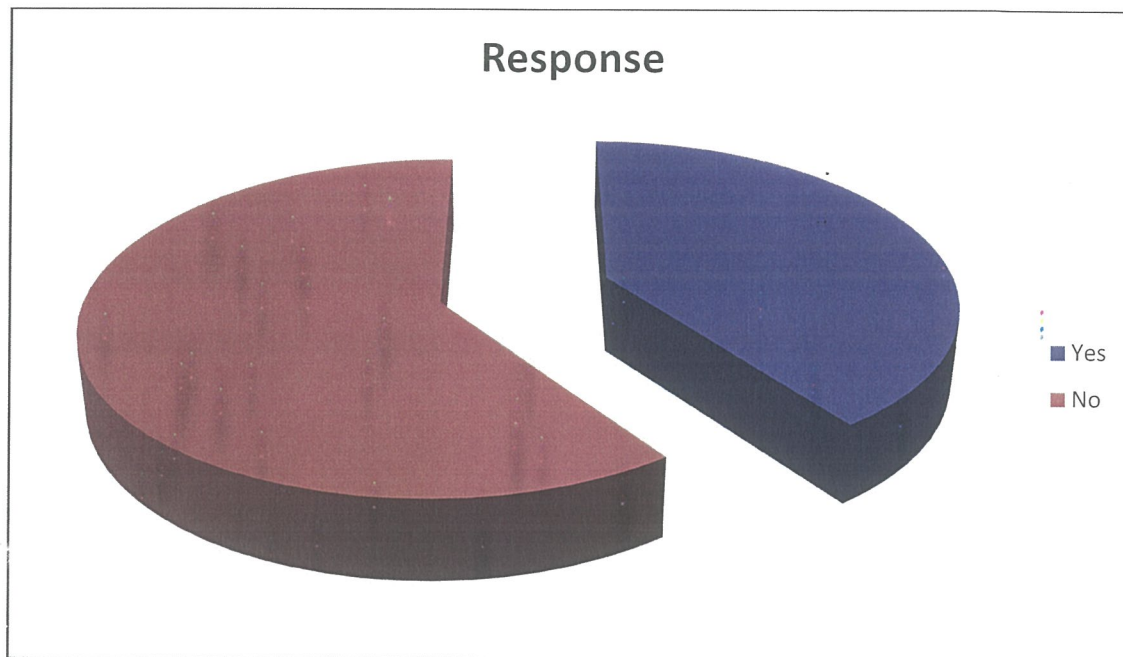
4.1.4 Analysis

As the above finings showed that, the current system has challenges which cause inconveniencies to both the staff and the patients. Thus the need of a new system developed which corrects the shortcomings of the current systems.

4.1.5 Data flow diagram for the current system

Information is entered and manipulated manually, which in turn led to the lose of most of the patient and lack of consistency in the patient history in the medical field. Information output is just recommendation of the kind of medicine that the patient should take. And the cards are store in the files in shelves and tracing that information is tedious.
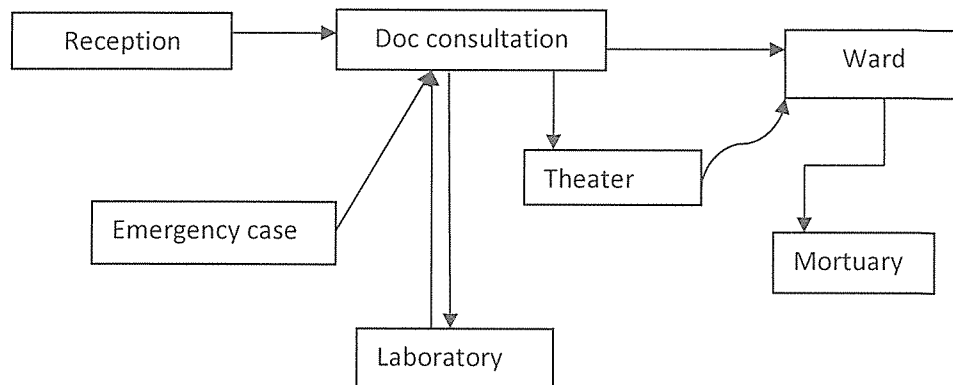
Figure 4.1: Data flow Diagram for the current system

This diagram above illustrates how information flows within the system. The public makes their grievances management or government agencies. Then, the Ministries health and government agencies make programme and project proposals and they fill in the Performances form. These forms help the Ministry keep track i.e. monitoring and evaluation of the programmes and projects.

4.1.6 User requirements

a) The applicants information was entered and be stored in the database.

b) The database was in position to produce relevant reports.

c) The database should retrieve historical information about a given patient.

d) Verification of patient's information.

e) Capture diagnosis results of each patient.

f) The database should check whether a given patient exists in the database.

g) The security of information should be the ultimate goal.

4.1.7 Functional requirements.

a) The system should have the ability to provide data input and output.

b) It should enable users to access patient's history on remote location.

c) Authenticity and system security by use of password at administrator's login time.

d) Show the log of previous administrator of the system

4.1.8 Non-functional requirements.

a) The system allows easy entry and deletion of records by the administrator.

b) Captures, save and retrieve required data.

c) It should be efficient, reliable and allow timely acquisition of required information at convenience.

4.2 System design and Development

The design and development of the system was accomplished through closely following the user requirement and specifications using extreme programming development methodology. This section encompasses the conceptual, logical and physical design of the database system. It deals with the preliminary design then the detailed design. It as well as included diagrams which facilitates the users understanding of the system

4.2.1 Physical Design

Physical design follows the technical systems option in the Structures, Systems Analysis and Design Methodology. From the Requirements Specification, dialogue design is prepared for functions associated with user interaction. Retrieval and Update Functions

are transformed into Retrieval and Update Processes. The major deliverables are the process modules.

The following are the physical designs of the tables to be created within the database;

4.2.1.1 Log-In Table (Medical Personnel)

This is an interface that allows the Medical staff/personnel to verify their identity. If the user is identified by the system, then and only then he/she would be allowed access to the system.

Field	Type	Field size	Key
User_Name	text	50	
Password	varchar	255	PK

4.2.1.2 Log-In Table (Existing Patients)

This is an interface that allows existing/returning patients to verify their identity. If the user is identified by the system, then he/she would be allowed access to the system.

Field	Type	Field size	Key
ID	varchar	255	PK
Names	text	50	

4.2.1.3 Patient Table

This is an interface that captures patients' records. This interface can only be accessed by authorized users with user names and passwords.

Field	Data Type	Field Size	Key
ID	Varchar	255	PK
Names	Text	50	
Date_Of_Birth	Date	50	
Gender	Text	50	
Marital_Status	Text	50	
Phone	int	50	
Email	Text	50	
Residence	Text	50	
Next_of_Kin	Text	50	
NOI_Email	Text	50	
Medical_History	mediumtext	500000	

4.2.2 Logical design

Was concerned with identifying the data i.e. the entities and their attributes as well as the relationships that exists between the data

4.2.3 Database Technology.

Database has a major significance throughout the whole system since it's an on-line system that uses databases on servers to store retrieve and modify patient's information, appointment, patient's diagnosis, specimen/findings from the lab, doctor's scheduler and hence SQL-RDBMS was very vital for the researcher during this stage of design and implementation

4.2.4 Hyper Linked Pages

These are links that connects the pages for easier navigation through the system .links connects the index page to the scheduler, registration, appointments, specimen, findings, diagnosis, doctors available and other inter linked pages.

4.2.5 Design plan or architecture

This was our proposed design for MDT which indicates the information flows in the hospital environment. And the Doctor Scheduler part.

Fig 4.2 A diagram showing information flow in the new system
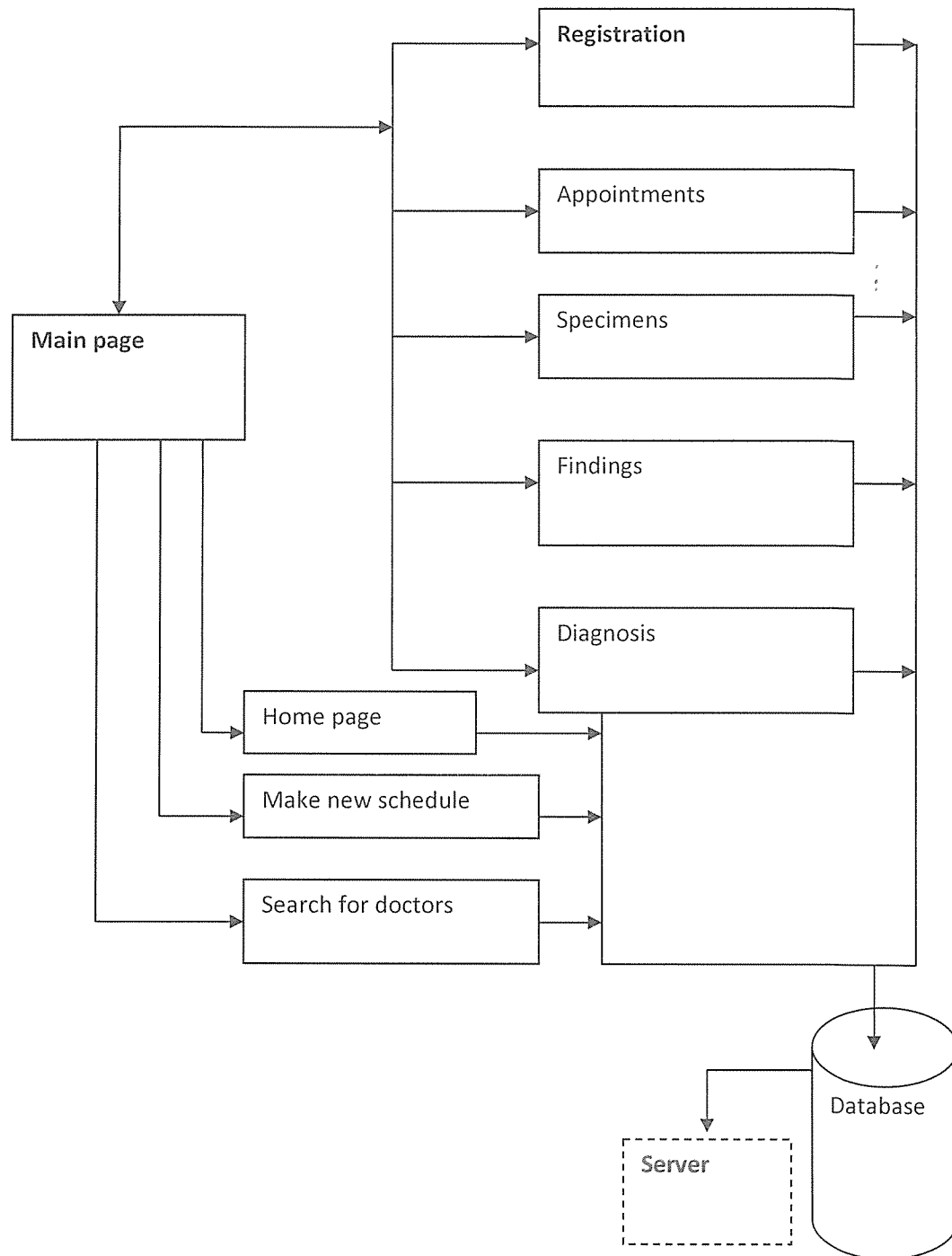
The diagram represents a simple data flow framework that the new system would use. Both information users of the old system and users of new online system would be captured through the new system and then stored into the database.

4.2.6 Response Time

The system will provide a response time of not more that 10 microseconds. It will also provide required information in real time when it is searched.

4.3 System Architecture

4.3.1 Codes

4.3.1.1 Log-In Page (Medical Personnel)

```php
<?php require_once('Connections/conn.php'); ?>

<?php

mysql_select_db($database_conn, $conn);

$query_Recordset1 = "SELECT * FROM personnel";

$Recordset1 = mysql_query($query_Recordset1, $conn) or die(mysql_error());

$row_Recordset1 = mysql_fetch_assoc($Recordset1);

$totalRows_Recordset1 = mysql_num_rows($Recordset1);

?><?php

// *** Validate request to login to this site.

if (!isset($_SESSION)) {

  session_start();

}


$loginFormAction = $_SERVER['PHP_SELF'];

if (isset($_GET['accesscheck'])) {
```

```php
$_SESSION['PrevUrl'] = $_GET['accesscheck'];

}


if (isset($_POST['User_Name'])) {

$loginUsername=$_POST['User_Name'];

$password=$_POST['Password'];

$MM_fldUserAuthorization = "User_Name";

$MM_redirectLoginSuccess = "Patient-new.php";

$MM_redirectLoginFailed = "response.php";

$MM_redirecttoReferrer = false;

mysql_select_db($database_conn, $conn);


$LoginRS__query=sprintf("SELECT User_Name, Password, User_Name FROM
personnel WHERE User_Name='%s' AND Password='%s'",

get_magic_quotes_gpc() ? $loginUsername : addslashes($loginUsername),
get_magic_quotes_gpc() ? $password : addslashes($password));


$LoginRS = mysql_query($LoginRS__query, $conn) or die(mysql_error());

$loginFoundUser = mysql_num_rows($LoginRS);

if ($loginFoundUser) {


  $loginStrGroup  = mysql_result($LoginRS,0,'User_Name');


  //declare two session variables and assign them

  $_SESSION['MM_Username'] = $loginUsername;

  $_SESSION['MM_UserGroup'] = $loginStrGroup;
```

```php
    if (isset($_SESSION['PrevUrl']) && false) {

      $MM_redirectLoginSuccess = $_SESSION['PrevUrl'];

    }

    header("Location: " . $MM_redirectLoginSuccess );

  }

  else {

    header("Location: ". $MM_redirectLoginFailed );

  }

}

?>
```

```html
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml"><!-- InstanceBegin
template="file:///C|/wamp/www/Templates/PAT.dwt"
codeOutsideHTMLIsLocked="false" -->

<head>

<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />

<!-- InstanceBeginEditable name="doctitle" -->

<title>Medical Personnel</title>

<!-- InstanceEndEditable -->

<!-- InstanceBeginEditable name="head" --><!-- InstanceEndEditable -->

<style type="text/css">

<!--

body,td,th {

        color: #FFFFFF;
```

```css
}
body {
        background-color: #000033;
}
#Layer1 {
        position:absolute;
        width:750px;
        height:32px;
        z-index:1;
        top: 255px;
}
#Layer2 {
        position:absolute;
        width:120px;
        height:35px;
        z-index:2;
        top: 250px;
        left: 16px;
}
#Layer3 {
        position:absolute;
        width:137px;
        height:33px;
        z-index:3;
        left: 206px;
```

```
        top: 186px;

}

#Layer4 {

        position:absolute;

        width:126px;

        height:30px;

        z-index:4;

        left: 842px;

        top: 247px;

}

#Layer5 {

        position:absolute;

        width:165px;

        height:34px;

        z-index:1;

        left: 393px;

        top: -1px;

}

.style1 {font-size: 24px}

#Layer6 {

        position:absolute;

        width:133px;

        height:30px;

        z-index:5;

        left: 640px;
```

```css
        top: 247px;

}
#Layer7 {

        position:absolute;

        width:134px;

        height:33px;

        z-index:6;

        left: 624px;

        top: 188px;

}
#Layer8 {

        position:absolute;

        width:200px;

        height:462px;

        z-index:6;

        left: 761px;

        top: 303px;

}
a:link {

        color: #FFFFFF;

}
a:visited {

        color: #FFFFFF;

}
a:hover {
```

```html
<p><img src="IMAGES/PIC4.png" width="980" height="91" /><img
src="IMAGES/pic3.png" width="979" height="134" /></p>

<p> </p>

<div id="Layer2">

  <div align="center"><!-- InstanceBeginEditable name="hl" -->Home<!--
InstanceEndEditable --></div>

</div>

<div id="Layer6"><!-- InstanceBeginEditable name="hl1" -->

  <div align="center">About Us </div>

<!-- InstanceEndEditable --></div>

<div id="Layer9">

  <div align="center"><a href="Link.php">Patient</a><a href="login.php"></a></div>

</div>

<div id="Layer10">

  <div align="center"><a href="medical_personnel.php">Medical Personnel </a></div>

</div>

<div id="Layer4">

  <div align="center"><!-- InstanceBeginEditable name="hl2" -->Contact Us <!--
InstanceEndEditable --></div>

</div>

<table width="746" border="0" cellpadding="0" cellspacing="0">

  <!--DWLayoutDefaultTable-->

  <tr>

    <td width="746" height="399" valign="top"><!-- InstanceBeginEditable
name="body" -->

      <form id="form1" name="form1" method="POST" action="<?php echo
$loginFormAction; ?>">
```

```html
<div align="center">
  <table width="200" border="1">
    <tr>
      <td>User_Name</td>
      <td><input name="User_Name" type="text" id="User_Name" /></td>
    </tr>
    <tr>
      <td>Password</td>
      <td><input name="Password" type="password" id="Password" /></td>
    </tr>
  </table>
  <p>
    <input type="submit" name="Submit" value="Submit" />
    <input name="Reset" type="reset" id="Reset" value="Reset" />
  </p>
</div>
</form>
<p> </p>
<!-- InstanceEndEditable -->
<p> </p>
<p> </p>
<p> </p>
<p> </p>
<p> </p>
<p> </p>
```

```
<tr>

  <td><div align="center">Week-end</div></td>

</tr>

<tr>

  <td>6:00am-8:00am</td>

</tr>

<tr>

  <td>2:00pm-6:00pm</td>

</tr>

 </table>

</div>

</body>

<!-- InstanceEnd --></html>

<?php

mysql_free_result($Recordset1);

?>
```

4.3.1.2 Log-In Page (Existing/returning Patients)

```
<?php require_once('Connections/conn2.php'); ?>

<?php

mysql_select_db($database_conn2, $conn2);

$query_Recordset1 = "SELECT * FROM loginpatient";

$Recordset1 = mysql_query($query_Recordset1, $conn2) or die(mysql_error());

$row_Recordset1 = mysql_fetch_assoc($Recordset1);

$totalRows_Recordset1 = mysql_num_rows($Recordset1);
```

```php
?><?php
// *** Validate request to login to this site.
if (!isset($_SESSION)) {

  session_start();

}


$loginFormAction = $_SERVER['PHP_SELF'];
if (isset($_GET['accesscheck'])) {

  $_SESSION['PrevUrl'] = $_GET['accesscheck'];

}


if (isset($_POST['ID'])) {

  $loginUsername=$_POST['ID'];

  $password=$_POST['Names'];

  $MM_fldUserAuthorization = "ID";

  $MM_redirectLoginSuccess = "Patient-new.php";

  $MM_redirectLoginFailed = "response.php";

  $MM_redirecttoReferrer = false;

  mysql_select_db($database_conn2, $conn2);


  $LoginRS__query=sprintf("SELECT ID, Names, ID FROM loginpatient WHERE
ID='%s' AND Names='%s'",

  get_magic_quotes_gpc() ? $loginUsername : addslashes($loginUsername),
get_magic_quotes_gpc() ? $password : addslashes($password));


  $LoginRS = mysql_query($LoginRS__query, $conn2) or die(mysql_error());
```

45

```php
$loginFoundUser = mysql_num_rows($LoginRS);

if ($loginFoundUser) {


  $loginStrGroup  = mysql_result($LoginRS,0,'ID');


  //declare two session variables and assign them
  $_SESSION['MM_Username'] = $loginUsername;

  $_SESSION['MM_UserGroup'] = $loginStrGroup;


  if (isset($_SESSION['PrevUrl']) && false) {

    $MM_redirectLoginSuccess = $_SESSION['PrevUrl'];

  }

  header("Location: " . $MM_redirectLoginSuccess );

}

else {

  header("Location: ". $MM_redirectLoginFailed );

}

}
?>
```

```html
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml"><!-- InstanceBegin
template="file:///C|/wamp/www/Templates/PAT.dwt"
codeOutsideHTMLIsLocked="false" -->

<head>

<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
```

```
<!-- InstanceBeginEditable name="doctitle" -->

<title>Existing Patient</title>

<!-- InstanceEndEditable -->

<!-- InstanceBeginEditable name="head" --><!-- InstanceEndEditable -->

<style type="text/css">

<!--

body,td,th {

        color: #FFFFFF;

}

body {

        background-color: #000033;

}

#Layer1 {

        position:absolute;

        width:750px;

        height:32px;

        z-index:1;

        top: 255px;

}

#Layer2 {

        position:absolute;

        width:120px;

        height:35px;

        z-index:2;

        top: 250px;
```

```
        left: 16px;

}

#Layer3 {

        position:absolute;

        width:137px;

        height:33px;

        z-index:3;

        left: 206px;

        top: 186px;

}

#Layer4 {

        position:absolute;

        width:126px;

        height:30px;

        z-index:4;

        left: 842px;

        top: 247px;

}

#Layer5 {

        position:absolute;

        width:165px;

        height:34px;

        z-index:1;

        left: 393px;

        top: -1px;
```

```
}
.style1 {font-size: 24px}
#Layer6 {
        position:absolute;
        width:133px;
        height:30px;
        z-index:5;
        left: 640px;
        top: 247px;
}
#Layer7 {
        position:absolute;
        width:134px;
        height:33px;
        z-index:6;
        left: 624px;
        top: 188px;
}
#Layer8 {
        position:absolute;
        width:200px;
        height:462px;
        z-index:6;
        left: 761px;
        top: 303px;
```

```css
}
a:link {
        color: #FFFFFF;
}
a:visited {
        color: #FFFFFF;
}
a:hover {
        color: #FFFFFF;
}
a:active {
        color: #FFFFFF;
}
#Layer9 {
        position:absolute;
        width:153px;
        height:34px;
        z-index:7;
        left: 407px;
        top: 253px;
}
#Layer10 {
        position:absolute;
        width:159px;
        height:32px;
```

```
            z-index:8;

            left: 186px;

            top: 254px;

}

-->

</style></head>


<body>

<p><img src="IMAGES/PIC4.png" width="980" height="91" /><img
src="IMAGES/pic3.png" width="979" height="134" /></p>

<p> </p>

<div id="Layer2">

  <div align="center"><!-- InstanceBeginEditable name="hl" -->Home<!--
InstanceEndEditable --></div>

</div>

<div id="Layer6"><!-- InstanceBeginEditable name="hl1" -->

  <div align="center">About Us </div>

<!-- InstanceEndEditable --></div>

<div id="Layer9">

  <div align="center"><a href="Link.php">Patient</a><a href="login.php"></a></div>

</div>

<div id="Layer10">

  <div align="center"><a href="medical_personnel.php">Medical Personnel </a></div>

</div>

<div id="Layer4">
```

```
<div align="center"><!-- InstanceBeginEditable name="hl2" -->Contact Us <!--
InstanceEndEditable --></div>

</div>

<table width="746" border="0" cellpadding="0" cellspacing="0">

<!--DWLayoutDefaultTable-->

<tr>

  <td width="746" height="399" valign="top"><!-- InstanceBeginEditable
name="body" -->

    <form id="form1" name="form1" method="POST" action="<?php echo
$loginFormAction; ?>">

      <div align="center">

        <table width="200" border="1">

          <tr>

            <td>ID</td>

            <td><input name="ID" type="password" id="ID" /></td>

          </tr>

          <tr>

            <td>Names</td>

            <td><input name="Names" type="text" id="Names" /></td>

          </tr>

        </table>

        <p>

          <input type="submit" name="Submit" value="Submit" />

          <input name="Reset" type="reset" id="Reset" value="Reset" />

        </p>

      </div>
```

```html
    </form>

    <!-- InstanceEndEditable -->

    <p> </p>

  <p> </p>

  <p> </p>

  <p> </p>

  <p> </p>

  <p> </p>

  <p> </p>

  <p> </p>

  <hr />    <p align="center">Copyright &copy; 2011 Muhimbili National Hospital </p>

  <p align="center">Designed by </p>

  <p align="center">Neema Ahmed Mwinge &amp; Henry Gitau </p></td>

 </tr>
</table>
<div id="Layer8"><img src="IMAGES/Maternity%20Ward.jpg" width="236"
height="279" />
 <table width="236" border="1">
  <tr>
   <td><div align="center">Visiting hours </div></td>
  </tr>
  <tr>
   <td><div align="center">Week days: </div></td>
  </tr>
  <tr>
```

```html
      <td>6:00am-7:00am</td>

    </tr>

    <tr>

      <td>12:00noon-2:00pm</td>

    </tr>

    <tr>

      <td>4:00pm-6:00pm</td>

    </tr>

    <tr>

      <td><div align="center">Week-end</div></td>

    </tr>

    <tr>

      <td>6:00am-8:00am</td>

    </tr>

    <tr>

      <td>2:00pm-6:00pm</td>

    </tr>

  </table>

</div>

</body>

<!-- InstanceEnd --></html>

<?php

mysql_free_result($Recordset1);

?>
```

4.3.1.3 Patient Record Page

```html
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml"><!-- InstanceBegin
template="file:///C|/wamp/www/Templates/PAT.dwt"
codeOutsideHTMLIsLocked="false" -->

<head>

<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />

<!-- InstanceBeginEditable name="doctitle" -->

<title>New Patient</title>

<!-- InstanceEndEditable -->

<!-- InstanceBeginEditable name="head" -->

<style type="text/css">

<!--

.style2 {font-size: 18px}

-->

</style>

<!-- InstanceEndEditable -->

<style type="text/css">

<!--

body,td,th {

        color: #FFFFFF;

}

body {

        background-color: #000033;

}
```

55

```css
#Layer1 {
        position:absolute;
        width:750px;
        height:32px;
        z-index:1;
        top: 255px;
}
#Layer2 {
        position:absolute;
        width:120px;
        height:35px;
        z-index:2;
        top: 250px;
        left: 16px;
}
#Layer3 {
        position:absolute;
        width:137px;
        height:33px;
        z-index:3;
        left: 206px;
        top: 186px;
}
#Layer4 {
        position:absolute;
```

```
        width:126px;

        height:30px;

        z-index:4;

        left: 842px;

        top: 247px;

}

#Layer5 {

        position:absolute;

        width:165px;

        height:34px;

        z-index:1;

        left: 393px;

        top: -1px;

}

.style1 {font-size: 24px}

#Layer6 {

        position:absolute;

        width:133px;

        height:30px;

        z-index:5;

        left: 640px;

        top: 247px;

}

#Layer7 {

        position:absolute;
```

```css
        width:134px;

        height:33px;

        z-index:6;

        left: 624px;

        top: 188px;

}
#Layer8 {

        position:absolute;

        width:200px;

        height:462px;

        z-index:6;

        left: 761px;

        top: 303px;

}
a:link {

        color: #FFFFFF;

}
a:visited {

        color: #FFFFFF;

}
a:hover {

        color: #FFFFFF;

}
a:active {

        color: #FFFFFF;
```

```
}
#Layer9 {

        position:absolute;

        width:153px;

        height:34px;

        z-index:7;

        left: 407px;

        top: 253px;

}
#Layer10 {

        position:absolute;

        width:159px;

        height:32px;

        z-index:8;

        left: 186px;

        top: 254px;

}
-->
</style></head>

<body>
<p><img src="IMAGES/PIC4.png" width="980" height="91" /><img
src="IMAGES/pic3.png" width="979" height="134" /></p>

<p> </p>

<div id="Layer2">
```

```
<div align="center"><!-- InstanceBeginEditable name="hl" --><a
href="HomePage.php">Home</a><!-- InstanceEndEditable --></div>

</div>

<div id="Layer6"><!-- InstanceBeginEditable name="hl1" -->

  <div align="center"><a href="AboutUs.php">About Us </a></div>

<!-- InstanceEndEditable --></div>

<div id="Layer9">

  <div align="center"><a href="Link.php">Patient</a><a href="login.php"></a></div>

</div>

<div id="Layer10">

  <div align="center"><a href="medical_personnel.php">Medical Personnel </a></div>

</div>

<div id="Layer4">

  <div align="center"><!-- InstanceBeginEditable name="hl2" --><a
href="ContactUs.php">Contact Us</a><!-- InstanceEndEditable --></div>

</div>

<table width="746" border="0" cellpadding="0" cellspacing="0">

  <!--DWLayoutDefaultTable-->

  <tr>

    <td width="746" height="399" valign="top"><!-- InstanceBeginEditable
name="body" -->

      <div align="center">

        <form id="form1" name="form1" method="post" action="insert.php">

          <p> </p>

          <table width="200" border="1">

            <tr>
```

```html
<td>ID</td>
<td><input name="ID" type="text" id="ID" /></td>
</tr>
<tr>
<td>Names</td>
<td><input name="Names" type="text" id="Names" /></td>
</tr>
<tr>
<td>Date_Of_Birth</td>
<td><input name="Date_Of_Birth" type="text" id="Date_Of_Birth" /></td>
</tr>
<tr>
<td>Gender</td>
<td><input name="Gender" type="text" id="Gender" /></td>
</tr>
<tr>
<td>Marital_Status</td>
<td><input name="Marital_Status" type="text" id="Marital_Status" /></td>
</tr>
<tr>
<td>Phone</td>
<td><input name="Phone" type="text" id="Phone" /></td>
</tr>
<tr>
<td>Email</td>
```

```html
<td><input name="Email" type="text" id="Email" /></td>
</tr>
<tr>
<td>Residence</td>
<td><input name="Residence" type="text" id="Residence" /></td>
</tr>
<tr>
<td>Next_of_Kin</td>
<td><input name="Next_of_Kin" type="text" id="Next_of_Kin" /></td>
</tr>
<tr>
<td>NOI_Email</td>
<td><input name="NOI_Email" type="text" id="NOI_Email" /></td>
</tr>
<tr>
<td>Medical_History</td>
<td><input name="Medical_History" type="text" id="Medical_History"
value="" /></td>
</tr>
</table>
<p>
<input type="submit" name="Submit" value="Submit" />
<input name="Reset" type="reset" id="Reset" value="Reset" />
</p>
<p class="style2"><a href="Patient-existing-login.php">Go back to Log-
In</a></p>
```

```
    </form>

    </div>

    <!-- InstanceEndEditable -->

    <p> </p>

    <p> </p>

    <p> </p>

    <p> </p>

    <p> </p>

    <p> </p>

    <p> </p>

    <p> </p>

    <hr />    <p align="center">Copyright &copy; 2011 Muhimbili National Hospital </p>

    <p align="center">Designed by </p>

    <p align="center">Neema Ahmed Mwinge &amp; Henry Gitau </p></td>

  </tr>

</table>

<div id="Layer8"><img src="IMAGES/Maternity%20Ward.jpg" width="236"
height="279" />

  <table width="236" border="1">

    <tr>

      <td><div align="center">Visiting hours </div></td>

    </tr>

    <tr>

      <td><div align="center">Week days: </div></td>

    </tr>
```

```
      <tr>
        <td>6:00am-7:00am</td>
      </tr>
      <tr>
        <td>12:00noon-2:00pm</td>
      </tr>
      <tr>
        <td>4:00pm-6:00pm</td>
      </tr>
      <tr>
        <td><div align="center">Week-end</div></td>
      </tr>
      <tr>
        <td>6:00am-8:00am</td>
      </tr>
      <tr>
        <td>2:00pm-6:00pm</td>
      </tr>
  </table>
</div>
</body>
<!-- InstanceEnd --></html>
```

4.3.1.4 Connect Page (connects the Log-In Medical personnel interface to the database and relevant table)

```
<html>

<body>

<?php

$con= mysql_connect("localhost","root","");

mysql_select_db("medical",$con);

mysql_query("insert into personnel (User_Name,Password) values
('$_POST[User_Name]','$_POST{Password}')");

?>

</body>

</html>
```

4.3.1.5 Connect Page (connects the Log-In Existing Patient interface to the database and relevant table)

```
</html>

<body>

 <?php

$con= mysql_connect("localhost","root","");

mysql_select_db("medical",$con);

mysql_query("insert into loginpatient (ID,Names) values
('$_POST[ID]','$_POST{Names}')");

?>

</body>

</html>
```

4.3.1.6 Insert

```php
<html>

<body>

<p>

 <?php

$con=mysql_connect("localhost","root","");

mysql_select_db("medical",$con);

$sql=("insert into patient values
('$_POST[ID]','$_POST[Names]','$_POST[Date_Of_BirthID]','$_POST[Gender]','$_PO
ST[Marital_Status]','$_POST[Phone]','$_POST[Email]','$_POST[Residence]','$_POST[N
ext_of_Kin]','$_POST[NOI_Email]','$_POST[Medical_History]')");

if (mysql_query($sql,$con))

{

echo "Record added";

}

else

{

echo "Record not added";

}

?>

</p>

<p align="center" class="style1"><a href="HomePage.php">Go back Home</a></p>

</body>

</html>
```

4.3.1.7 Retrieval

```php
<html>
<body>
<?php
$con=mysql_connect("localhost","root","");
mysql_select_db("medical",$con);
$result=mysql_query("SELECT * from patient");
echo"<table>
<tr>
<th>ID</td>
<th>Names</td>
<th>Date_Of_Birth</td>
<th>Gender</td>
<th>Marital_Status</td>
<th>Phone</td>
<th>Email</td>
<th>Rssidence</td>
<th>Next_of_Kin</td>
<th>NOI_Email</td>
<th>Medical_History</td>
</tr>';
while ($row=mysql_fetch_array($result))
(
```

```
echo"<tr>";

echo"<td>"$row["ID"]"</td>";

echo"<td>"$row["Names"]"</td>";

echo"<td>"$row["Date_Of_Birth"]"</td>";

echo"<td>"$row["Gender"]"</td>";

echo"<td>"$row["Marital_Status"]"</td>";

echo"<td>"$row["Phone"]"</td>";

echo"<td>"$row["Email"]"</td>";

echo"<td>"$row["Rssidence"]"</td>";

echo"<td>"$row["Next_of_Kin"]"</td>";

echo"<td>"$row["NOI_Email"]"</td>";

echo"<td>"$row["Medical_History"]"</td>";

echo"</tr>";

)

echo"</table>";

mysql_close($con);

?>

</body>

</html>
```

4.3.2 User Interfaces

4.3.2.1 Home Page

This page introduces the website to the user of the system and provides links which allows the user to navigate throughout the website.
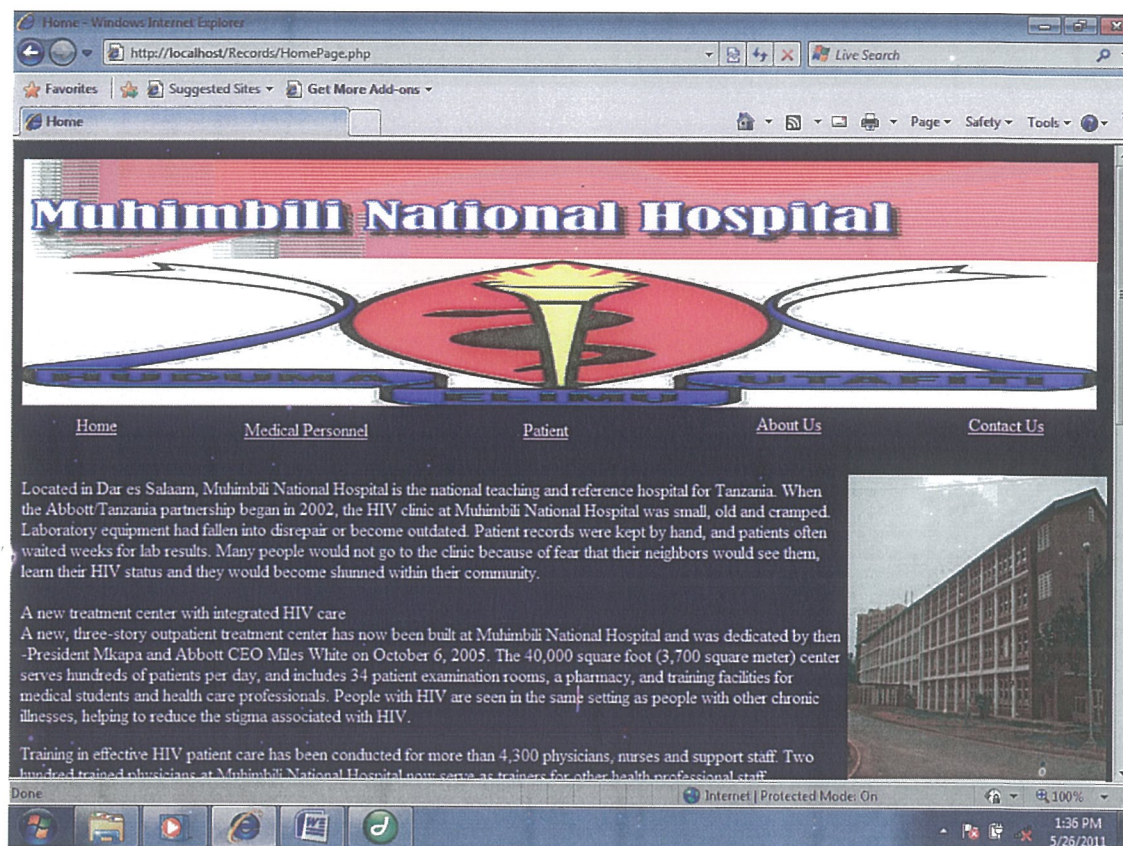
Fig 4.1 Home Page

4.3.2.2 Log-In Page (Medical personnel)

This page requires authentication of the system user by issuing User name and password

before given access to Patients' Records page.
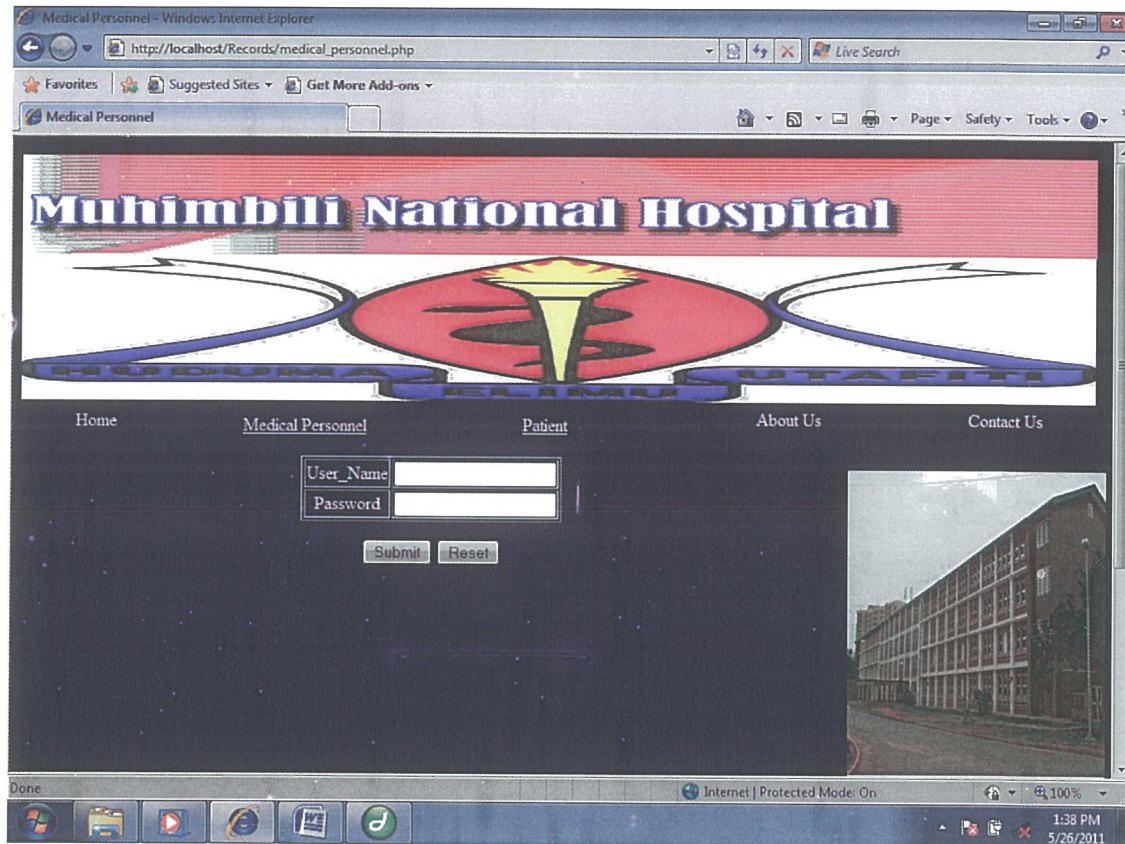
Fig 4.2 Log-In Page

4.3.2.3 Log-In Page (Existing Patients)

This page requires authentication of the system user by issuing ID and Name

before given access to Patients' Records page.
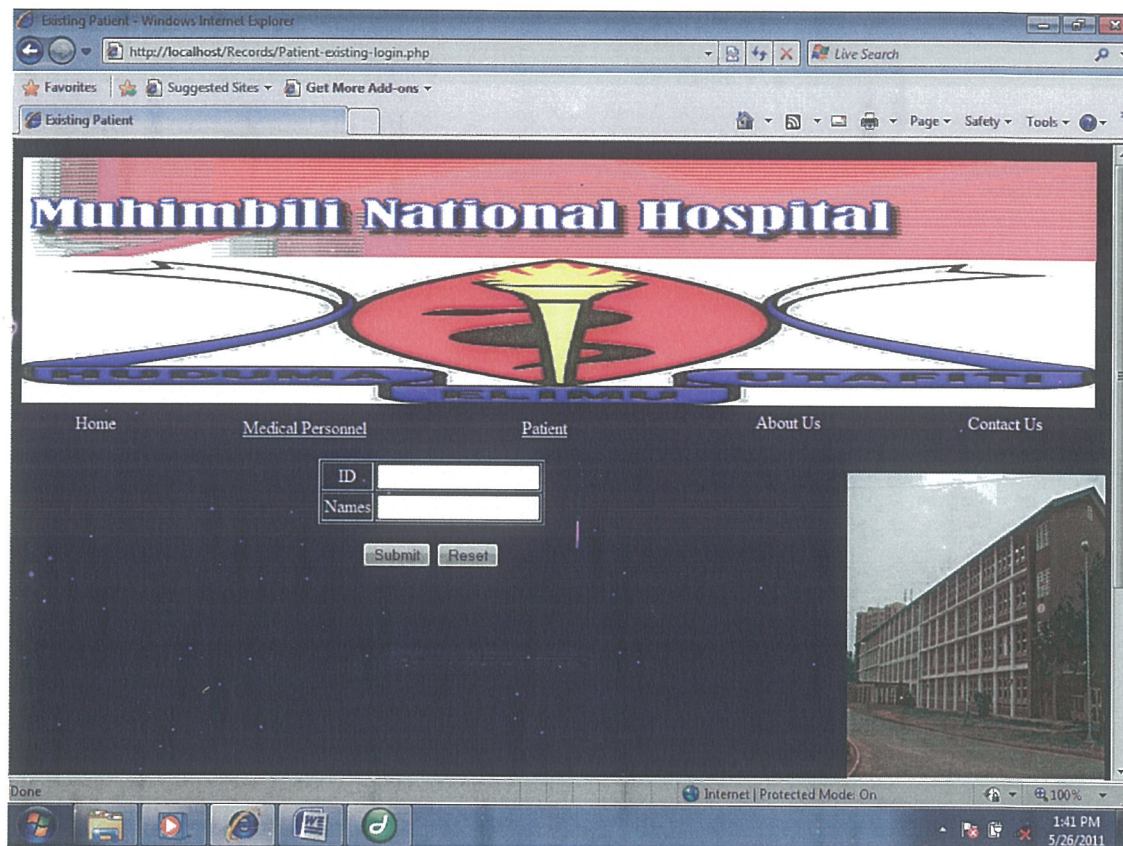
Fig 4.3 Log-In Page

4.3.2.4 Patient Record Page

This page has a form which captures, stores and reveals patients' records. After authentication in the previous page, if access is allowed, only then this page can be viewed.

Fig 4.4 Patient Record Page

4.3.2.5 About Us

This page tells the origins and all about the Muhimbili National hospital.
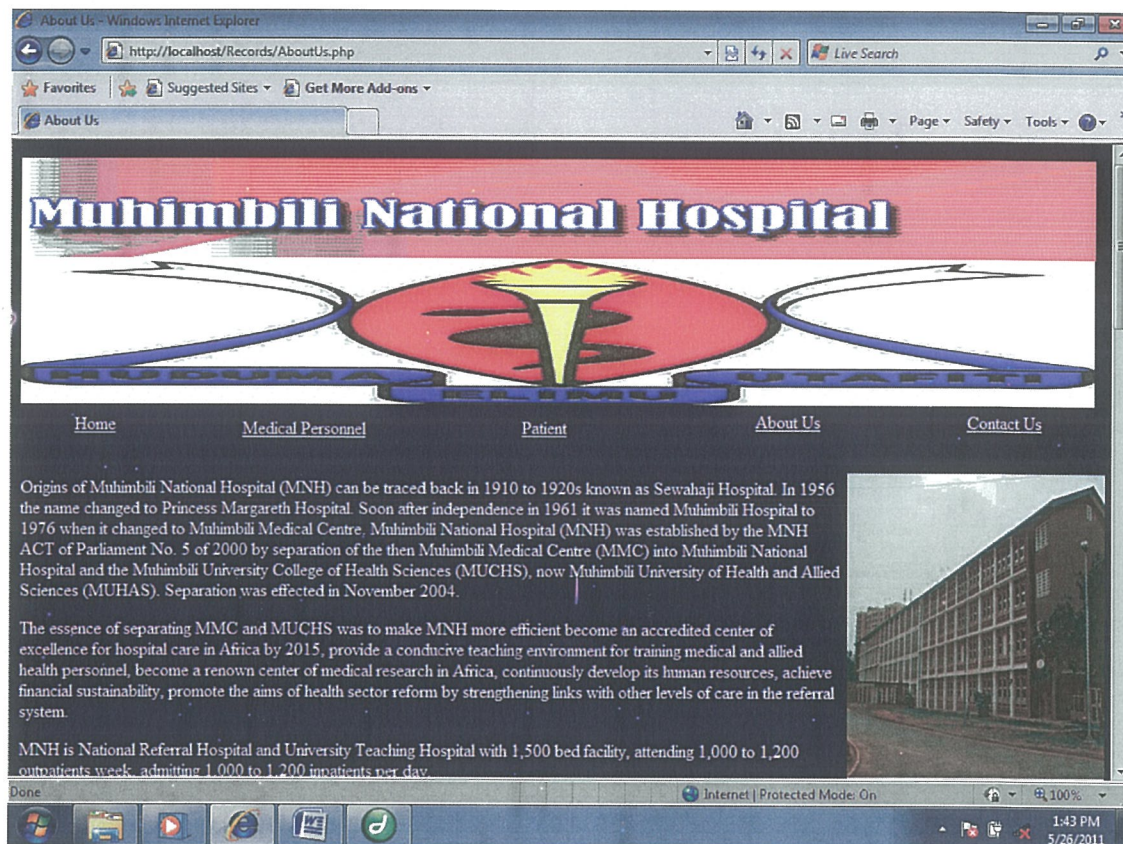
Fig 4.5 About Muhimbili National Hospital

4.3.2.6 Contact Us

This page displays the contact addresses and details of the Muhimbili National Hospital.
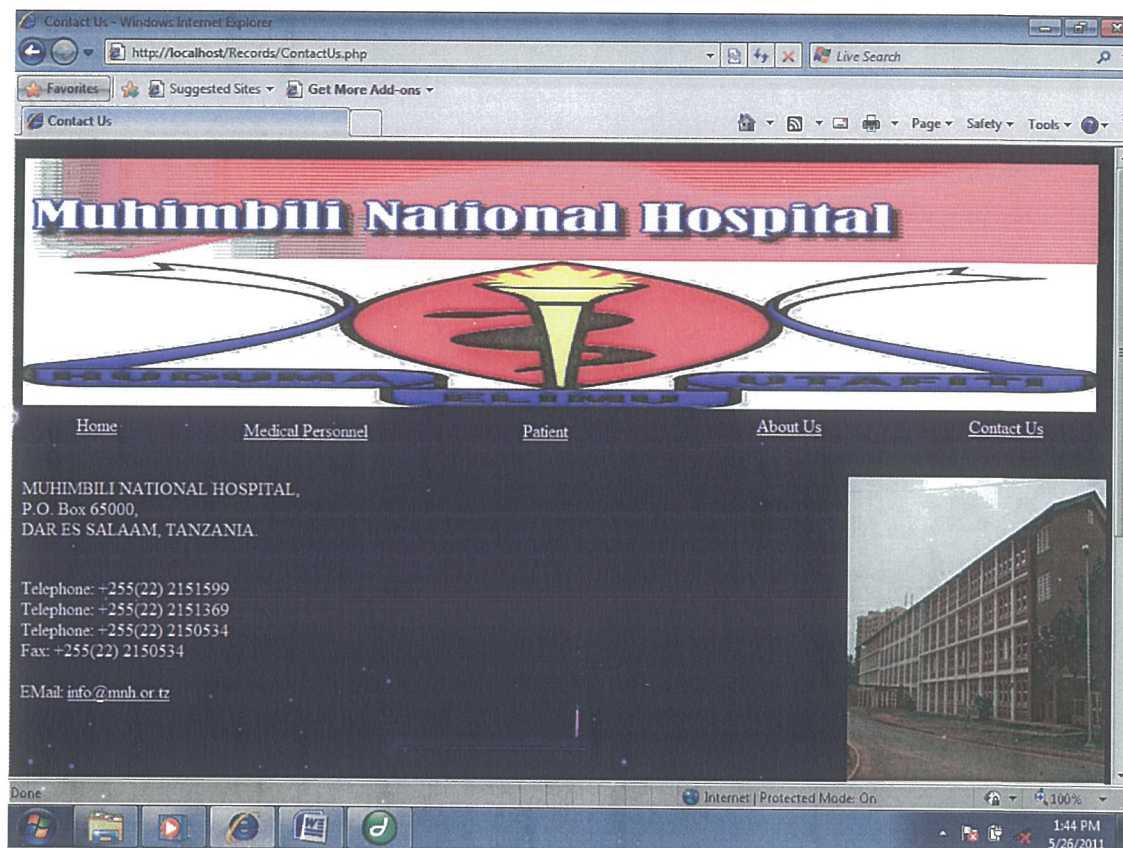
Fig 4.6 Contact Us

4.4 System Functionality

When on the Home Page of the system, the Medical Personnel or the Patient clicks on their respective links i.e Medical Personnel and Patient respectively, where the log-in page appears.

After entering their identities, if the system recognizes them, access is allowed to them so they can enter into the system. If the system does not recognizes their identities, then a page appears informing them that access was denied.

In the case of new patients, after clicking on the "Patient" link at the top of the page, a page comes where the new patient enters his/her details and then clicks a submit button. A page appears informing the user whether the record set was added to the database or not.

4.5 Database (MySql)

Below is the database named Medical which was created in MySql. The database has three tables; loginpatient, personnel and patient.

Furthermore, the recordsets in the table "patient" are displayed. This illustrates that the data entered from the User Interface i.e Patient Page, was captured and stored in the relevant table within the database.
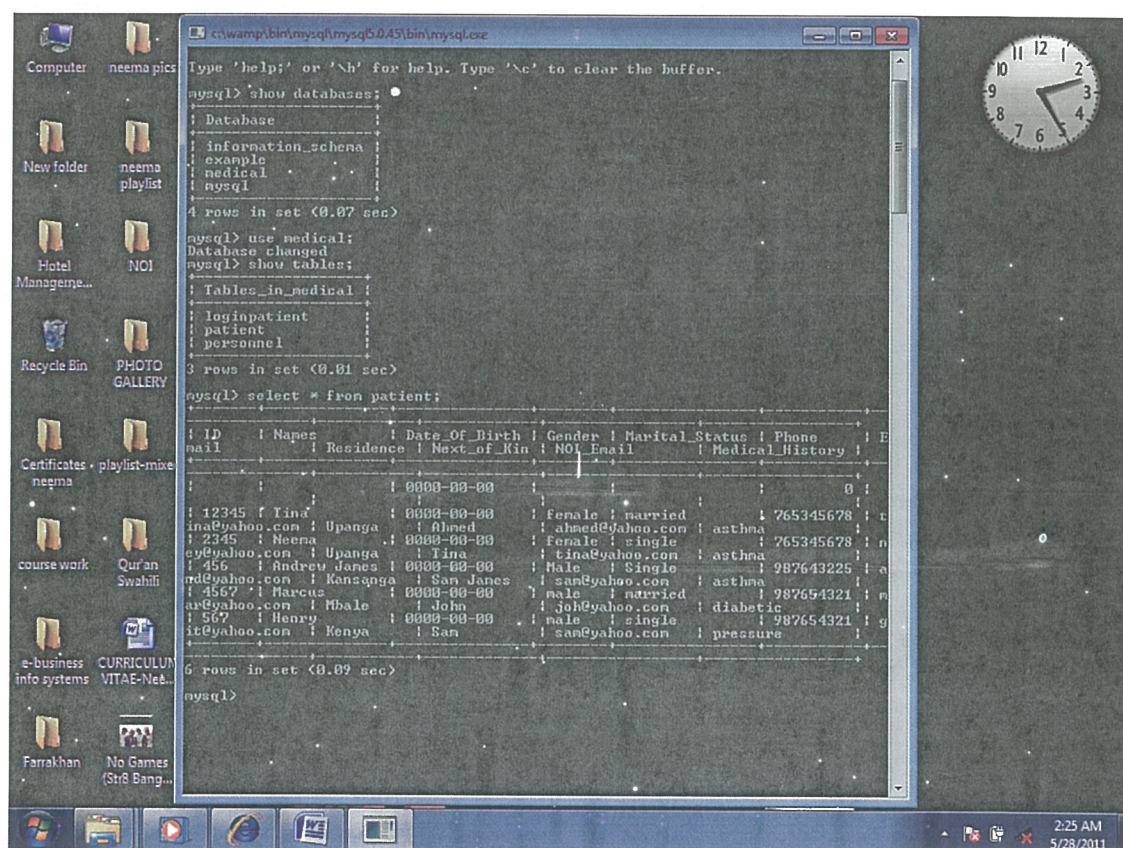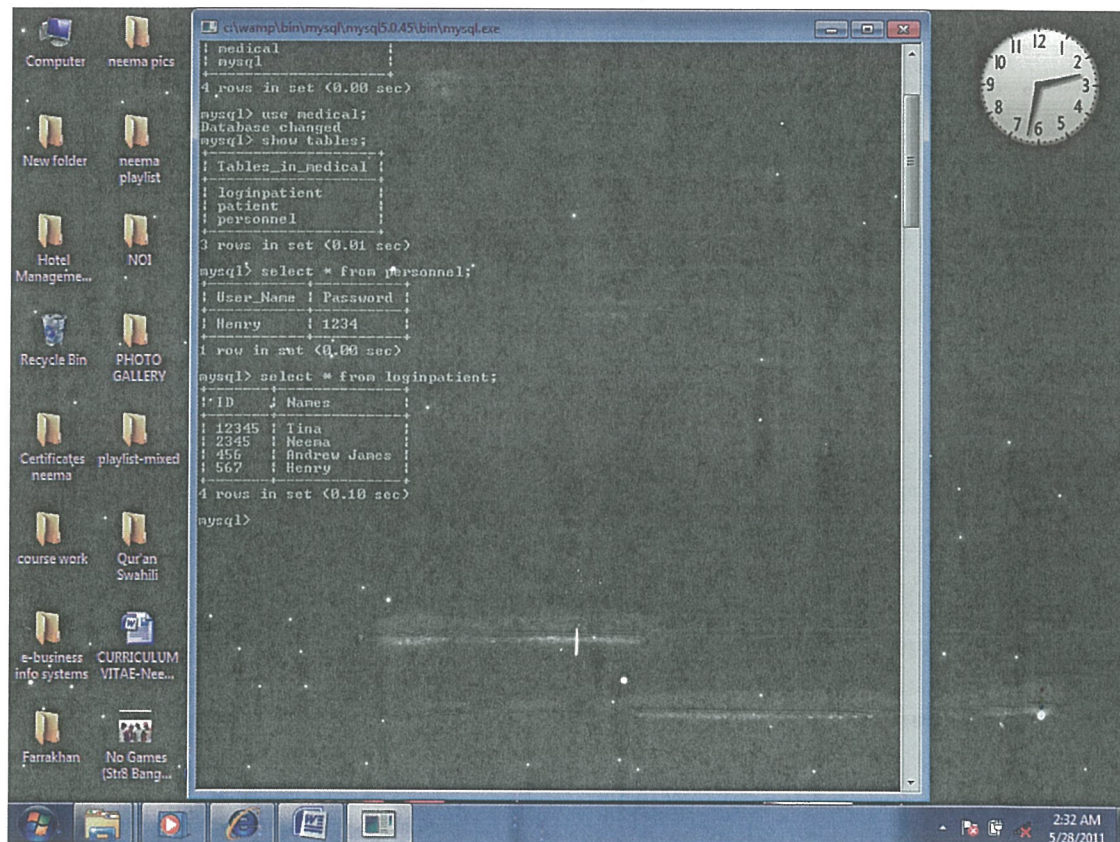
Fig 4.7 MySql table "Patient" within database "Medical

In addition to that, authorized medical personnel and patients are given User-names and Passwords, and ID and Names respectively. With the insertion of such identification, the users are given access to the system. The MySql print-screen below illustrates the authorized users.

Fig 4.8 MySql tables "log in patient" and 'Personnel" within database "Medical"

4.6 System testing and Implementation

4.6.1 Testing

Unit testing of a software or hardware is to take the smallest piece of testable software in the application, isolate it from the remainder of the code, and determine whether it behaves exactly as you expect. Each unit is tested separately before integrating them into modules to test the interfaces between modules.

System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements.

4.6.2 System convention (form the old one to new one)

Data is inserted in the new system and processing of information is done immediately when inputted to the system. At each an every department that the patient goes be it the reception to the mortuary, information of the patient is made available, and the history of the patient can be easy be updated by the authorized staff of the hospital.

Review cards of the patient are printed by the system and electronically the information is stored in the database of the site.

4.6.3 Benefit of the proposed system

To ensures increased functionality of the database. Every data will be in one database instated of there being a number of files, papers, books and registers scattered all over. This will create space that could be put to other user

Help in providing data consistency thus improving on accurate record keeping and data capture. Errors due to manual computations will be greatly reduced

Information is easily shared therefore cutting down on time wastage.

The proposed system will help increase efficiency and effectiveness of the departments services to the hospital and the patient

The data is stored proximate to the location where it is most frequently used and therefore can be referred to at any time.

The system offers increased security to the system by use of password

The development application and database ensures a unified system of recorded keeping

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

Since monitoring and evaluation process is most times the source of programmes and projects failures in the hospital management, public scrutiny is a must and this can easily be done if data is provided in an electronic format which can be easily disseminated and analyzed.

5.1 Discussion

An optimized online patient record handling system for monitoring and evaluation of patient services is considered as a very important part of hospital by most of the European, Asian and American countries. However, the optimized online patient record handling system developed and the approach taken to implement them by all these hospital is different, although they are striving to achieve the same common goals which are transparency, effectiveness and efficiency, value for money, accountability, exchange of information between hospitals and public and dissemination of information to the prospective providers and the public.

5.2 Recommendations

Users of the system need to be thoroughly able to know how the tool works. We as the researchers recommend that all system requirements stated be implemented for efficient operation of the system. Finally Medic's Digital Tool is an easy to learn easy to use tool that the hospital cannot miss to implement for better results.

5.3 Conclusions

The research has enabled the development of a new system that has been able to collect data in large amount in the organization pertaining the patient and storing the information for future reference. This information is easily accessed by authorized personnel and the patient history in the medical field is easily followed up. The time of retrieving information has greatly been reduced to a point that, information can be accessed at different point of the hospital and still give correct data about a patient.

The cost of too much labor force and much paper work has been reduced in that the hospital does not need to print files and folders for the patient since the information regarding the patient is input in the system the moment the patient enters in the hospital.

The patient risks in terms of treatment are reduced; the doctors first study the medical history of the patient and then he/she starts treating the patient. The chances for wrong prescription are next to nil.

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APPENDICES

APPENDIX 1 : PLAN SCHEDULE

	ACTIVITIES	TIME
1	Identification of topic	1 week
2	Data collection and organization	2 weeks
3	Proposal formulation	3 weeks
4	Project Submission	May 2011

APPENDIX 2 : PROJECT BUDGET

	PARTICULARS	AMOUNT Ugx
1	Print work	100,000/=
2	Communication /Air time	100,000/=
3	Transport cost	360,000/=
4	Food	150,000/=

APPENDIX 3: PROJECT TOOLS

	TOOLS TO USE
1	Wamp Server, MySql
2	Php, Apache
3	Macromedia Dreamweaver

APPENDIX 4: QUESTIONNAIRE FOR STAFF OF MUHIMBILL HOSPITAL ONLINE RECORD HANDLING SYSTEM

Dear respondent,

We are students pursuing a bachelor's degree in Business computing and management at the school of Computer studies, Kampala international University. Kampala, Uganda.

We are conducting a research study on "monitoring and evaluation systems, provides better means for learning for the past experience, improving services delivery as partial fulfillment of our degree. Monitoring and evaluation (M&E) systems provide better means for learning from past experience, improving service delivery, booking appointment, online treatment of patient.

Specifically the study seeks to find out important elements of the current monitoring and evaluation system, challenges that are evident from the use of the system and how the adoption of the system mentioned above will alleviate the problems experienced and bring new strengths into the Hospital.

The following general instructions will guide your responses when filling the questionnaire.

- There is no right or wrong answer. The only correct answer is the one that mostly corresponds to your true feelings and experiences.
- Please do not indicate your name on the questionnaire.
- In answering the questions, you are assured that your responses will be kept confidential and that answers are intended for research purposes only.
- Please read each question carefully and follow the given instructions.

- Try to answer all the questions.

Your assistance will be highly appreciated. For any clarifications, do not hesitate to contact us on **+255786585180**, **+254728804153**, Or e-mail: **emneema@hotmail.com**, **gitauwaiti@mail.com**

Yours faithfully,

Neema Ahmed Mwinge

Gitau Henry Waiti

BBC. Students

Kampala International University-School of computer studies

Questionnaire for departmental management staff

1. Name of the department:

   ....

2. List the duties and responsibilities of your department in the organization?

   ....

   ....

   ....

   ....

   ....

   ....

   ....

   ....

3. Is the current monitoring and evaluation system effective?

   Yes   No

4. Reasons for your choice?

   ....

   ....

   ....

   ....

   ....

....

....

5. Do you support the development of online optimized record handling system? (tick one)

☐
Yes

☐
No

6. Any reasons for your support?

....

....

....

....

....

....

....

Questionnaire for selected community members

Complete this section by ticking (√) what is relevant to you.

1. **Category**

Head of institution   Member of community

2. Do you like the Online Acheduling Appointment system used by the Hospital?

Yes ☐   N ☐   Not ☐

3. Do you support the need to develop an Online Scheduling Appointment and evaluation System for the Hospital?

Yes [ ]   No [ ]

4. If your choice is NO tick (√) **any one** of the following points which best describes your reason.

[ ]

   I do not think that the system to be developed will bring significant changes to the

   Hospital operations.

[ ]

   I don't know much about Online Scheduling Appointment and evaluation system.

5. If your choice is YES tick (√) **any one** of the following points which best describes your reason.

[ ]

   The current system used does not provide adequate accountability on the part of the

   Hospital.

[ ]

   using the current monitoring and evaluation system, it takes long for one to be

Served by the Hospital.

☐

Most of the records get lost in the Hospital

6. If a system is developed for the organization, how do you expect it to solve the problems being faced? (To be answered by those who answered question 5)

....
....
....
....
....
....
....
....

7. What were your expectations of the organization's performance? (Relate your answer to the current paper-based monitoring and evaluation system being used by the organization)