DESIGN AND IMPLEMENTATION OF LIBRARY MANAGEMENT SYSTEM CASE STUDY: KAMPALA INTERNATIONAL UNIVERSITY

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DECLARATION

We, Musalia Ndung'u Mark and Odhiambo Catherine Akinyi declare that this research project is our original work and it has not been presented to any other Institute of higher learning for any academic award.

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SUPERVISOR APPROVAL

This research project entitled "Design and Implementation of Library management system" was conducted and written under my supervision.

Ms. Onkangi

Signature: .....

Date: 6/10/2010

DEDICATION

To our parents, and supervisor for all the love, understanding, encouragement, material and moral support without whom our education would not have been a success. To our dear brothers and sisters together with our friends, we love you all.

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First we would like to acknowledge the divine presence of our Almighty God without whom this research study could not have been successful. His loves, care, protection, comfort, support and provision is just overwhelming. Al the glory belongs to Him.

We give thanks to our dear supervisor, Ms. Onkangi. Your support, guidance and encouragements were effective for the completion and shaping of this edition. Thank you for your patience and bearing with us in the completion of the project

Our sincere appreciation goes to our dear parents, brothers and sisters for all the support they have shown us through all hardships and struggles till this far. May the Almighty grant then more strength to move on.

Finally, we thank the institution of Kampala International University for enabling us carry out the research and also the knowledge they have impacted in us. .

LIST OF ACRONYMS

CDS	:	Computerized Document System
DBMS	:	Database Management Information System
DFD	:	Data Flow Diagram
ERP	:	Enterprise Resource Planning
GB	:	Gigabyte
GHz	:	Giga Hertz
ICT	:	Information Communication Technology
INDAB	:	Indian and Indexing services and Database in science And Technology
IT	:	Information Technology
MS	:	Micro Soft
NISSAT	:	National Information System on Science and Technology
ODBC	:	Open Database Connectivity
PhP	:	Hypertext Pre-processors
RAM	:	Random Access Memory
RDBMS	:	Relation Database Management System
SQL	:	Structured Query Language
TPS	:	Transaction Processing System
XP	:	Extreme Programming

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ABSTRACT

Information is a very important aspect in our day-to-day activities to ensure effective communication. As a result of this, information communication technology plays a great role to guarantee efficient and effective communication within and among different institutions and organizations. In response to this, each organization institution strives to make sure that there is as secure means of disseminating, storing and retrieving of information within their boundaries. This calls for an information system that is capable of handling all these tasks without fail. The administrations department of Kampala International University has been used as a case study.

With the use of computer database systems, it becomes easier to run and effectively co-ordinate the operations of the department bearing in mind the environment under which it operates. Consequently, in this project, the researcher has displayed database development using the system development lifecycle to come up with a good database design for ease of operations within the department, using Mysql and Php.

The researcher used the following methods to collect data. The primary methods included; observation, interview, questionnaire and secondary method include; text books, magazines, journals and internet. The researcher analyzed the data using Microsoft Excel.

Since the system is under operation for it to be implemented with fewer problem, it was recommended for it to be run on Windows XP Operating system, Pentium 4 with 2.5 GHz, Hard Disk size of at least 40 GB and RAM size of at least 512 MB.

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CHAPTER ONE
INTRODUCTION

1.0 General Introduction

Information management involves all those activities designed to control the life cycle of any record, its creation to its ultimate disposition. Quibble, (2001).

The process of record management falls within the scope of information management which has over the years led to the emergence of many system models as well as methods and techniques of handling and processing data. Information management consists of facts providing knowledge relating to a particular event which may be used as a basis for making a decision. Anderson, (1990).

In 1994, Computerized Document System (CDS) was introduced with the automation of the inventories. According to Buxton (1994) Computerized Document System was released by UNESCO in 1985. It is a computer-based system for information storage, processing and retrieval especially suited for non-numerical database. Computerized Document System is different from other database in that it has variable lengths, repeatable fields, sub-fields and flexibility in indexing and ability to handle different languages.

This study was undertaken to design an advanced database for a library management system for the new Kampala International University (KIU) library in Uganda. Library Management System was a system that was designed to keep the records of how librarians and book bankers handle and process data and ease the problem of the receiving and issuing of books to students. The management system involved all those activities designed to control the life cycle of collection and retrieval of records quickly.

1.1 Background to the Study

The study was undertaken inside the university called Kampala International University, which was located 15kms from Kampala City; it resides in between Kansanga and

Kabalagala. The Kampala International University specializes in the provision of Education to students.

The case study took place in the library inside the university, which was located adjacent to the Cisco (Networking) department, second floor.

The library was divided into two sections; the librarian's office, the book shelves for the faculty of Computer, Education and Social Sciences. The section contained computers that the students could search for information on the internet. The other section was where the book bank was located, book shelves for Business and Law textbooks and a conducive environment which was spacious for reading.

The process of issuing books to students followed a short procedure, whereby the students was asked to produce the library card and after the students received the textbook of their choice if available, but the student was given a condition, to read the book in that vicinity of the library. After finishing reading, the student returned the textbook and the library card was released.

The librarians and book bankers kept their records manually, that they relied on the information present in a book, and in that case the information could be lost easily. Therefore the new system focused on how data was consistent and enforced.

An efficient and flexible database could only be achieved by planning the database structure before designing the actual database. The following basic guidelines were useful in designing a standard database. The purpose of the proposed database was used for information management in the different departments (Book banks) for the New KIU Library. The information was obtained from potential database users by asking questions relating to the proposed database, analyzing the existing data capture and storing instruments like forms, reports among others. E.S Waburoko,(2004).

1.2 Statement of the Problem

Due to the increase in the number of users and the changes in Information Technology method of handling records, KIU library was automating some of the services in order to

hasten the collection and retrieval of records. This action was meeting problems like, the insufficient staff who were overworked, classification of books in the book banks with different methods which was cumbersome, inadequate reserve section for storing books, and the problem of mismanagement of records since the system was manual it affect the level of efficiency of the library . These problems provided the focus for the study and necessitate an investigation to arrest the situation before it became worse. Therefore, the researcher aimed at designing and developing a Library Management System that was used to handle the library services efficiently.

1.3 Project Objectives

1.3.1 General Objective

The researcher designed an appropriate database for receiving and issuing books to students as well as the university teaching staff.

1.3.2 Specific Objectives

i. To investigate the problems that arose from the current system.

ii. To design a database interface that was appropriately used for records management in the library.

iii. To implement the developed system so as to ease the entry of data into Information System.

iv. To test the developed system to be used by the management.

1.4 Research Questions

i. What are the problems that arise from the current system?

ii. Which database interface was appropriate for records management in the library?

iii. Which criteria can be used to implement the developed system to ease the entry of data into information system by management?

iv. How can the developed system be tested?

1.5 Scope of the Study

1.5.1 Geographical Scope

The geographical scope of the study was limited to the New KIU Library. The New KIU Library in this context was to encompass the entire department within. The choice of this Library was based on the fact that it is the one to be used in the database for information management.

1.5.2 Subject Scope

The study aimed at developing a database for records management in New KIU Library.

1.5.3 Time Scope

The study lasted for a period of two months and focused on the database for records management.

1.6 Significance of the Study

i. The study benefited the librarians, book bankers and the students in a way that time wastage was eliminated, making efficient use of space, time and users leading to completion of data entry. Since most of the delays are attributed to poor information management, scheduling and book allocation, automating the process with a database greatly reduced time wastage.

ii. Successful design, development and implementation saved time for the librarians and book bankers. Instead of administration taking all the time attending to the students, automated and accurate database was free to the librarians to perform other activities.

iii. The study also added on the available research materials in KIU and make recommendations for further research. Students desiring to carry out research and projects in the subsequent years had the point of reference for their work. The recommended further research areas provided the starting point for the projects.

iv. The study helped the book bankers and librarians in such a way that, the system registered and monitored the information concerning the retrieval and return date of books received by students and the teaching staff.

1.7 Conceptual Framework

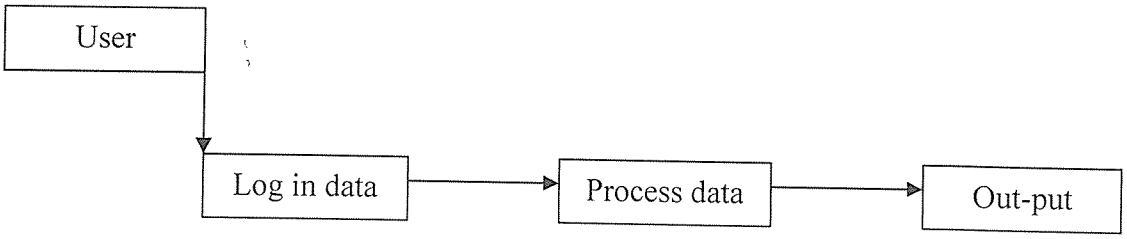


Figure 1: *Conceptual framework for the Design and Implementation of Library Management System*

The above framework represent how the user logged in data and awaits the data to be processed, that w involved the verification of the data relevancy and the system was able to detect any inconsistency, if there was, the system sends a signal, and the data could be integrated, the process goes on and the user gets the output.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter consisted of literature review about data base usage as far as Information Management System is concerned in Uganda and else where in the world especially in libraries where computers are used. Some of these findings are gaps that the study helped to identify the literature books, e-book, internet and research.

2.1 Data

It refers to streams of raw facts representing events occurring in organizations before they have been organized and arranged into a form that people can understand and use. Laudon, (2001).

Data can originate in many forms but the computers can only accept it in a machine sensible form. Lucey, (2004). Data was input into computer by keying in via a keyboard. It was checked, displayed on the screen and then entered for processing.

2.1.1 Database

Elmasri, (1994). Defines a database as a collection of related data. By data, meaning known facts that can be recorded and that have implicit meaning.

Wikipedia, an online encyclopaedia, defines a database as a collection of information stored in a computer in a systematic way, such that a computer program can consult it to answer questions. The software used to manage and query a database is known as a Database Management System (DBMS). *Wikipedia, (2006)*

A database management system (DBMS) is a collection of programs that enables users to create and maintain a database. The DBMS is a general purpose software system that facilitates the process of defining, constructing and manipulating databases for various applications. (Fundamentals of Database System, 3rd Edition- Elmasri, Navathe).

2.2 Database Management System

Database management system (DBMS), these were the general database packages intended for handling structured data, that was factual and numeric and provided for matching of data fields, for calculations and summarization and for generation of standards. It uses and links two or more files at the time making data more meaningful. All DBMS should allow the user to create table or record formats for the storage of data, maintain data by update, modification and insert: retrieve data and format it for display or printing. In records management, DBMS can be used to facilitate network between databases. For example there can be a bibliographic database, catalogue and referral database. (Bowden) and Blackman (1990)

To access say records or citation from bibliographic database and records on address of organisation in referral database, a DBMS would be ideal for such navigation. This is supported by Rowley (1992) that on important feature of a DBMS is the ability to work with several linked databases simultaneously instructions. One of its main roles is to allow data manipulation by using a database or query languages with which the user can formulate instructions to act on the data. Examples of DBMS include data truck integrated system library management system, proprietary database and text retrieval via document imaging.

In all, an information worker who wishes to choose a DBMS was needed to conceder carefully the requirements of the planned system to ensure that the applied database fits well with the purpose Clayton, (1992)

Text records management is designed to manage text based documents. Text records management database is a special purpose database designed to handle environments where the records do not need to be related to records in others files Rowley, (1993).

It is criticized by relatively sophisticated search refinement, contextual searching, nesting and bracketing, range searching, adjacency searching and field directed searching. Circulation control, monograph acquisition serial management, inters library records,

data formatting and transfer and communication modules are some of the key components which enable an appropriate DBMS to be user friendly.

2.2.1 JDBC Data Access

JDBC is a Java API for executing Structured Query Language (SQL) statements. Sun Microsystems says that JDBC is a trademark and is not an acronym for Java Database Connectivity; however, it is often associated with Java Database Connectivity. It consists of set of classes and interfaces. JDBC makes it possible to write database applications using a pure Java API. In its simplest form, JDBC makes it possible to do three things: a) establish a connection with a database, b) send SQL statements, and c) process the results. JDBC cannot be used to create databases. Therefore, in order to access a database using JDBC, a database has to be created with a Relational Database Management System (RDBMS). Open Database Connectivity (ODBC) is probably the most widely used programming interface for accessing the relational databases. ODBC, developed by Microsoft, was the first standard database driver. ODBC drivers provide a common API to database clients. However, using ODBC drivers in Java has its own drawbacks. It is written in C language, which is not an object-oriented language. It uses pointers and other programming structures that Java does not support. Also, ODBC drivers must be installed on the client side. This requires that an ODBC driver has to be present on the client side in order for Java applets to be run on the client's Web browser.

As mentioned above, JDBC provides a common database programming API for Java programs. The JDBC API supports both two-tier and three-tier models for database access. In the two-tier model, a Java applet or application talks directly to the database. This requires a JDBC driver that can communicate with the particular database management system being accessed. A user's SQL statements are delivered to the database, and the results of those statements are sent back to the user.

In the three-tier model, commands are sent to a "middle tier" of services, which then sends SQL statements to the database. The database processes the SQL statements and sends the results back to the middle tier, which sends them to the user. In many cases the

development of an open learning approaching to higher education. For intellectual development to be achieved, Library has a big role to play in information management. The importance of capital database application cannot be ignored.

Appropriate database that can support information system is a pre-requisite to success and as such demands the attention of management as well as staff using the system. According to Dewey (1998), many programs are available to assist in the management of information system, so of these programs, if care is not exerted, may lead to selection of products because they suit the existing computer. Infrastructure and with out reference to how well the supermarket's requirements are met. The categories of this program for records management are discussed in the following sector.

Rowley (1992) says that, of the many databases in the markets, the ones likely to be appropriate for records management can be divided into four categories. Archivists argue that a record is a specific and unique type of information quite different in its creation and purpose than any of these other types of recorded documentation. Archivists have identified two distinguishing characteristics of records. First of all, records reflect business processes or individual activities; a record is not just a collection of data, but is the consequence or product of an event. Of course, this is not new concept; older definitions identify records with a process or an activity. What is new is the emphasis on defining more precisely and conceptually when the record is created by the business event or personal activity. The other part of the definition of a record stresses that records provide evidence of these transactions or activities. In other words, recorded documentation cannot qualify as a record unless certain evidence about the content and structure of the document and the context of its creation are present and available. Now again, this is not exactly a new concept. However, these newer definitions provide much more detail than ever before on the type and exact nature of this evidence. This topic was explored in more detail in the section on metadata.

Within the profession, there is a growing consensus around the definition of a record as: Recorded information in any form created or received and maintained by an organization,

person or system in the transaction of business or the conduct of affairs and kept in a widely accessible form as evidence of such activity. This definition, however, must be recognized as only the starting point for a complete and useful definition. To be meaningful, it must be accompanied by a detailed set of definitions that identify when a record is created and what type of evidence is required to create reliable and authentic records. In addition, archivists are recognizing that this definition needs to articulate the cultural, historical and heritage dimensions of archives. The dialogue on this issue is often presently framed in terms of describing "archives as evidence" and "archives as memory."

2.5 Record Management System

Traditional records management methodology focuses on managing and controlling records, usually as part of a record series. Newer, revised definitions of the objectives of records management, however, focus on evaluating the processes creating records and the systems for managing them. For example, one prominent definition identifies the goals of records management as the identification and capture of records generated in the context of business processes, and the creation of systems that manage and preserve these records. In essence, the new definition is concerned less with managing records and is more focused on defining and assisting in the management of recordkeeping systems.

The strategy of transferring records to software independent formats, such "plain" ASCII text or for hierarchical and relational database records, a flat table structure, has the advantage of moving records out of a software dependent mode, thus ensuring the accessibility of the records for longer periods of time. Most archivists agree, however, that in many cases this advantage is achieved at a great cost, i.e., in the loss of instructions or code used in representing or formatting the record. As a result, "the authenticity of the electronic records as 'imitative copies' that replicate the structure, content, and context of the original records could no longer supported." In other words, the evidence required to understand and interpret a record may no longer be present.

The decade of the 1990s was undoubtedly be remembered as a period that witnessed an incredible diffusion of information technology through a massive and unanticipated spread in the use of personal computers and local area networks, the maturing of the Internet, and the development of the World Wide Web and its enabling browser interface software. It was a decade that saw the emergence of networking and the widespread sharing of information, of the transformation from personal to work group computing, and of enterprise architecture and integrated systems. In short, the 1990s was a time when the power of computing and document creation passed out of the hands of traditional centralized providers of data and into the hands of individual workers. Two of the more important consequences of these truly revolutionary changes were the transformation of how businesses functioned and individuals worked and in how institutions and workers communicated. Among the most prominent changes in these areas were the emergence of less centralized communication patterns, of more horizontal communication outside of the traditional bureaucratic channels, and of collaborative team projects and the concept of "virtual shared work space." The resultant transformations in the flow of inter- and intra- organizational information and in workflow and business processes dramatically and irrevocably altered the workplace.

Significant changes were also occurring in the products of this communication – the business record. Rapid transformations in the form of the record – the emergence of hypermedia documents, dynamic documents, e-mail – prompted technologists but especially records' professionals, i.e., archivists and records managers, to increasingly ask: what is this electronic (digital) record? How is it different from traditional analog forms, such as those preserved on paper, microfilm and on audio and videotapes?

The early days of computing, from the 1950-1970s, were dominated by small business and massive mainframe computers (used primarily for scientific applications), which managed data inputted from punched cards, produced massive amounts of paper printouts, and supported an attached network of a few local and remote terminals. The emphasis was on inputting data found in traditional paper forms and on automating computing intensive business transactions, such as accounting and payroll. The outputs

of these systems were automated versions of traditional paper documents, such as bills, pay checks and orders, or video screen displays often formatted to resemble a familiar document. Most employees had little or no direct access to the systems or to the data; they were largely dependent on programmers and systems analysts to interpret their data needs. Requests for data or information in the form of summaries or reports were submitted to the computer centre and the results, processed in batches over night or in the course of a week, were returned in the form of paper printouts.

Similarly, archivists and records managers of this period relied heavily upon conversion of computer data to paper documentation to do their work. The prevailing recordkeeping methodology of the time was to generate printouts of computer files - the so-called "data dumps" - as a means of appraising the value of the data. For records with primary value to the institution, it was common practice to print to paper and store the record in established filing systems, and to summarize the data and produce various standard reference reports (the annual budget, the biweekly payroll, etc. For records with secondary values, either evidential or informational, the general rule was to retain the files on computer tapes in tape libraries and develop descriptive finding aids to facilitate access to the tapes. Overall, recordkeeping practices in the early decades of automation were not radically different from techniques employed for paper records, and so some degree this was justified. In a system where the basic strategy was to convert paper forms to an automated environment, where file management systems predominated, and where systems were characterized by functional units creating and managing their own files in isolation from other applications, it was possible to devise a records management strategy based on capturing screen views or forms and converting them to paper documents. In this environment methodologies designed for the management of papers systems still had relevance.

The 1980s and 1990s witnessed dramatic and frequent changes in technology, featuring most prominently the emergence of the personal computer and of the Internet, and the development of database management systems, client-server architectures, distributed computing and enterprise-wide applications. All of these developments and more have had the effect of dramatically changing the way data, information and records were

created and managed. Perhaps the most dramatic transformations were in document or record creation and in the resultant changing form of documents. To better understand this issue, let us first review how the most prevalent systems in use by businesses, Transaction Processing Systems (TPS), manage data and records.

The most basic business system and the heart of most organizations is the Transaction Processing System (TPS). A transaction processing system "is a computerized system that performs and records the daily routine transactions necessary to the conduct of business." The primary goal of these systems is to automate computing intensive business transactions, such as those undertaken in the financial and human resource functional areas. The emphasis is on processing data (sorting, listing, updating, merging), on reducing clerical costs, and on outputting documents required to do business, such as bills, pay checks and orders. The guiding principles of these systems are to create data that is current, accurate, and consistent. To achieve these goals, these systems employ traditional Database Management System (DBMS) or modern Enterprise Resource Planning (ERP) software. Unlike traditional file management systems, data elements in a database management system (DBMS) are integrated and shared among different tables and databases. Consequently, one of the primary advantages of DBMS is its ability to limit and control redundant data in multiple systems. Instead of the same data field being repeated in different tables, the information appears just once, often in separate tables or databases, and computer software reconnects the bits of data when needed. Another advantage of DBMS is that it improves data integrity. Updates are made only once, and all changes are made for that data element no matter where it appears. For database managers, this is a much more efficient system, which minimizes data redundancy and maximizes data integrity.

Without question, TPS are very good at supporting current business needs for information, minimizing the amount of data stored in the system, improving overall efficiency of the system, removing obsolete data and providing an organizational resource to current data. But are they good recordkeeping systems? The answer, with few exceptions, is a resounding no, because these systems were never designed and

structured for the purpose of capturing and maintaining business records. In a typical transaction processing system, business records are not stored as stable, finite, physical entities. Rather, these systems create records by combining and reusing data stored in discrete units organized into tables. Once created, a record of a business process may not, indeed, likely was not captured as a physical entity. Not only was the record not being captured at the time of creation, it may be impossible to recreate at some later date. Databases are dynamic, volatile systems, in a state of continual change. Data updates occur frequently, and with DBMS software managing the system, these revisions are made in every file containing that revised data element. Moreover, databases typically maintain only the current value for any given data element. As a result, in a typical transaction processing system, inviolate business records are difficult, if not impossible, to locate and retrieve.

There are a few transaction processing systems, however, where the objective is to create and maintain records of business processes. Prominent examples include systems maintaining general financial ledgers and those that manage academic records and transcripts. In systems managing financial ledgers, data documenting actual business events, such as updating the ledger as a result of a transaction, is captured and maintained as an inviolate record stored as a row of data in a sequential table. These inviolate records represent a cumulative and historical account fixed in time of specified business events. As such, they meet in many respects the definition of a record as articulated by archivists. However, even these systems fail to meet all the requirements of a recordkeeping system. They often do not capture and retain all the metadata necessary to create complete, authentic and reliable records. In addition, these systems often summarize business processes, resulting in a set of records that do not contain sufficient detail to document all relevant business events.

To summarize, automated systems do only what they are designed to do, and for most transaction processing systems, recordkeeping is not the primary objective. Consequently, TPS fail to meet most of the basic requirements of a recordkeeping system. While TPS do routinely bring together data from various sources to form a

logical view of a record at the time of making a decision, they typically do not physically create and preserve a record of that transaction. Even systems that do capture and store business records often summarize business processes, and consequently do not document all pertinent business events. Typically, transaction processing systems do not capture and retain complete documentation about business events, particularly as it relates to the context of creation. TPS typically retain only current data, and consequently do a poor job of tracking the history of changes to data values. Finally, because data about a business transaction is typically stored in separate tables or databases, key content data or critical metadata about a business transaction can become disconnected over time, or may be preserved or discarded according to different timetables.

For archivists and records managers this new architecture presented many new and difficult challenges for capturing, accessing and describing records. With the emergence of database views and dynamic and virtual documents, the differences in the way paper and electronic records were created and managed were accentuated and could no longer be ignored. The widespread use of personal computers had an equally destabilizing effect on the management of records. By creating a less structured, less centralized environment for record creation and use, in which records were frequently not integrated into the normal business processes, PC's made the capture and management of the work products much more difficult. Eventually, archivists came to recognize that they were dealing with systems that would support the transactions of a functional area, but would not routinely and systematically capture and maintain the records or evidence of those business transactions. With this recognition came the realization that archival and records management principles and practices needed to be reviewed and perhaps revised.

The emergence of this new generation of technology prompted the archival profession to re-examine some it's most basic archival theories and concepts, such as provenance, original order, the nature of a record and the life cycle concept. It also resulted in a spirited debate about whether traditional methodologies and procedures developed for paper records would be effective in the world of electronic records, and about what changes in traditional concepts and practices might need to be made. In short, throughout the 1990s, archivists have been asking themselves the question, what are the principles

and criteria that guided the development of international, national, and organizational strategies, policies, and standards for the long-term preservation of authentic and reliable electronic records?

As might be expected, responses to this question have differed widely. Some archivists have argued that traditional archival concepts and methods do not easily lend themselves to the world of electronic records, and that archival theories and concepts require a new theoretical basis and justification if they are to remain valid. These archivists suggest that a "new archival paradigm" is required. Other archivists have argued that traditional concepts and methods still have great value in managing electronic records, and that traditional archival concepts "continue to have resonance and, in fact, provide a powerful and internally consistent methodology for preserving the integrity of electronic records."

There is also a records management system. Such database normally supports ordering and acquisition, cataloguing, circulation control records management. According to Clayton and Batt (1992) the database was developed in the first and fore most as a means of automating the task of circulation control. With the increased power and storage capacity of micro computers other modules were integrated.

According to Capron (1996), database is a set of steps instructions that directs the computer to perform the tasks you want it to do and produce the results you want. It is a generic term covering the concepts, procedures and instructions, which cause the computer system to do useful things usually, database is thought of in terms of programs discrete units of a database which cause the computer to carryout particular tasks, or system or packages, integrated collections of programs. Bowden and Blackman, (1990).

2.6 Indigenous Databases.

Is the backbone of knowledge community in any country. Indigenous databases in India provide indigenous information and knowledge that is not provided by foreign or commercial databases. One example is the INDAB (Indian& Indexing Services and Databases in Science and Technology). Developed by the National Information System on Science and Technology (NISSAT), INDAB is an inventory of indigenous databases

developed by institutions in this country. The database currently contains 398 records providing information on 202 Indexing/abstracting Services, 83 directories and 113 Indigenous Databases. The database has been designed and created using CDS/ISIS (a UNESCO product distributed by NISSAT in this country) using MS-DOS with minimum hardware requirements. Each record in the database contains the following data: name of the database/title of the A and I Service; institution (database/service producer); address, contact person, type of database; contents of the database, subject area, year of production; and, size of the database. The database can be accessed by all of these data elements

Unuigbe, (1990), saw records management as the quality, quantity, and cost of records and encompassing the procedures, systems, operations, space, equipment and staff required administering the records. Asiwaju, (1985), recognized it as a dynamic science of handling recorded information for immediate and future use efficiently and economically. The impact of new technology (e.g. electronic filing) on traditional approaches to handling records cannot be overemphasized and the case has been made for it for years. Over 30 years ago, recommendations were made for a sophisticated database system for records management where the rapid processing power of the computer was needed for automatic storage and retrieval. McAfee, (1983).

In a study, Barry (1996) indicated ways in which African countries have been obtaining and increasing inventories of late generation information technology equipment, emphasis was placed on. The need to redress the imbalance in focus between information technology (where nearly all the focus is today) and information management (where there is little or no focus today). The need for national legislation to protect the integrity of Government paper/electronic records; the necessity of addressing information management and technology standards; and the requirement to link paper and electronic records and to clean up paper records before or while automating them, etc.

Hence, Omenyi (1997) observed that most institutions have failed in the keeping and management of records because, the rise in customers' population has made data

generated too complex to handle; the offices charged with the analysis of the data are ill-equipped and ill-trained to do so. There is a lot of indiscipline among these officers; they leave their work undone and even destroy the confidentiality of the data; customers and other users tend to bribe the record officers to alter some information in the receipts; as it is likely to happen to the Library, the computational aids, like computers, may be unavailable; and poor funding has led to non-recruitment of sufficient and qualitative staff, low provision of adequate space and lack of modern computational and storage aids.

Where to start when asked to produce a 'maturity model' for records management within the HE/HE sector? Maturity models and other benchmarking tools certainly seem to be popular at the moment in all sorts of areas, especially in relation to ICT. On the plus side they allow an organisation to think objectively and comprehensively about the subject in question. They encourage investigation and reflection and through the picture they paint allow organisations to celebrate their strengths and to address their weaknesses. Maybe it's no surprise that such approaches are gaining in popularity at a time when budgets are being squeezed as a much clearer idea of spending priorities should emerge as a result of working through such a model. On the minus side I'm always slightly concerned about the terminology and the (unintended) slight which may be felt by those who cannot demonstrate full maturity in a particular area and who might, justifiably, be reluctant to admit to being 'immature'.

However, that the emergence of maturity models for records management is, in itself, evidence of a new phase in the profession's development. For these are not tools attempting to demonstrate the need for records management or to justify expenditure in it, they assume (rightly or wrongly) that that stage has already passed. The maturity model assumes that whatever it is that is being assessed – records management in this instance - is an accepted and valued function of the organisation and that what is required is an assessment of how well it is performing and the impact that it is having. Thus hopefully the very existences of such models are evidence of a new level of maturity for records management as a discipline. But to return to my opening question: 'where to start' when

asked to produce one? My first thought was that this is a potentially risky endeavour. After all, in order to assess 'maturity' this implies that you have a clear idea of what 'mature' records management should look like.

Starting from scratch in this regard seemed especially foolhardy. After all, it would be a pretty bold claim to assume that I alone or even we as a service were in a position to define what this would look like. Getting together a working group or consultation panel would have been another approach and would certainly have increased the chances of producing a more rounded model, but wouldn't we then be in danger of trying to reinvent the wheel? After all, what we are talking about in terms of this picture of 'mature' records management is surely pretty similar to defining a 'standard' for records management – and, as we all know, there are plenty of those around already (as someone once said: the great thing about standards is that there are always so many to choose from!). And we certainly didn't want to try to produce a JISC info Net standard for RM for people to start comparing with and mapping against 15489 et al

So although firmly based on the National Archive's Code of Practice and developed with their knowledge and assistance it should be noted that this Maturity Model was developed separately to it and any mistakes or omissions are very much ours not theirs. It also therefore follows that this Maturity Model is quite specific in its focus and the model of mature records management that it represents – i.e. a model appropriate for UK further and higher education institutions who want to be able to ensure compliance with the Freedom of Information Act. Of course the benefits of achieving such a model should be felt much further and deeper than this and in many more contexts but these remains at its core. This certainly helped simplify the business cases for records management we presented to management: "we have to because the law says so". It also helped simplify how to sell records management to users: "you have to because the law says so". Okay, so this is a deliberate over simplification but even so is probably not a million miles wide of the mark. If the number of new records management posts within public authorities over this period is anything to go by we also shouldn't be too quick to dismiss its effectiveness as a strategy.

2.7 Manual System Verses Database Management System

The information explosion, accompanied by rapid developments in the field of Information Technology (IT), has redefined the way in which information products and services are delivered worldwide. One of the most profound impacts of IT developments on the information industry has been the paradigm shift from paper asked to electronic media. The impact of IT has been all pervading. It has changed the way in which information is stored and disseminated and threatened traditional library services, which are associated with time consuming, theft of books and location of books is small as a result of limited storage space.

The contemporary global situation is alarming, owing to the enormous increase in scientific and technological knowledge, and the growth in the volume of information. From grass roots to top executive level, everyone is well aware of the need for fast, simple, accurate and comprehensive access to available resources.

Kaul, (1986), states that most academic scientists are aware of the existence of computerized databases but that only a small fraction uses them. Those who do are finding that the development of machine-readable databases has revolutionized the process of information retrieval, especially for locating published scientific literature. The Database Society of India (1985) has the following main objectives:

As discussed earlier, the creation and retention of complete and inviolate records documenting business events are not the primary objectives of most transaction processing systems. In an environment where records often exist as logical and not physical entities, and where data documenting a business event is incomplete, volatile, and reflects primarily current or near-current data values, archivists are attempting to construct a conceptual model of a record that includes enough detail to permit one to describe and identify a record even though it cannot be viewed or accurately and completely represented as a physical object. The ultimate objective is to define a record with enough precision to inform systems designers when records are created and what

kind of data needs to be captured. In addition, archivists recognize that they need to differentiate the concept of a record from the numerous, other forms of documentation, and to distinguish the mission of the archivist/records manager from that of other information and data professionals. Archivists increasingly are aware that they must be able to articulate to administrators, information technologists and other potential partners how records differ from other digital objects, and why it is important to capture and manage records.

Finally, archivists are debating whether traditional methods for describing archival records (descriptive inventories, guides, and other finding aids created after the records are transferred to the archives) are adequate and useful tools for documenting electronic records. Critics of traditional strategies for describing electronic records identify three major reasons for adopting other methods. In the first place, critics claim that traditional descriptive methodologies that depend upon physically reviewing records, files and series to identify content and context are not viable in the world of electronic records. In addition, they argue that traditional prose narratives and descriptions of data structures cannot possibly describe the multitude of record linkages or reflect the relationships between and among transactions in automated systems. To properly describe these complex record systems, they recommend that much more dynamic and interactive documentation strategies be employed. Finally, proponents of this position of change argue that a viable system of documenting business processes already exists in the form of record system metadata. Systems designers and programmers routinely generate documentation on the content and structure of the systems and programs they create. Why not, it is suggested, make this metadata/metatag system the basis for describing electronic records? Why not consider a shift from creating descriptive information to capturing, managing, and adding value to system metadata.

Naturally, not all archivists agree with the strategy described above. Their arguments focus on the themes of the authenticating role and the unique and vital contributions of traditional archival description. For example, Luciana Duranti argues that the "verification of the authenticity of electronic records over the long term had to rely on one thing and one thing only: their archival description." Traditional arrangement and description verify authenticity, according to Duranti, by preserving the network of

administrative and documentary relationships. "Administrative relationships are revealed and preserved through the writing of the administrative history of the archival fonds and its parts, including the preservation and custodial history. Documentary relationships are revealed and preserved through the identification of the levels of arrangement of the fonds and their representation in structured descriptions." Another argument put forward in defence of traditional archival description is that it performs a vital function that system metadata cannot

2.8 Structure of the DBMS

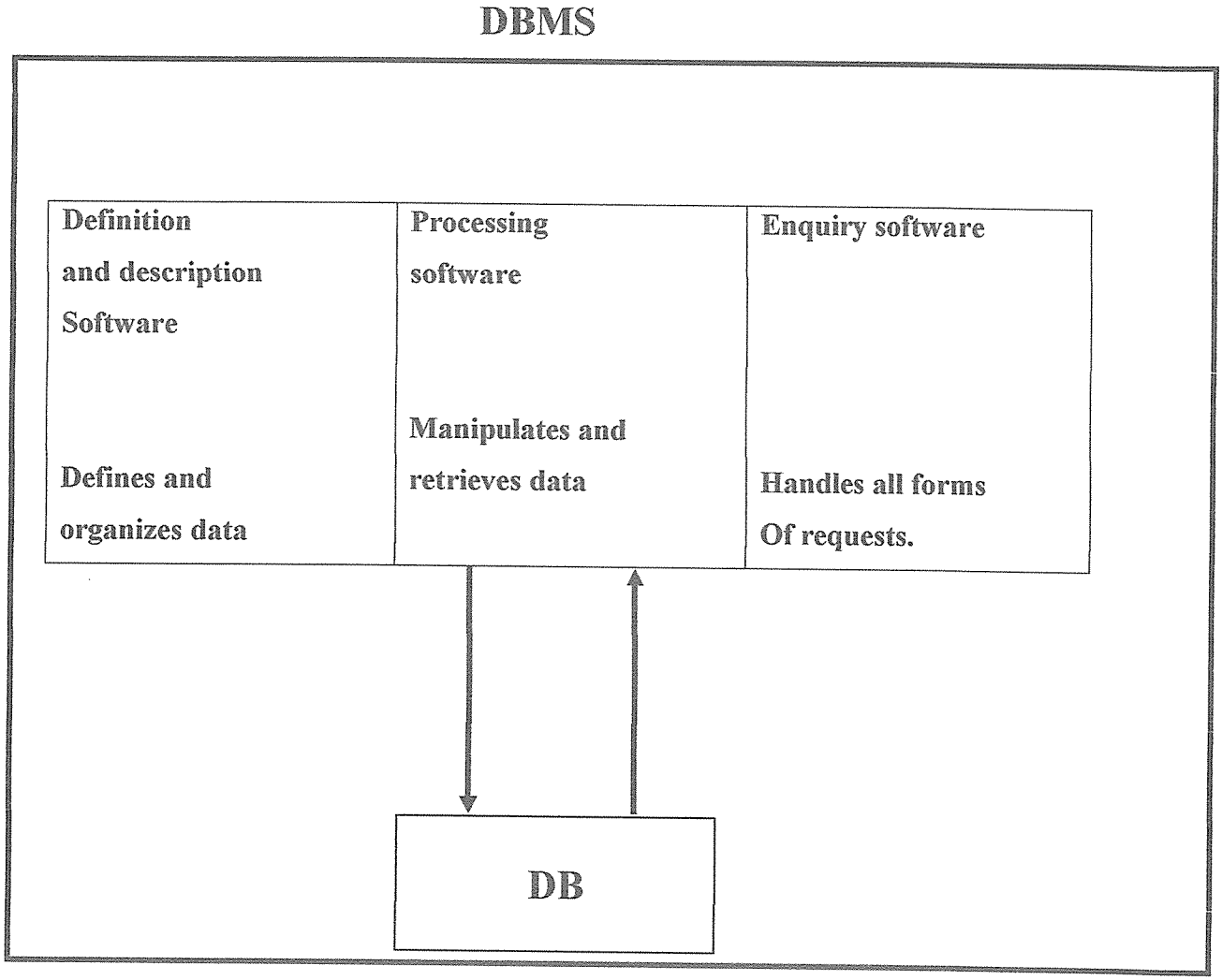


Figure 2: *The DBMS structure and its functions.*

2.8.1 Advantages and Disadvantages of DBMS

According to C. J. Date, (1992) states the advantages of DBMS are; control of data redundancy since the whole data resides in one central database hence data present in one file need not be duplicated in another.

Reduced maintenance due to the centralized nature of the system.

Data integration, enforcing data integrity is much easier; moreover, the function in the DBMS can be used to enforce the integrity rules with minimum programming in the application programs.

Enforcement of standards in the organization and structure of data files is required and also easy in a database system.

Similarly, the disadvantages are; complexity, provision of the function we expect of good DBMS makes the DBMS an extremely complex piece of software.

The cost of DBMS varies significantly depending on the environment and functionality provided for example, a single-user DBMS for a PC may only cost $ 500.However a large mainframe multi-user DBMS servicing hundreds of users can be extremely expensive. The cost of conversion of the existing application.

Higher impact of failure, the centralization of resources increases the vulnerability of the system. Since all users and applications rely on the availability of DBMS, the failure of any component can bring operation to a halt.

2.8.2 Applications of DBMS

Thomas Connolly, (2000) moreover mentions the applications of DBMS in areas like; the bank for customer information, accounts, loans, and banking transaction.

Universities; for students information, course registration and grades.

Human resource; for information about employees salaries, payroll taxes and benefits, and for generation of pay checks.

Manufacturing; for management of supply chain and for tracking production of items in factories, inventories of items in warehouse, stores and orders for items.

CHAPTER THREE
METHODOLOGY

3.0 Introduction

This chapter presented the methodology which was used in the study; it was divided into sections which include; the research design, sample procedure, sample size, data sources, data collection methods and instruments plus data analysis and presentation.

3.1 Research Design

The study was used a quantitative and qualitative research design for the purpose of making valid conclusions. Quantitative design which was classified in two broad categories, that was; experimental and general survey design examined the effectiveness of information management in library book banks for the new library as an independent variable.

3.2 Target Population

The population of the study ranged from librarians, book bankers and students at the library.

3.3 Sample Size

The respondents were randomly selected and categorized. They comprised of both sexes but of different marital status and age groups and the study used 50 respondents. This was intended to get a variety of views and unbiased responses which made the study a reality. Also this sample size was selected since, Sutton and David, (2004); states that a sample size should not be less than 30. Beyond basic description it would be difficult for the researcher to under take more complex statistical analysis, as most of these analyses require a minimum sample of 30 respondents.

3.4 Data Source

Data was collected from primary sources which included; Questionnaires, Interviews and Observation Secondary data was got from text books, magazines, journals, the internet

and already existing research work about database used for library management system in order to make valid conclusions.

3.5 Data Collection Methods

The researcher used both primary and secondary data through reviewing documents and abstracting data from text books, journals, internet and already existing research work for secondary data. Primary data was got from librarians and book bankers through interviewing.

3.5.1 Observation

Direct observation was the most effective method of getting first hand information for the research.

3.5.2.1 Interviews

This involved face to face interaction between the researcher and the participant through discussion. The interviews were carried in two ways; structured interview, in which the responses by the participants was brief and specific and unstructured interviews, where the responses were long, elaborated and not specific, and the interviews, was conducted in individual group.

3.5.2.2 Questionnaires

The close-ended questionnaires in which questionnaires were provided by the researcher and the participants could fill one of them accordingly, for example strongly agree, agree or strongly disagree.

The researcher gave out 40 closed-ended questionnaires to the students, librarians and book bankers. These had guiding questionnaires in which the researcher gave to individual respondents to fill. The researcher gave some two days to respondents to study and fill the questionnaires. The researcher requested the respondents to ask for clarification where the respondents did not understand.

The respondents had enough time to fill the questionnaire correctly.

3.6 Data Analysis

The collected data was analyzed using a computer program called Microsoft Excel where the coded and edited responses from the field in form of questionnaires which was entered by tallying it and tabling it in frequency tables identifying how often certain responses occurred and later evaluation was done.

The recorded data was later edited and interpreted to ensure uniformity, legibility and consistence. Also, interview results were then coded in frequency tables which was calculated in terms of percentages and presented in this study.

3.6.1 Tables

Tables were the most common method of presenting analyzed data. Tables offered useful means of presenting large amounts of detailed information in a small place. A frequency distribution table in this case was used whereby response values were summarized in a table.

Frequency distribution table measurements were grouped into classes. Then the number of measurements for each class was reported. The totals for each class were called the frequency of the responses for that class. Frequency distribution tables present the frequencies or counts of the occurrence of each value (class or category) of a variable Babbie, (1990).

3.6.2 Graphs

The main objective of graph was to present data in a way that was easy to understand and interpret, and interesting to look at. (Common types of graphs include; bar charts, histograms, frequency polygons, scatter graphs and cumulative frequency polygons.)For this research, bar charts and pie charts was used to present the collected data.

3.6.2.1 Bar Charts

A bar graph was a visual display that was used to compare the amounts or frequency of occurrence of different characteristics of data. This type of display allowed the researcher to compare data and to make generalization about the data quickly.

3.6.2.2 Pie Charts

A pie chart was a graphic display of data that depicts the differences in frequencies or percentages among categories of a nominal or ordinal variable.

3.7 The Model

This was the building of an experimental system quickly for demonstration and evaluation so that the end users can better define information requirements. The model as a preliminary system was adjusted continuously until it meets the end-user requirements. The model was an interactive process of repeating the steps in order to build a system over and again.

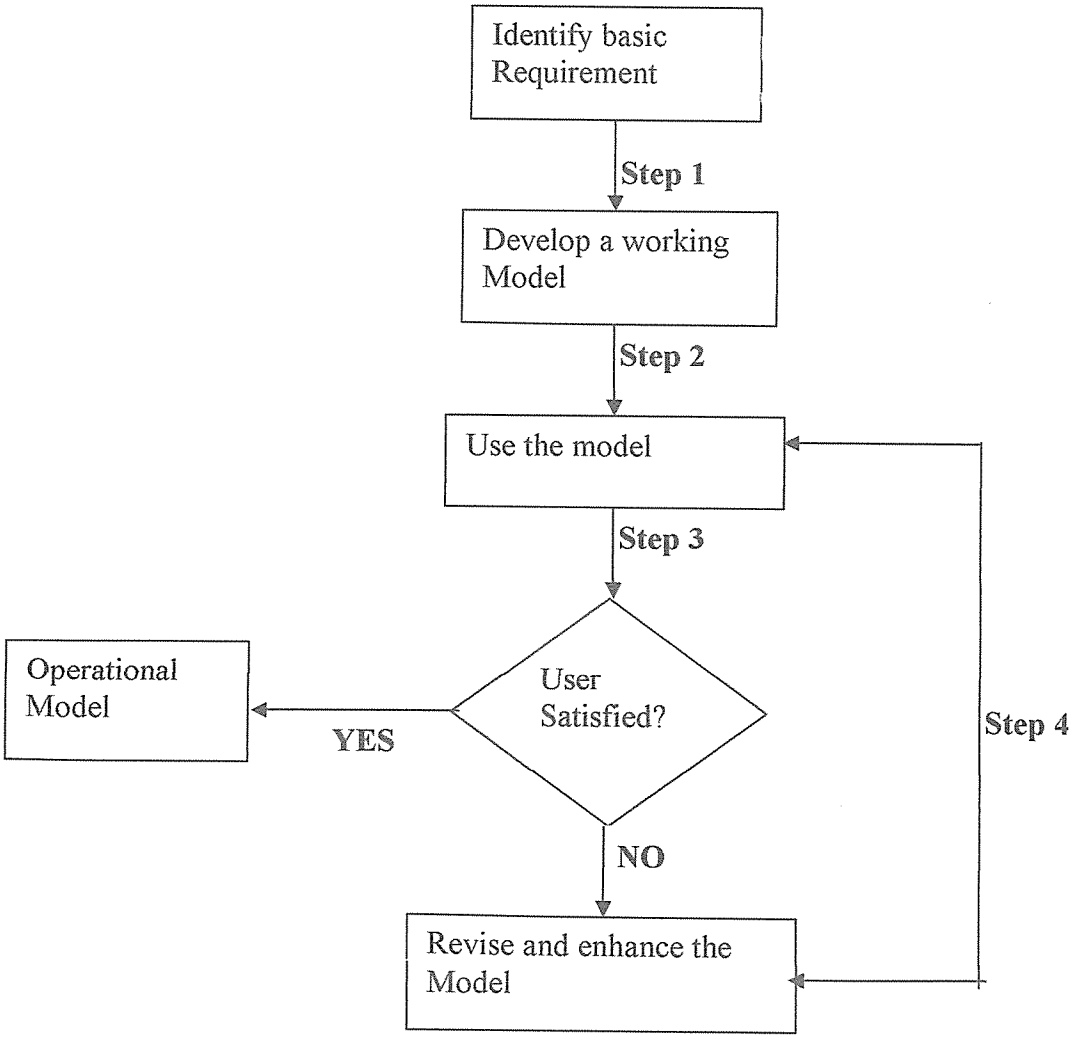


Figure 3: *The process of developing a model*

The process of developing this database took four steps. The system took the designer through several alterations it repeated step 3 and step 4, to refine and enhance the model before arriving the final operational one.

CHAPTER FOUR
SYSTEM ANALYSIS AND DESIGN

4.0 Introduction

System analysis and design is the phase in which the requirements of the new system are identified. It is a process of gathering and interpreting facts to either recommend a change to new system or remain in the current system. It basically evaluates the feasibility of both the current and the new system. Once the current is found worthy to be replaced, the design and implementation of the new system are done.

4.1 Analysis of the Current System

The university had computers which were mainly used at top management level to support automated library system. The students, librarians and senior librarians were accessible to the computers thus check on their work. The library was divided into two sections; the librarian's office, the book shelves for the faculty of Computer, Education and Social Sciences. The section contained computers that the students could search for information on the internet. The other section was where the book bank was located, book shelves for Business and Law textbooks and a conducive environment which was spacious for reading.

The process of issuing books to students followed a short procedure, whereby the students was asked to produce the library card and after the students received the textbook of their choice if available, but the student was given a condition, to read the book in that vicinity of the library. After finishing reading, the student returned the textbook and the library card was released.

The librarians and book bankers kept their records manually, that they relied on the information present in a book, and in that case the information could be lost easily. Therefore the new system focused on how data was consistent and enforced.

4.2 Proposed System

The proposed system seeks to overcome the shortfalls associated with the old sytem.The new system seeks to achieve the following goals:

1. Improve the current data collection, storage and update methods.
2. Increase collaboration by putting in place a database to enable the units within the scope to share information on data stored.
3. Improve on data capture and reporting. This enhances periodic reports based on accurate in formation.
4. Quick and efficient retrieval of data.

4.3 Benefit of the Proposed System

Ensure increased functionality of the database. Every data will be entered in one database instead of there being a number of files, paper, books and registers scattered all over. This will create space that could be put to other use.

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

The system offers increased security to the system by use of passwords.

Only the relevant unit needs to enter information that is of importance to it. This reduces duplication of data.

Information is easily shared therefore cutting down on time wastage.

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

The development application and database ensures a unified system of record keeping.

The proposed system will help increase efficiently and effectiveness of the department's services to the institution and the customers.

4.4 Feasibility of the Database System

Feasibility study is also known as preliminary investigation evaluated the system in technical, operational and economical.

4.4.1 Technical Feasibility

According to Riagga, (2003), divides the technical area into two sections: hardware, software and personnel to develop (or purchase), install and operate the system. To

decide technical feasibility, the analyst simply determines if the preliminary design can be developed and implemented using exiting technology.

In the view of the study that was carried out, the project is technically feasible because the study is in a position to develop the system.

4.4.2 Operational Feasibility

Operational feasibility in Riaga's, (2003), view is the determination of the new system will be able to perform the designated functions within the existing organizational environment with its current personnel and existing procedures. The system is put in use once it has been developed and implemented. In view of this project, operational feasibility is upto date since all the staff and the top management wholly accept the new system to be developed. The original environment that encompasses of the personnel and the staff member of the university who came up with the existing procedures played a big role in operational feasibility to help come up with the database system.

4.4.3 Economical Feasibility

The cost benefit analysis carried out showed the benefits of the proposed system outweighed the cost of the existing system. The organization could afford the hardware, software and technical resources and were easily affordable in the local market. The cost was to be incurred in terms of configuration and installation of hardware and software, personnel cost i.e. employee's salary, training users etc and also purchasing some equipment. The further analyses the cost of implementing, running and maintain the database system.

Item	Costs (Ug. shs)
Transport to the field	150,000/=
Printing	100,000/=
Typesetting the work	50,000/=
Accommodation	150,00/=
Airtime	40,000/=
Compact disk	10,000/=
Computer	600,000/=
Stationery	200,000/=
Miscellaneous	50,000/=
Total	**1,350,000/=**

Table 1: *Economic feasibility of the new system*

The table above explains the expenses to be incurred in the development of the database system. All these expenses are to be incurred during the development of the system. The expenses to be incurred are far much lower compared to the expenses incurred in the using the current system.

4.5 Requirements Specification

This focused on reviewing what was collected in relation to the existing system. Areas that was investigated included; system requirement, and functional requirement.

4.5.1 System Requirement

These brought the choice of entities to be used in the database in order to store and maintain information and included the following.

i. The staff entity, which included the staff ID, their Biometric (names, photograph) and the signature among others.
ii. The students' entity, which included the names and the course done.
iii. The order's entity had the call numbers for books that were inter-linked, location and the department.

iv. Registration's entity, this encompassed searching for the particular books that were Senior Librarian's entity, which included the Librarian's name and the position of the different book banks.

4.5.1.1 Hardware Requirement

RAM for windows, disk space at least 40GB, printer, Keyboard, mouse, and monitor. Processor Pentium 4 with at least 2.5GHz to enable faster computation and allowed further investigation of new components into the application and run it.

This involved the project developer identifying and analyzing the end-users' needs. Users described the people who used the system and this was mainly the Library staff, students, and other authorized persons.

Requirements was what the intended users required of the system, what requirement could be met to perform effectively. It included capturing of information, maintaining and updating the database and further manipulation and processing of data.

4.5.1.2 Software Requirement

This involved a collection of programmes, routines, and sub-routines that facilitated the programming and operation of a computer but also include documentation and operational procedures. The researcher used a Structured Query language (SQL) to develop the system. This was accompanied by the following requirements: Operating system for example, Windows XP with a higher version, Script editor (Note pad and Macromedia Dream waver) software MS Office 2003 and PhP was used to develop the application and run it.

4.5.2 Functional Requirement

These described what functions the database performed on completion. It illustrated the different purposes for which the model was developed.

The database made data updates of librarians with corresponding details.

The database reduced data redundancy by saving an entry once and allows multiple viewing of the same entry simultaneously.

A user was able to access all the data in the system, update and make changes accordingly.

4.6 System Design

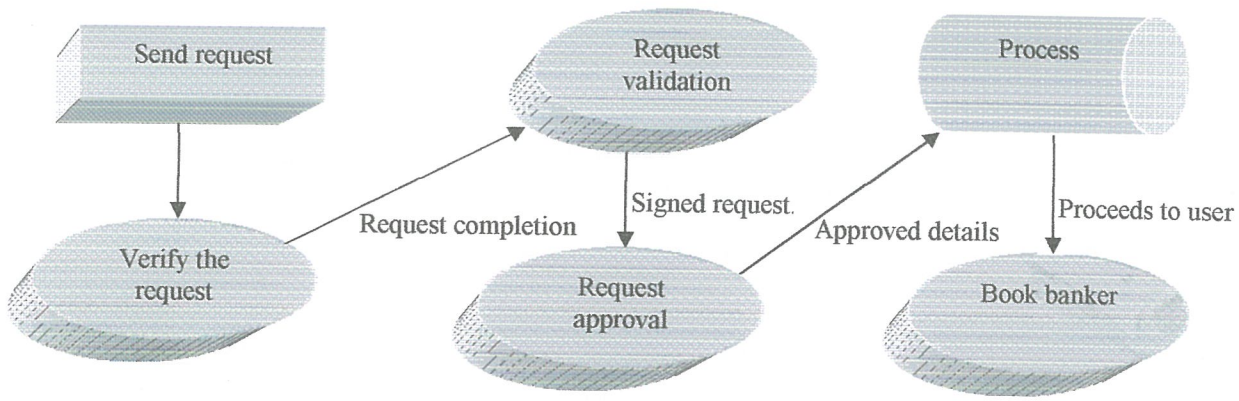
This section encompasses the conceptual, logical and physical design of the database system. It deals with the preliminary design then the detailed design. It as well as included diagrams which facilitates the user's understanding of the database system.

4.6.1 Conceptual Design

This includes a conceptual data model which is detailed model that captures overall structure of organizational data, while being independent of any database management system or other implementation consideration. A conceptual data model includes the relevant entities, relationship and attributes as well as rules and rules and constraints that define how data are used. The conceptual data model may be expressed in one of the several forms: - the most common are detailed entity relationship diagrams or object oriented models.

4.6.1.1 Data Flow Diagram (DFD)

Data flow diagram (DFD) is a tool that depicts the flow of data through a system and the work or processing performed by that system. It shows the external agents who (the sources or destination of data), the processes that transforms (act on) the data and the data are collected and held. The names of data stores in DFD's correspond to the names of the data entities in the E-R diagrams



Key:

Data storage

Process

Initiates the activities

Start

Figure 4: *Data flow diagram for book processing*

The figure above explains the process that the user undergoes before the book is given to the user. Requesting for the book from the librarian, the book is checked in the system in the preferred category then verified, the book banker enters the details of the users and then issues the book.

4.6.1.2 Context Model Diagram

A context data flow diagram defines the scope and the boundary for the system and since the scope of any system is always subject to change, the context diagram is also subject to constant change. As shown in the diagram below, external agents are drawn around the perimeter. Data flow defines interactions of the system with the boundaries and the external data stores.

The main purpose of the computerized database was to serve and manage customer details efficiently and effectively. It encompasses conceptual, logical and physical design of the database system.

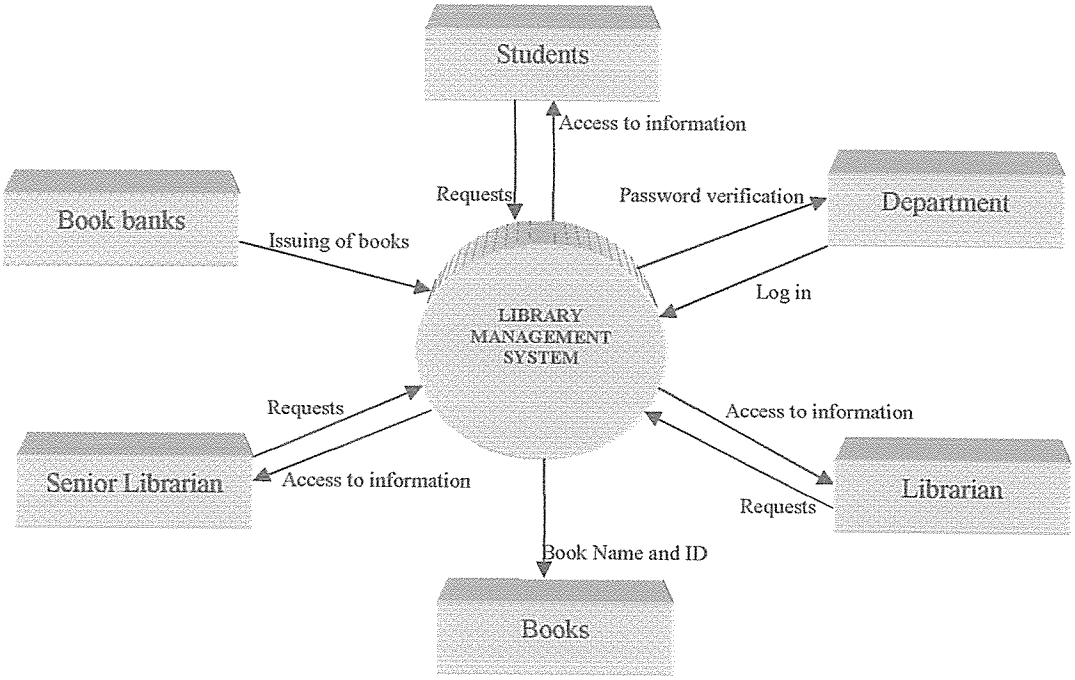


Figure 5: *Context level diagram for the new Library Management System*

The above figure explains how the Library Management System works in coordination with the students, librarian and senior librarian benefit from the system.

4.6.2 Logical Design

This was the process of mapping of the conceptual data model to the structures that were specific to target DBMS. The logical design process was concerned with transforming the conceptual data model to a logical data model.

4.6.2.1 Entity Relationship Diagram of the database

The key elements of the Entity Relationship Model (E-R Model) are entities, attributes, and relationships. The E-R diagram depicts the information requirements at the departments.

4.6.2.2 Entities

An entity is something that can be identified in the users' work environment, something that users want to track, Kroenke, (2000).

In this case, books, students, departments, librarian, senior library and book banks are the entities.

4.6.2.3 Attributes

Entities have attributes, also called properties that describe the entity's characteristics. Examples of attributes are as follows. Students; Stud _Name, Reg_No, Faculty, Course, Gender, Year and Contacts. Books; Title, Pub _Year, ISBN, Auth_Name and Bk_cost.Book banks;TextBkNo,NoOfBks and ShelfName.Departments;Dept_Name,DeptID,Dept-Name,PhoneNo,Lectures_Name and No_of_Students.Librarian;Librn_Name,LibrnID,Gender and Contacts.

4.6.2.4 Relationships

A relationship is an association between entities Kroenke, (2000). An E-R model consists of both relationship classes and relationship instances. Relationship classes are associations among entity classes and relationship instances are associations among entity instances.According to the library management system, one librarian registers many students, one student can search for many books, one student can belong to one department, one or many students can receive one or many books from the book banks, and one senior librarian heads many book banks.

4.6.2.5 Entity-Relationship Model

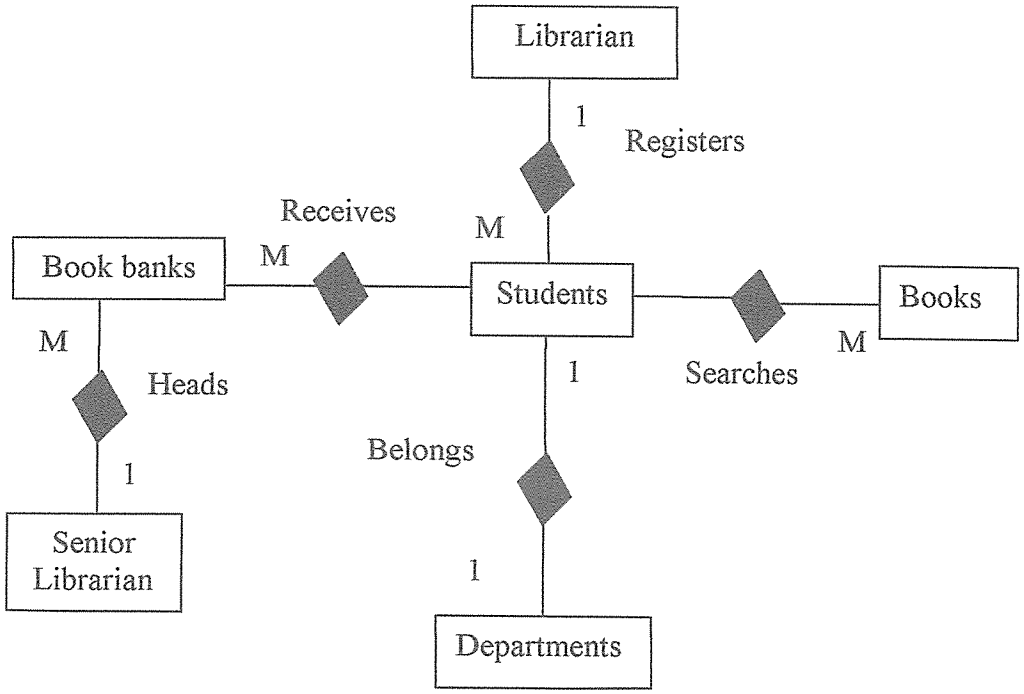


Figure 6: *The Entity-Relationship Model*

The Entity-Relationship (ER) model was originally proposed by Peter, (1976) as a way to unify the network and relational database views. Simply stated the ER model is a conceptual data model that views the real world as entities and relationships. A basic component of the model is the Entity

Relationship diagram which was used to visually represent data objects. Since Chen wrote his paper the model has been extended and today it is commonly used for database design for the database designer, the utility of the ER model is:

4.7 Tables

4.7.1 Book Bank

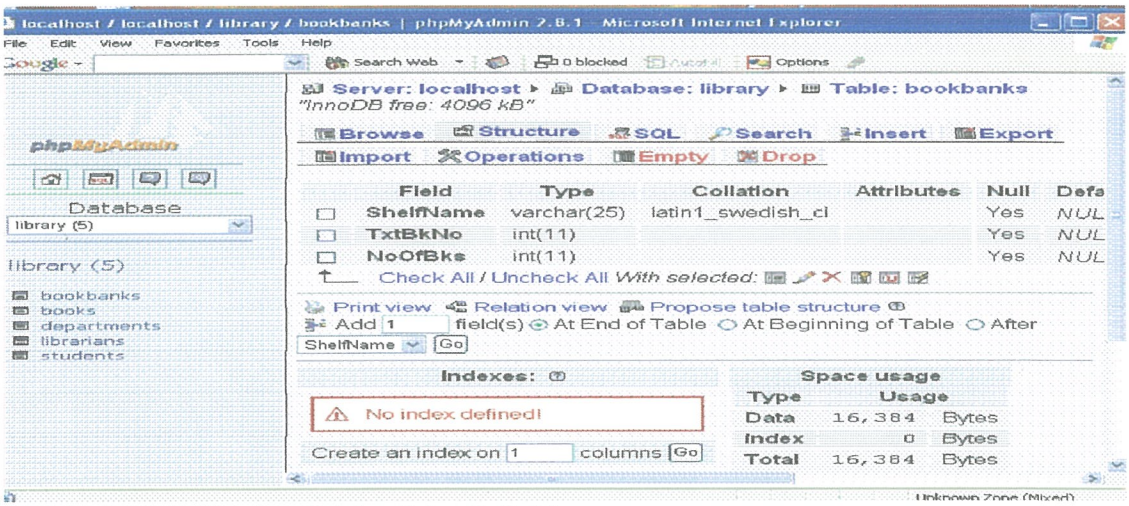


Figure 7*: showing book bank fields*

4.7.2 Books

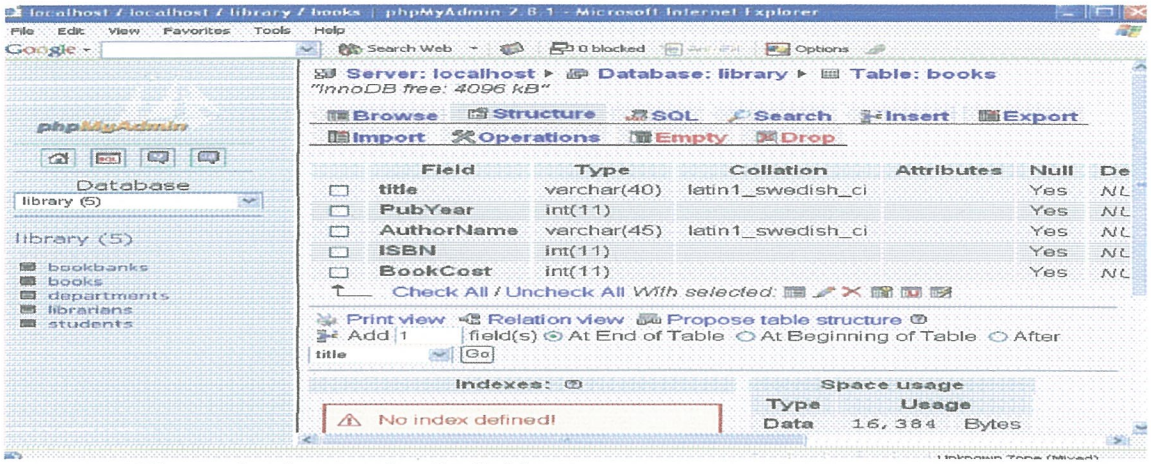


Figure 8: *showing books fields*

4.7.3 Departments

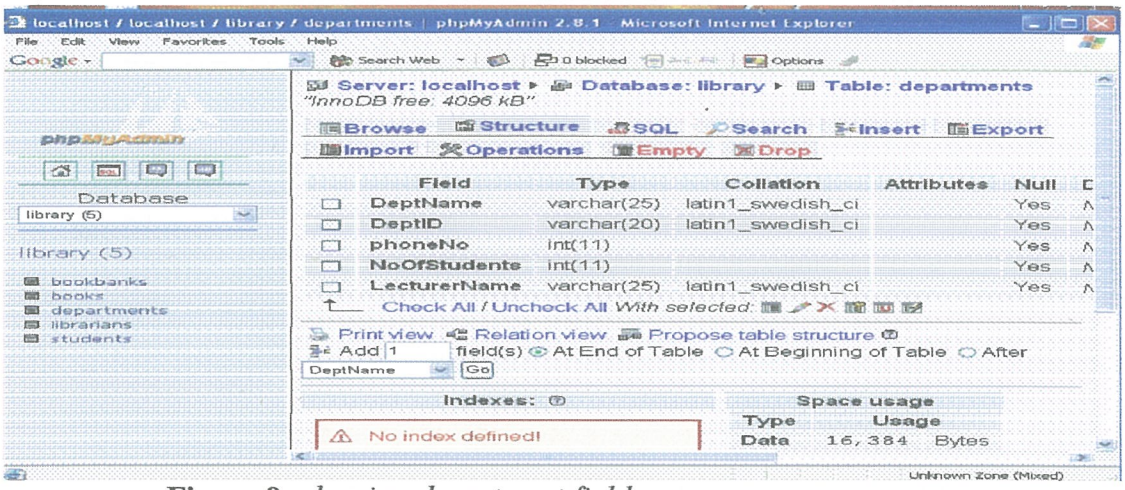


Figure 9*: showing department fields*

4.7.4 Librarians

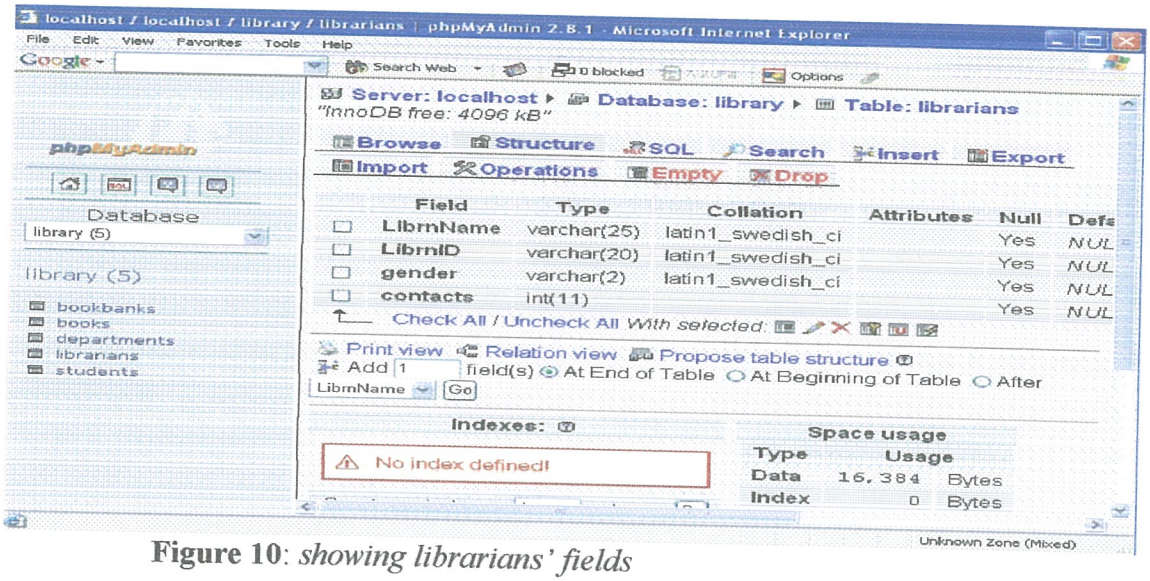


Figure 10: *showing librarians' fields*

4.7.5 Students

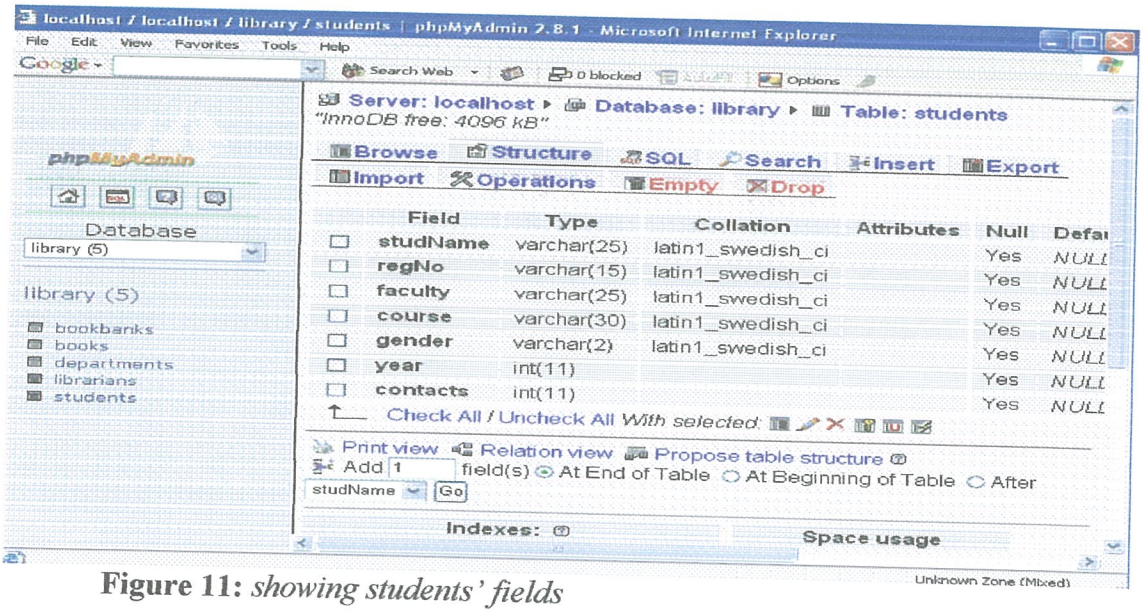


Figure 11: *showing students' fields*

4.8 Forms

A number of forms were designed to capture students, staff and ID number details and enable editing, for updating and accessing information required. Several forms were

generated for the purposes of correspondence to each item on the main form; the form menu. The forms are customized with different types of buttons to enable navigation through different components that make up the whole system.

4.8.1 Administrator Login Window

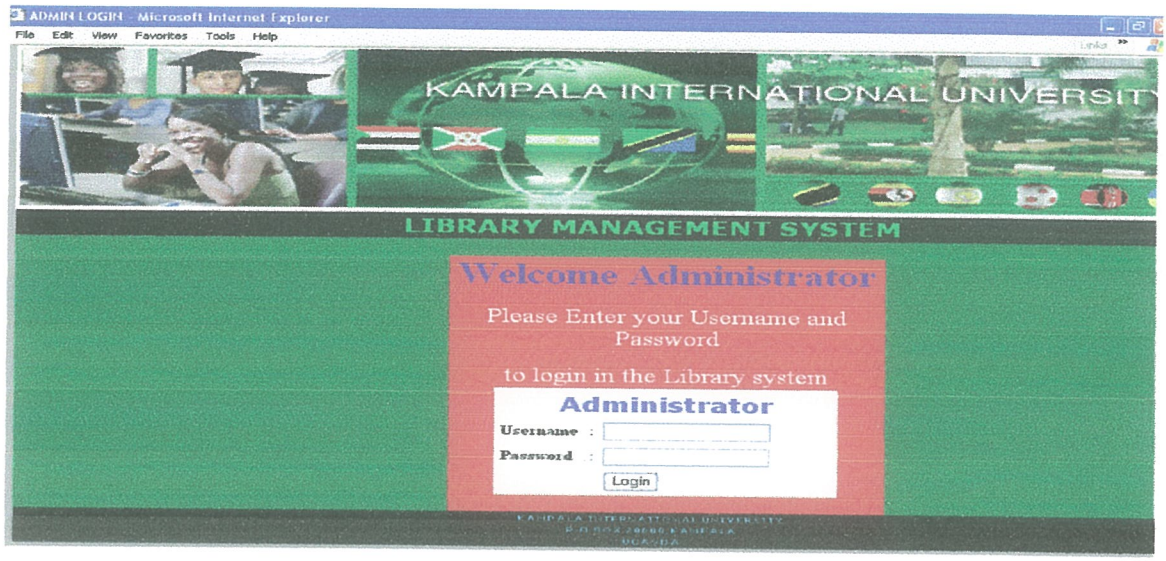


Figure 12: *Administrator login form*

4.8.2 User Login Window

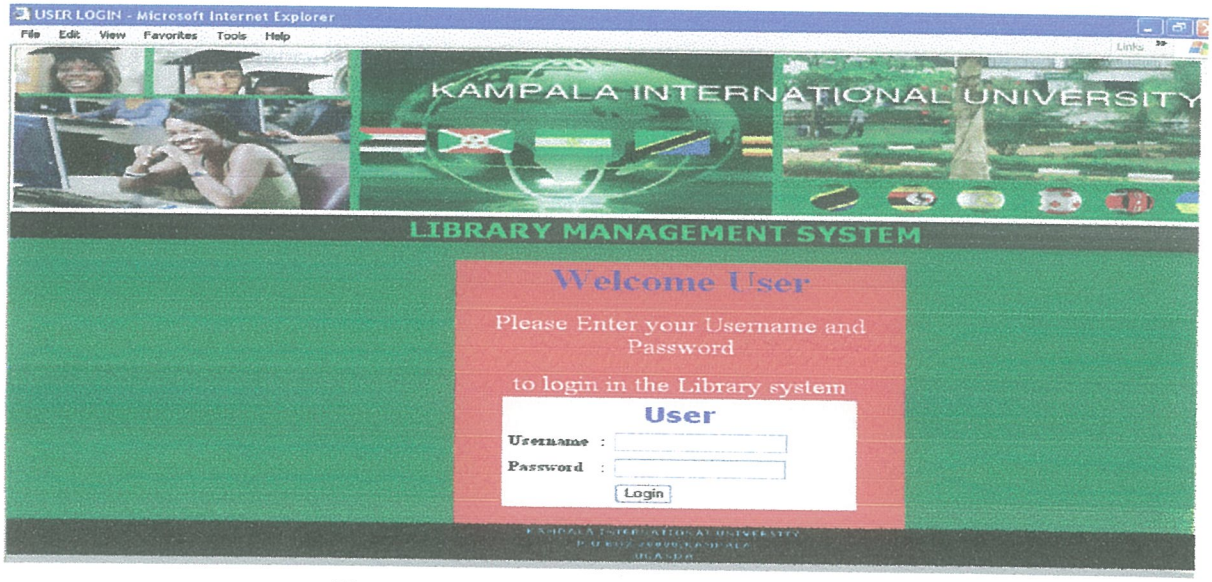


Figure 13: *User login form*

4.8.3 Main Form

This is the main form interface of the whole information system for the library management system. It has a number of forms to be filled. This includes staff form, or

students form, category form owner or property and buttons to navigate the report menu and the data entry menu.

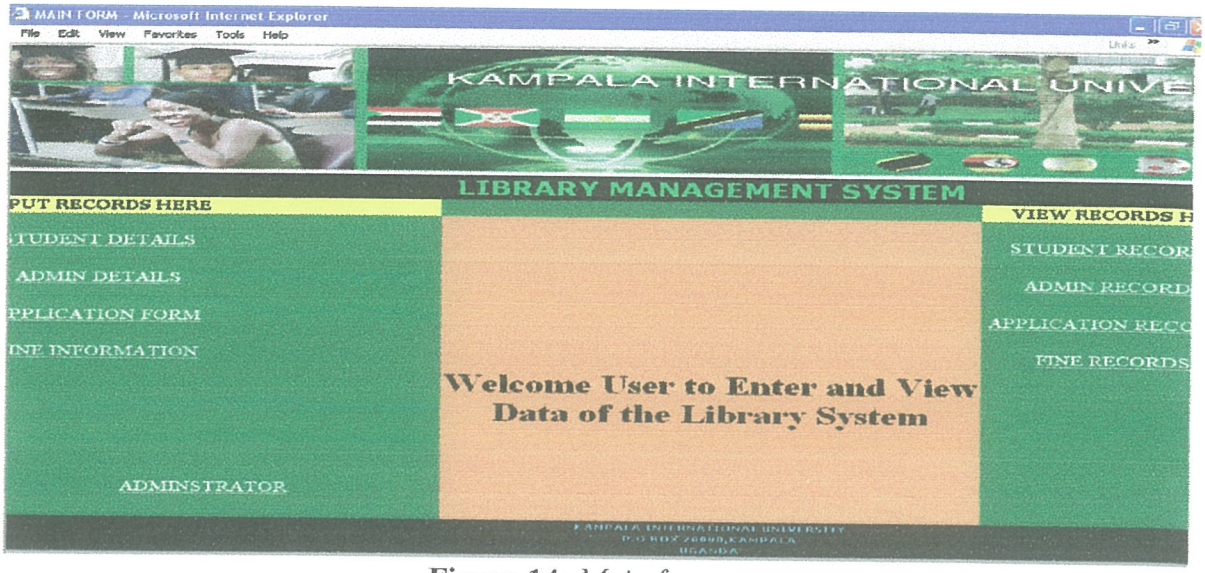


Figure 14: *Main form*

4.8.4 Administrator Details form

This form has all the reports produced by the system ready for printing or using when the user clicks on the reports navigation button, it appears in print preview form and is selected for printing or viewing the report. It contains all the details about administrators and students which include; the identification number, names, occupation, contacts and other details concerning the payments. It also contains different buttons to enable navigation through the records and other forms like the reports and the main menu.

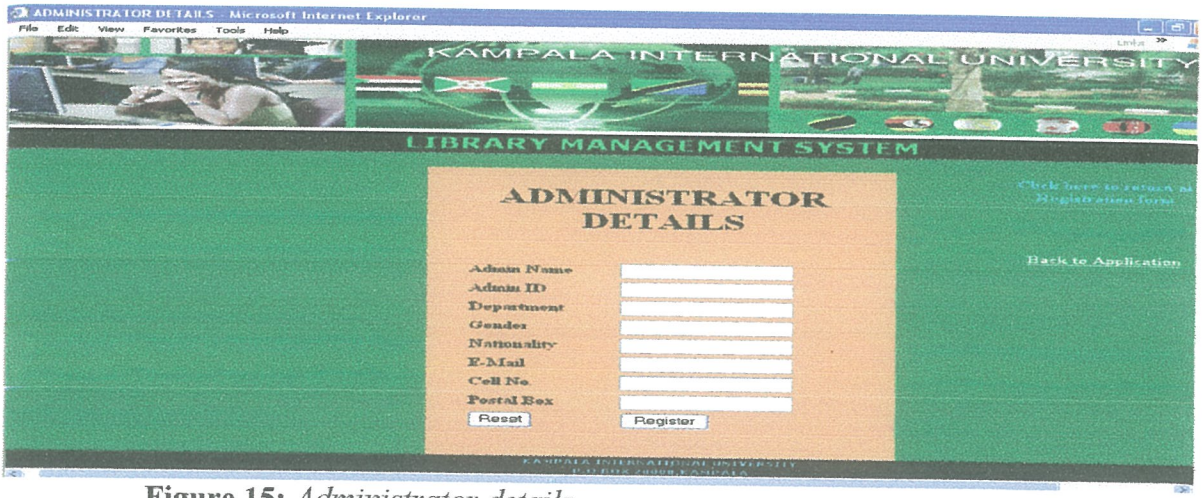


Figure 15: *Administrator details*

4.8.5 Student Details form

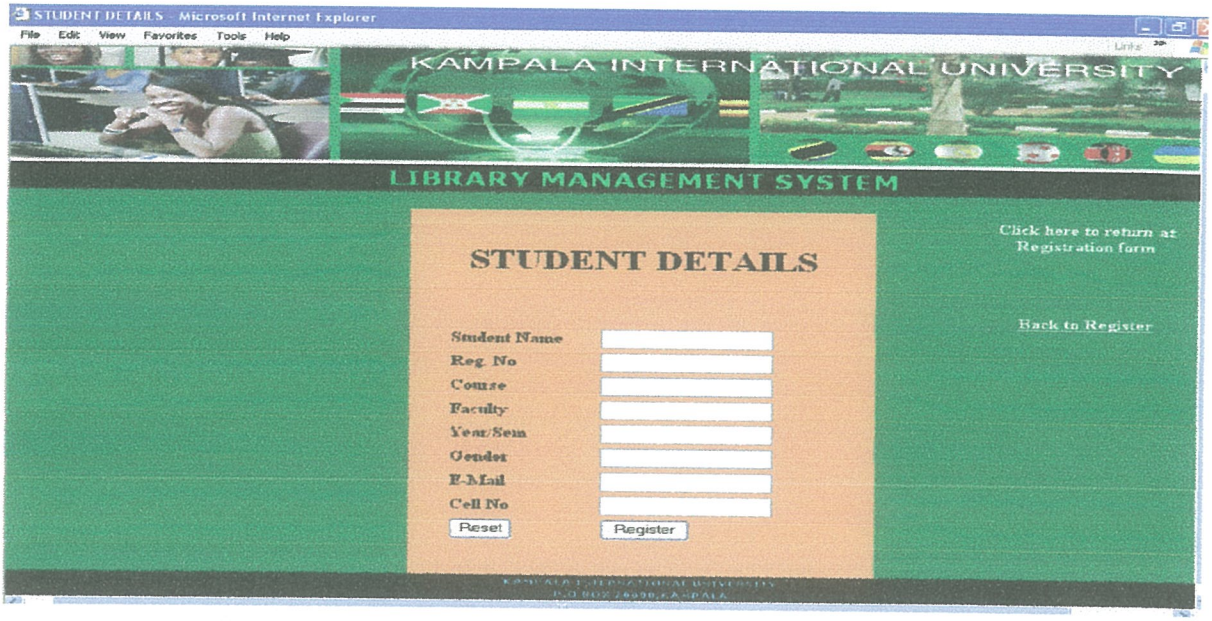


Figure 16: *Students details*

4.9 System Testing

Before actually implementing the new system into operations, a test run of the system was done by removing all the bugs. It was an important phase of a successful system.

4.9.1 Unit Testing

This was the first stage of testing; this was done by using written test planning and prepared test data. The path consists of a number of tests run such as valid path through the codes. For each test run, there was a list of condition tested, the test data used and expected results. All the forms that are on the system are tested against the test plan and conditions.

4.9.2 Integration Testing

This was the interfaces between programs in the same function area. Each program was linked to other program with which it interacts. The whole process must be in a specific

sequence and within specified response time. The integration between the program interfaces created in dream weaver and the database created in mysql is fully tested to ensure that they effectively linked.

4.10 System Implementation

This involves the construction, installation, testing and delivery of the system into production.

4.11 System Conversion

Conversion into new system from the old system is a significant milestone. This included a strategy for converting from the old system to the new system. The following method was used.

4.11.1 Parallel running.

This is the most used method, involving processing of the current data on both the old and new systems in order to cross-check the results. This kept the old system alive until the new system had been proved for at least one processing cycle. Infact it promoted user confidence since it allows the results of the old and new system to be compiled side by side. Also the system had given time to familiarize with the new system.

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

This chapter gives the summary of the major findings of the study conclusions and what the researcher recommends. The recommendations are based on the researcher's analysis and interpretation of the findings.

5.1 Discussion

The objective of the new system was to capture accurate information to be used in the timely and efficient manner and accurately so that management can use the system for their various management problems and enable the making of right decisions while basing on the accurate information.

The researcher has established that the formulation of a friendly graphical user interface is easily done by use of a computerized system. This is achieved by the use of software program to develop a user interface. This was done by using Microsoft access.

The use of an implemented computerized system fastens the rate of inserting information into the super market's information system. The researcher has established that the time of retrieving and collecting information is has been shortened and there are fewer complaint and errors. Availing the system to various branches, western branch has led to faster results submission. From the library management staff to the main branch library management.

The project has been involved with following challenges:

i. The library has a big population and collecting information took a lot of time.
ii. Limited finance in terms designing and printing.
iii. Limited access to computer and software requirements for instance visual basic.
iv. Time constraints especially the time involved in developing the recommended system.

5.2 Recommendations

The function performed by the existing system include; collection, recording, storing and basic data processing. The researcher intended to capture the functions performed by the existing system into a computerized system which was done through scanning the processes by the existing process. Using the new system may be difficult for users and the system may require a help facility to help users in using the new application. Recommendations include the development of the help facility with in the developed to help new and naïve users to use the application. The help facility may be a soft ware program developed to explain what various components of the system do and how they operate.

Data and information for the existing system is usually stored on hard copies. The new system stored data and information on computer hard disks from where the application is run. Future improvements include the storage and backup of data in different locations to enable backup of information. This can be done through developing a back up prompt facility system to enable back up of data and database security system for system protection.

Implementation of the new system was done by the researcher on the libraries computers so as to enable the achievement of the researcher's objectives. The new system was a stand alone and was only used by the library. Future research may the interaction of all facilities providing similar services through the World Wide Web. This enabled students to quickly locate books in other libraries in Kampala other areas around the country.

The data interface developed was a MS software application to enable capture and processing of data using computerized interface. The data is to be captured using a keyboard on the machine that houses the application. Future improvements may include the enabling of data on line via the internet or point of library terminal. This can be done by developing the application through a web base platform. Authorized users had to use passwords to access database. This enabled access of information from remote locations and the sending of student's bills through the internet.

The new proposed system should be tested by the library management to ensure that it runs smoothly meeting the requirements of the various users. Ant-virus should be put in place to ensure the continued flow and safety of information.

5.3 Conclusion

The manual system used in the library was inefficient, data entry and retrieval was tedious, there was mixing and misplacement of records, updating and correcting of records took a lot of time thus there was a need to develop a computerized system to solve the above problems. With the development of the information system, the problems were solved as the system was able to meet the requirements specified by the users. The completion of this project is of great importance to the new KIU main library.

5.4 Limitation of Study

i. Some of the respondents don't return their questionnaires in time and that led to delay of information
ii. Some of the respondents were illiterate.
iii. The results were not spontaneous.
iv. The researcher did not know whether, what is observed was a representative normal routine of the respondents.
v. The presence of the enumerators influenced the response; sensitive questions were not answered accurately.
vi. The cost of printing the questionnaires was expensive and some of the questionnaires was misused by the respondents

5.5 Future Research

Performance appraisal using computerized systems in today's organizations.

How implemented information technologies have influenced customer satisfaction.

Integrated information systems and organizational performance in organizations today

REFERENCES

Barry, (1996); *The value of information, The value and impact of information*, Mary Feeney, West Sussex, Bowker-Saur, Ltd.

Blackman, (1990); *Implementing micro-computers*, Hand book of microcomputer applications in communication disorders edited by A.H. Schwarz, San Diego, Colle-Hill Press.

Bruce Eckel,(1995) *Thinking in Java: A Definitive Introduction to Object-Oriented Programming in the Language of the World Wide Web*. Prentice Hall, Upper Saddle

Capron, (1996); *The impact of information on the management of large academic institution,* Mary Feeney, West Sussex, Bowker-Saur, Ltd.

Clayton and Batt, (1992); *Computers-tools for an information age*, 4th ed. reading Colle-Hill Press.

Collier (1994); *Going automated, Implementing and using information technology in organisations*, London; Aslib.

Cay S. Horstmann and Cary Cornell, (1998) *Core Java 2, Volume I: Fundamentals*. Prentice Hall, Upper Saddle River, NJ.

C.J.Date, (1992) *An introduction to database systems,* 7th ed. Kelly and sonford, Inc. LA.
Dewey (1998); *Journal of Business Logistics*, "Supply chain collaboration and logistical service performance," Vol. 22, No. 1, pp. 29.

Graham Hamilton, Maydene Fisher and Rick Cattell, (1997) *JDBC Database Access with Java: A Tutorial and Annotated Reference*. Addison Wesley Longman Inc., Reading, MA.

Jason Hunter and William Crawford,(1998) *Java Servlet Programming*. O'Reilly and Associates, Inc., Sebastopol, CA.

James Goodwill, (1999) *Developing Java Servlets*. Sams Publishing, Indianapolis, Inc.

Kaul, (1986); Inter-organizational information system technology and buyer-seller relationships," *The Journal of Business & Industrial Marketing*, Vol. 13, No. 3, pp. 215..

Laudon,(2001); Information technology investments in purchasing: An empirical investigation of communications, relationships and performance outcomes," *Omega, The International Journal of Management Science*, Vol. 32, No., pp. 41-55

Omenyi, (1997); Modelling the relationship between firm IT capability, collaboration and performance," *Journal of Business Logistics*, Vol. 26, No. 1, pp. 1.

Tom Christiansen and Nathan Torkington, (1996) *Perl Cookbook*. O'Reilly and Associates,
Inc., Sebastopol, C

APPENDICES

Appendix A: *System Sample Codes*

```
<!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">
<head>
<?
// Put this code in first line of web page.
session_start();
session_destroy();
?>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
<title>USER LOGIN</title>
<style type="text/css">
<!--
body {
        background-color: #999999;
}
.style8 {
        font-family: Verdana, Arial, Helvetica, sans-serif;
        font-weight: bold;
        font-size: 24px;
        color: #66FF00;
}
.style9 {       font-size: 24px;
        color: #FFFFFF;
}
.style11 {
        font-family: Verdana, Arial, Helvetica, sans-serif;
        font-weight: bold;
        font-size: 24px;
        color: #0000FF;
}
.style12 {
        font-size: 36px;
        color: #3300FF;
}
.style14 {font-size: 10px; font-family: Verdana, Arial, Helvetica, sans-serif; font-weight:
bold; color: #00FFFF; }
-->
</style>
</head>

<body bottomMargin=0 bgColor=#ff99ff topMargin=0>
```

```
<table width="975" align="center" cellspacing="0">
  <tr>
    <td colspan="7" bgcolor="#FFFFFF"><div align="center"><img src="logo.jpg"
alt="hi" width="191" height="196" align="left" /><img src="picture.png" width="1105"
height="199" align="left" /></div></td>
  </tr>
  <tr bordercolor="0">
    <td colspan="7" bgcolor="#000000"><div align="center" class="style8">LIBRARY
MANAGEMENT SYSTEM </div></td>
  </tr>
  <tr bordercolor="#FFFF00">
    <td width="235" bordercolor="#FFFFFF" bgcolor="#006600"> </td>
    <td width="112" bordercolor="#FFFFFF" bgcolor="#006600"><a
href="file:///G|/ASSP WEB -hashim/ASSP webdeveloped final project 14 Sept
2009/Index.php"></a></td>
    <td width="112" bordercolor="#FFFFFF" bgcolor="#006600"> </td>
    <td width="234" bordercolor="#FFFFFF" bgcolor="#006600"> </td>
  </tr>
  <tr>
    <td rowspan="2" bgcolor="#006600"><table width="228" border="0">
      <tr>
        <td width="222"> </td>
      </tr>
      <tr>
        <td> </td>
      </tr>
      <tr>
        <td> </td>
      </tr>
      <tr>
        <td> </td>
      </tr>
      <tr>
        <td> </td>
      </tr>
    </table></td>
    <td colspan="5" bgcolor="#FF0000"><h1 align="center" class="style12">Welcome
User </h1>
      <p align="center" class="style9">Please Enter your Username and Password </p>
      <p align="center" class="style9">to login in the Library system </p>    </td>
  <td rowspan="2" bgcolor="#006600"><p align="center"><table width="200"
border="0">
  <tr>
    <td><div align="center"></div></td>
  </tr>
  <tr>
```

```
    <td> </td>
  </tr>
  <tr>
    <td> </td>
  </tr>
  <tr>
    <td> </td>
  </tr>
  <tr>
    <td> </td>
  </tr>
</table></tr>
  <tr>
    <td colspan="5" rowspan="4" bgcolor="#FF0033"><form method="post" form
action="file:///G|/ASSP WEB -hashim/ASSP webdeveloped final project 14 Sept
2009/insert2.php">
    </form>
      <table width="300" border="0" align="center" cellpadding="0" cellspacing="1"
bgcolor="#CCCCCC">
<tr>
<form name="form1" method="post" action="checklogin2.php">
<td>
<table width="100%" border="0" cellpadding="3" cellspacing="1" bgcolor="#FFFFFF">
<tr>
<td colspan="3"><div align="center" class="style11">User</div></td>
</tr>
<tr>
<td width="78"><strong>Username</strong></td>
<td width="6">:</td>
<td width="294"><input name="myusername" type="text" id="myusername"></td>
</tr>
<tr>
<td><strong>Password</strong></td>
<td>:</td>
<td><input name="mypassword" type="password" id="mypassword"></td>
</tr>
<tr>
<td> </td>
<td> </td>
<td><input type="submit" name="Submit" value="Login"></td>
</tr>
</table></td>
</form>
</tr>
</table></td>
  </tr>
```

```
  <tr>
    <td bgcolor="#006600"></td>
    <td bgcolor="#006600"> </td>
  </tr>
  </tr>
  <tr>
    <td bgcolor="#006600"> </td>
    <td colspan="5" bgcolor="#FF0000"><p> </p>    </td>
    <td bgcolor="#006600"> </td>
  </tr>
  <tr>
    <td colspan="7" bgcolor="#000000"><div align="center"
class="style14">KAMPALA INTERNATIONAL UNIVERSITY </div></td>
  </tr>
  <tr>
</body>
</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">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
<title>MAIN FORM</title>
<style type="text/css">
<!--
body {
        background-color: #999999;
}
.style8 {
        font-family: Verdana, Arial, Helvetica, sans-serif;
        font-weight: bold;
        font-size: 24px;
        color: #FFFF00;
}
.style10 {font-size: 24}
.style15 {
        font-size: 18px;
        color: #FFFFFF;
}
.style18 {font-size: 18px; color: #FF0000; }
.style9 {font-family: Verdana, Arial, Helvetica, sans-serif;
        font-weight: bold;
        font-size: 24px;
        color: #66FF00;
}
```

```
.style19 {font-size: 10px; font-family: Verdana, Arial, Helvetica, sans-serif; font-weight:
bold; color: #00FFFF; }
.style20 {
        font-family: Georgia, "Times New Roman", Times, serif;
        font-weight: bold;
}
.style21 {font-family: "Times New Roman", Times, serif}
-->
</style>
</head>

<body bottomMargin=0 bgColor=#ff99ff topMargin=0>

<table width="981" align="center" cellspacing="0">
  <tr>
    <td colspan="7" bgcolor="#FFFFFF"><div align="center"><img src="picture.png"
width="1262" height="157" /></div></td>
  </tr>
  <tr bordercolor="0">
    <td colspan="7" bgcolor="#000000"><div align="center" class="style8"><span
class="style9">LIBRARY MANAGEMENT SYSTEM</span></div></td>
  </tr>
  <tr bordercolor="#FFFF00">
    <td width="235" bordercolor="#FFFFFF" bgcolor="#FFFF00"><div align="center"
class="style20">PUT RECORDS HERE </div></td>
    <td width="112" bordercolor="#FFFFFF" bgcolor="#006600"><a
href="file:///G|/ASSP WEB -hashim/ASSP webdeveloped final project 14 Sept
2009/Index.php"></a></td>
    <td width="112" bordercolor="#FFFFFF" bgcolor="#006600"> </td>
    <td width="114" bordercolor="#FFFFFF" bgcolor="#006600"> </td>
    <td width="110" bordercolor="#FFFFFF" bgcolor="#006600"> </td>
    <td width="112" bordercolor="#FFFFFF" bgcolor="#006600"> </td>
    <td width="234" bordercolor="#FFFFFF" bgcolor="#FFFF00"><div align="center"
class="style20">VIEW RECORDS HERE</div></td>
  </tr>
  <tr>
    <td rowspan="2" bgcolor="#006600"><table width="218" height="190" border="0">
      <tr>
        <td height="36"><div align="center"><span class="style18"><a
href="file:///F|/KIU Lib Magt Syst/details.php" class="style15">STUDENT DETAILS
</a><a href="file:///F|/KIU Lib Magt Syst/details.php"></a> </span></div></td>
      </tr>
      <tr>
        <td><div align="center"><a href="file:///F|/KIU Lib Magt Syst/repairs.php"
class="style15">ADMIN DETAILS </a></div></td>
      </tr>
```

```
    <tr>
      <td height="35"><div align="center"><a href="file:///F|/KIU Lib Magt
Syst/application.php" class="style15">APPLICATION FORM</a></div></td>
    </tr>
    <tr>
      <td><div align="center"><a href="file:///F|/KIU Lib Magt Syst/bill.php"
class="style15">FINE INFORMATION</a></div></td>
    </tr>
   </table></td>
   <td colspan="5" bgcolor="#FF9966"><h1 align="center"> </h1>
   </td>
   <td rowspan="2" bgcolor="#006600"><table width="218" height="190" border="0">
    <tr>
      <td height="36"><div align="center"><span class="style18"><a
href="file:///F|/KIU Lib Magt Syst/detailsRep.php" class="style15">STUDENT
RECORDS </a><a href="file:///F|/KIU Lib Magt Syst/details.php"></a>
</span></div></td>
    </tr>
    <tr>
      <td><div align="center"><a href="file:///F|/KIU Lib Magt Syst/repairsRep.php"
class="style15">ADMIN RECORDS</a></div></td>
    </tr>
    <tr>
      <td height="35"><div align="center"><a href="file:///F|/KIU Lib Magt
Syst/applicationRep.php" class="style15">APPLICATION RECORDS </a></div></td>
    </tr>
    <tr>
      <td><div align="center"><a href="file:///F|/KIU Lib Magt Syst/bilRepl.php"
class="style15">FINE RECORDS </a></div></td>
    </tr>
   </table>
 </tr>
 <tr>
   <td colspan="5" rowspan="4" bgcolor="#FF9966"><h1 align="center"
class="style21"><span class="style10">Welcom</span>e <span
class="style10">User</span> to Enter and View Data of the Library System </h1></td>
 </tr>
 <tr>
   <td bgcolor="#006600"></td>
   <td bgcolor="#006600"> </td>
 </tr>
 <tr>
   <td bgcolor="#006600"> </td>
   <td bgcolor="#006600"> </td>
 </tr>
 <tr>
```

```
   <td bgcolor="#006600"><?
// Check if session is not registered , redirect back to main page.
// Put this code in first line of web page.
session_start();
if(!session_is_registered(myusername)){
header("location:index.php");
}
?> 
   <div align="center"><a href="file:///F|/KIU Lib Magt Syst/adminlogin.php"
class="style15">ADMINSTRATOR</a></div></td>
   <td colspan="5" bgcolor="#FF9966"><p> </p>
   <p> </p>
   <p> </p></td>
```

Appendix B: *Time Frame*

	Number of weeks											
Activities	1	2	3	4	5	6	7	8	9	10	11	12
Proposal development	✓											
Data collection methods		✓	✓									
Entries & Coding			✓									
Analysis				✓	✓							
Design						√	√	√				
Compilation					✓	✓	✓	✓				
Submission									✓			
Review										✓		
Submission												✓

Appendix C: *Questionnaire*

Preamble

Dear recipient, we do distribute these questionnaires with the reason of gathering the necessary information which will be used in our further research and findings. We really request you to complete the following questions honestly and appropriately to the best of your ability and knowledge because your information will be treated high confidential.

1. SEX

a) Male ☐ b) Female ☐

2. AGE

a) Below 25years ☐

b) Above 25 years ☐

3. POPULATION

a) Student ☐ b) Librarian ☐ c) Book banker ☐ d) Others ☐

4. FACULTY

a) Computer ☐ b) Business ☐ c) Law ☐ d) Social Science ☐

e) Education ☐

6. What is your opinion, regarding to the implementation of the new Library Management system?

.....

.....

7. What is your attitude towards the current situation of the Library Management System?

8. Do you believe that the system will initiate the receiving and issuing of books to students?

a) Yes ☐ b) No ☐ c) Don't know ☐

If yes, explain briefly

.....

Thanks for, your cooperation.

May GOD bless you

Appendix D: *Interview Questions*

Interview questions for librarians and book bankers

1. What do you think is the current situation concerning the issuing and receiving of books?
2. What do you suggest about the implementation of the new Library Management System will?
3. How do you keep your records?
4. How will you benefit from the new system?

Interview questions for students

1. What is the relationship between you, the librarians and book bankers?
2. What do you think is the current situation?
3. What are procedures that you undertake when you need a textbook from the book banker?
4. As a student, how will you benefit from the new system?

Thanks for, your cooperation

May GOD bless you.