

COMPUTER TROUBLESHOOTING SYSTEM

CASE STUDY: RICK ICT LABORATORY - GULU

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**A GRADUATION PROJECT REPORT SUBMITTED TO THE SCHOOL OF
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DECLARATION

We do hereby declare to the best of our knowledge that this graduation project is our original work produced during the course of the project carried out at the Rick ICT Laboratory Gulu and that it has never been submitted to any university or any other institution. The project group consists of two members who shared project management tasks that proved to be vital to the success of the project under the supervision of Mr. Ochen Moses.

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APPROVAL

This Graduation project is under the title ***COMPUTER TROUBLESHOOTING SYSTEM FOR RICK ICT LABORATORY - GULU*** and has been checked and submitted with my approval as project supervisor.

Signed.....

Mr. OCHEN MOSES

Date.....

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ABSTRACT

Automation of Computer troubleshooting system is meant to store, update and help the users and administrators in finding problems and solutions associated with computers in the Rick ICT Laboratory. This will also cater for the newly detected problems and symptoms in the computers at the institution. It's in due course because of the problems incurred due to poor computer troubleshooting techniques in the institution such as software and hardware failures like hard disk crashing, inadequate power supply, incompatibles devices, and data loss. The system will therefore generate reports for the problems, symptoms and solutions for both the users and administrators according to the search. The system will also generate a report for the authorised users that will only be viewed by the system administrator.

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CHAPTER ONE

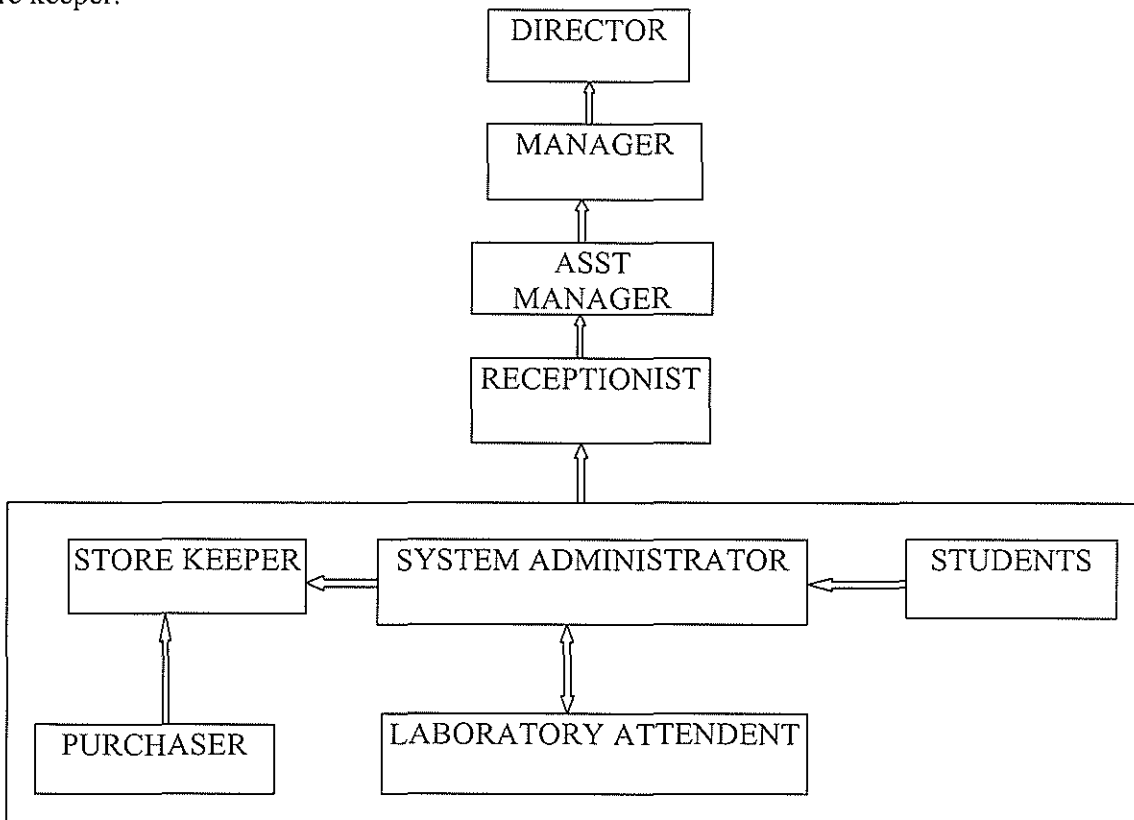
INTRODUCTION

1.0 Background

Rick ICT Laboratory is an Institution that provides computer training to the people. Rick ICT Lab is located in Gulu town on Andrea Olal road, opposite Mega shoppers. It started in the year 2006 with about 31 students doing different computer short courses and four(4) trainees' and now serving up to about 200 students with an increased number of trainees up to about 16. The institution has played an important role in increasing the number of computer literates in Gulu district.

1.1 Structure of the Institution

This gives a description of the arrangement of Rick ICT Laboratory management from the Director to store keeper.



1.2 Problems Statement

According to Innocent Odongping the Laboratory attendant, Rick ICT Lab is experiencing problems of software and hardware failure which requires the Lab management to hire experts from outside to fix the problems which is very expensive in terms of funding. The management therefore thought of coming up with a computer troubleshooting system to combat the above problems to improve on their systems efficiency.

Therefore the project aims at providing easy and fast detection of software and hardware problems to enable users of the system with ease in solving problems they need.

1.3 General Objectives of the Project

To establish a system that will assist computer users in maintaining the good working state of their computers. In particular the system will make the following to be realized. Test and implement the system at the Institution offices.

1.3.1 Specific Objective

- To design and implement a system that will provide security for the institution information system by restricting user through Authentication. That is the use of Username and Password.
- To design a system that will ease the work of technicians when troubleshooting computers.
- To improve on the service delivery to the users at the institution.

1.4 Scope of study

This project would be bounded to the Rick ICT Laboratory Gulu .The software will be able to handle the computer troubleshooting for both software and hardware problems associated with computers for the Rick ICT Laboratory. And to overcome the constraints that Rick ICT Laboratory is currently experiencing. They include hard disk crashing, hardware conflict, inadequate power supplies etc.

1.5 Justification of the Study

Many ICT institutions that use computer troubleshooting system will still continue to face the problem of manual repairing of computers and installation of programs which will still accompanied with certain problems.

However when successfully implemented, Rick ICT Laboratory troubleshooting System will greatly have the following impacts:

- The System would provide a friendly Graphical User Interface to enable even the less advanced users of the system to reliably and efficiently use it to get or extract the needed information.
- The System will provide actual and accurate information and help in efficient decision making by the System administrator, manager and all other computer users in the Institution in the process of troubleshooting.
- The database system would provide security where authorized users can access the contents of the database and unauthorized users are denied access to the information due to use of passwords at the login form only known by the management and authorized users of the database.
- Data backups will ensure that data will not be lost completely

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter gives a summary and interpretation of research findings reported by the researchers in the related systems. It also takes a deeper look at concepts like MIS, IS, IT, DB related terminologies DBMS and strength plus weakness of the other systems are also looked at.

2.1 The concept of Databases

This is an integrated collection of logically related data and a description of this data, designed to meet the information needs of the organization (Thomas Connolly, 2005). With databases we realize that it has to facilitate all our daily business activities.

2.2 The concept of the Database System Environment

A database refers to a shared collection of logically related data, and a description of this data, designed to meet the information needs of an organization (Connolly, Begg, 2002). The database system environment is composed of hardware, procedures, people, software and data as illustrated in figure 2.3.2 below.

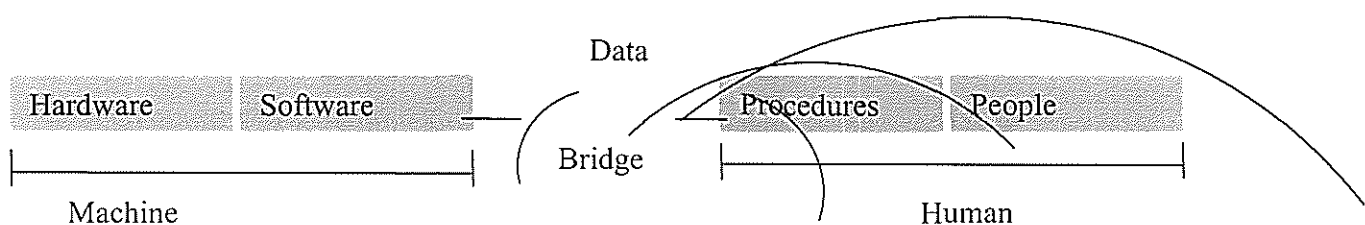


Figure 2.2 An illustration of the components a database system. (Source: Connolly et al., 1997).

- **Hardware**

According to Rob Coronel (2000), hardware refers to all the systems physical devices. The most common hardware known are computers or a network of computers. However, other hardware components include: mice, modems, printers and keyboards. Computers are connected together using peripherals to form a network of computers, this network of computers are very important for database that store data that are likely to be accessed from remote locations like for re-stance automatic teller machines, air plane

reservation systems and so on.

- **Procedures**

Procedures are the rules and instructions that govern the design and use of the database system. These also ensure an organized way to monitor and audit both data entering the database and information generated through the use of the data entered.

- **People**

This component includes all users of the database system. Examples include: system administrators, Database administrators, Database designers, system analysts, programmers and end-users (Rob Coronel).

- **Software**

This refers to the collection of programs used by the computer with in the database system. Examples of software include:

- Database Management System (DBMS) Software

This software manages the database with in the database system. Examples of database management systems include Microsoft Access and SQL server, MySQL, Oracle corporations, Oracle and IBM's DB2.

- Application programs and utilities software

This is used to access and manipulate data in the database management system and to manage the computer environment in which data access and manipulation take place. Application programs access data found in the database so as to generate reports, tabulations and other information to facilitate decision-making.

- Operating System Software (OSS)

This manages all hardware components and makes it possible for all other software to run on the computer by offering a platform. Some of the OSS's include Linux and Windows that are used by microcomputers, UNIX and VMS used by minicomputers and MVS, IBM mainframe computers, and Disk Operating System.

- **Data**

Data refers to the collection of factual raw material that is stored in the database (Thomas C., et al 2002). It is however important to determine which kind of data is to enter the database since it is a vital asset.

2.3 Information systems.

According to James (2004) information system refers to any organized combination of people, hardware, software, communication and data sources that disseminate information in an organization. According to Effy (2002) information system refers to all components that work together to process data and produce

Information.

Information system is the arrangement of people, data, processes and interfaces that interact to support and improve day-to-day operation in business as well as problem solving and decision making needs of management and users (Whitten, 2001).

Conclusively, information system refers to a situation which all the components and resources like:- people, hardware, software and communication are organized together in order to produce expected output of a system for a decision making.

2.4 Information Technology.

The term IT represents the various types of hardware and software used in an information system including computer and networking equipments (Gerald 2000).

According to Whitten (2001), IT refers to the contemporary terms that describe the combination of computer technology (data, image and voice network).

Inclusion, the term IT refers to the computer technology like printer, plotters, CR ROM cables and software like office applications like Ms word, Ms Excel, and network operation system, window 2000 that are use to transfer data in a network.

2.5Information system methodology

2.5.1 System development life cycle

The SDLC traces the history of the Information System (IS) and provides the big “picture” with in which the database design and application development can be mapped out and evaluated (Coronel, 2000, p.287).

Systems development cycle has five major phases: Planning, Analysis, Design, Implementation and Maintenance. SDLC is an iterative rather than a sequential process. The different phases of system development cycle can be illustrated as below.

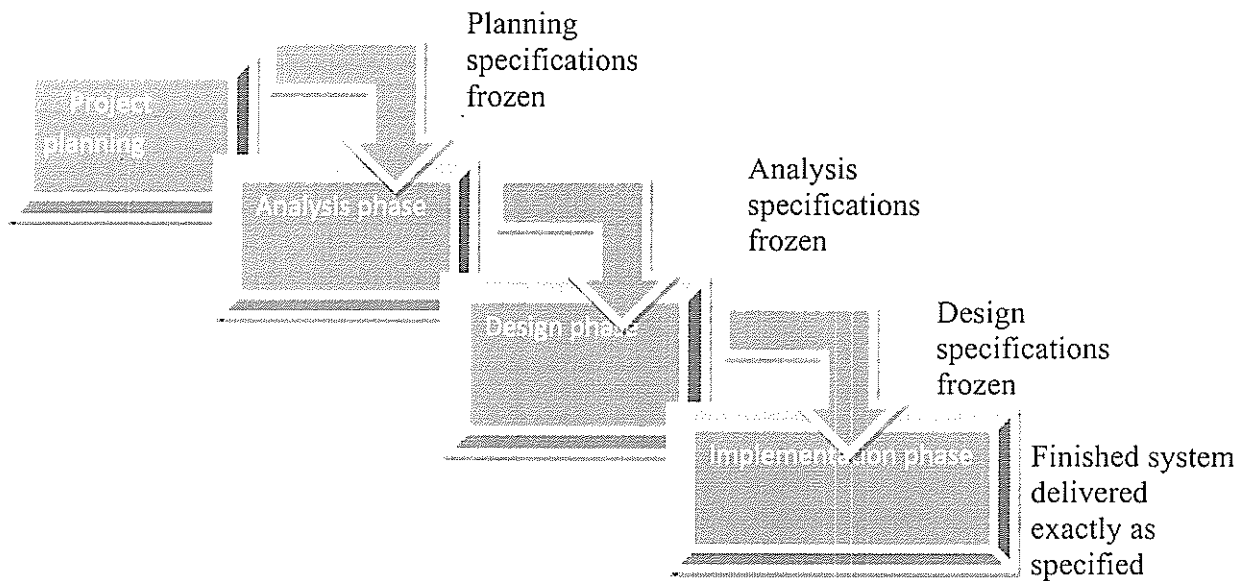


Figure 2.5: Illustration of a waterfall model of system development life cycle (SDLC). (Source: Satzinger, et al 2002)

- **System planning phase:**

This systems development phase begins with a system request which describes the problem in the current system and the required changes to be made in the system. It is here that the general overview of the company and its objectives are yielded and defines where an information system can add value (Coronel, 2000). This involves the organization of the project through the problem definition, review of management terms, objectives and the terms of reference for the system analysis team and among others. It is during this phase that an initial assessment of the information flow and the extent to which requirements must be made. At the end of this analysis a preliminary investigation report is produced from the questions asked, an examples of the question can be:

- What things make the system inefficient?
- Should the existing system be continued, modified or replaced?

- **Analysis phase:**

In this phase, a critical understanding of the business rules, processes and requirements and building of a logical model for the new system are put into consideration. The requirements gathered using the fact-

finding techniques for example questionnaires, interviews and observations. At the end of this phase is a detailed system requirements document.

- **Design phase:**

At this phase system design phase is completed. It includes all the necessary technical specifications for the menus, reports, screens, database design and other specifications that might be involved in the system design. The database design entails the following components.

- Conceptual design: this is a design of ideas, which are not yet on paper. Therefore, little time is normally spent on this step of design.
- Logical design: this design is independent of any particular and physical implementation aspect. This model presents what data is needed to be stored in the database and the relationships between the data. This design determines the overall success of the system being developed.
- The third stage of design is the physical design. This stage of design puts into consideration the storage structures, access methods and the operating system platform to be used.

The output of this phase is a system design specification document.

- **Implementation:**

During this phase, the hardware, the DBMS software and application programs are installed and the database design is implemented. It is in this phase that the system enters into a cycle of coding, testing and debugging until it is ready to be delivered. This phase takes most of the system development time. In the database system development, it can be seen as the implementation of the logical design into the physical design, which is the third step of design. It is used to describe the database on a secondary storage.

The result of this phase is a functional system.

- **Maintenance:**

As soon as the system is operational, end users begin to request changes in it. These generate system maintenance activities, which may be in form of:

- Corrective maintenance in response to the system errors.
- Adaptive maintenance due to changes in the business environment.
- Perfective maintenance to enhance the system.

The objective of this phase is to keep the system running at a minimum acceptable level.

2.6 Management information system.

According to Effy (2002), MIS refers to the use of computer for planning, controlling decision making and problem solving, rather than just reporting transactions MIS is a strategy that provides periodic information about such a topic and operational corporate database and processing it according to (Turban et al...2002), Therefore in conclusion, MIS refers to a computer based information system that is use to provide information for planning, controlling decision by extracting it from a cooperate database and processing according to user's interests.

2.7 Database

According to Date (2002), a database system is basically a computerized record keeping system. The database itself can be regarded as a kind of electronic filing cabinet that is, a repository or container for a collection of computerized data files.

According to Turban et al (2001), database refers to the collection of interrelated data organized to meet the need and structure of an organization and can be used by more than one person for more than one application like; ORACLE, VB 6.0.

In relation to the two definitions, database refers to the collection of a computerized interrelated data organized to meet the need of an organization.

2.7.1 Terminologies in database

E-R modelling (Entity-Relationship modelling).

E-R model is based on the perception of the real world which consists of sets of objects called entities and the relationship among those objects.

Entities

An entity is a "thing" or "object" in the real world that is distinguishable from the other objects (Silberscharz et al, 2002).

Attributes

It's a descriptive elements or properties possessed by each number of an entity set (Silberscharz et al, 2002).

Entity Integrity

Entity integrity rules state that no components of the primary key are allowed to accept a null value or null values (Date 2000)

Referential Integrity

It's a rule which state the database must not contain any unmatched foreign key values (Date, 2000)

2.8 Database management system-DBMS

According to Date (2000), DBMS is software that handles all access to the database. DBMS is software application system that is used to create, maintain, and provides a controlled access to the user database (Mc Fadden, 1994).

According to Whitten etal (2001), DBMS is specialized computer software available from computers vendors that is used to create, access, control and managed the DB.

In conclusion, DBMS is a software program for adding information to a DB and updating, deleting, manipulating, storing, and retrieving information.

2.8.1 Function of a database management system.

According to (2002) **Date definition:** The DBMS must be able to accept data definition (external schemas, the conceptual , the internal, and all associated mappings) in source form and convert them to appropriate object form.

Data manipulation. It must be able to handle requests to retrieve, update, delete existing data in the database, or add new data to the new database.

Optimization of the execution. DML request, planned and unplanned, must be processed by the optimizer components whose purpose is to determine an efficient way of implementing the request. Optimized request are then executed under the control of run-time managers.

Data security and integrity. The DBMS must monitor user request and reject any attempt to violate the security and integrity constraints defined by the DBA. This task can be carried out at compiling or run time or both.

Performance. A database provides user interface to the database efficiently and effectively.

2.8.2 Advantages of Database management systems

According to Ramakrishna (2002), DBMS has the following advantages:

- **Data independence:** application programs should be as independent as possible from details of data representation and storage. The DBMS can provide an abstract view of the data to insulate application codes such from details.
- **Data security and integrity:** if data is always access through the DBMS, the DBMS can enforce integrity constraints on the data. Example, before inserting certain information for an employee the DBMS can check that the department budget is not exceeded. Also the DBMS can enforce access controls that govern what data is visible to different class of users.
- **Efficient Data Access:** a DBMS utilizes a variety of sophisticated techniques to store and retrieve data efficiently and effectively. The feature is important if data is stored in an extended device.
- **Data Administration:** when several users share the data, centralizing the administration of data can offer significant improvement. Experience professionals who can understand the nature of data being managed and how different user uses it, can be responsible for organizing the data representation to minimize redundancy and for fine tuning the storage of data to make the retrieval efficient.
- **Concurrent Access and Crash Recovery:** A DBMS schedules concurrent access to the data in such a manner that users can think of the data as being accessed by only one user at a time. Further, protects the user from effects of system failures.
- **Reduced Application Development Time:** clearly, the DBMS supports many important functions that are common to many applications accessing data stored.

2.8.3 Disadvantages of Database management system

- **Complexity:** The provision of functionality we expect of a good DBMS makes the DBMS makes the DBMS an extremely complicated piece of software.
- **Size:** The complexity and breadth of functionality makes the DBMS an extremely large piece of software, occupying many MB or GB of disk space and requiring substantial amount of memory to run efficiently.

- **Cost of DBMS:** The cost of the DBMS varies significantly, depending on the environment and functional provided.
- **Additional Hardware Cost:** The disk storage requirement for the DBMS and the DB may necessitate the purchase of additional space to adhere required performance, it may be necessary to buy a large machine.
- **Cost of Conversion:** This cost may also include; cost of training staff to use the new system, employing specialist staff to help with the conversion and running of the system.
- **Performance:** DBMS is written to be more general to cater for more application rather than just one. The effect is that some application may not run as fast as any other.
- **Higher Impact of Failure:** The centralization OF resources increases the vulnerability of the system since all users and applications rely on the availability of the DBMS.

2.8.4 The DBMS must produce the following

Forms: These are the screen display of the DBMS of the computer form that someone fills in for a particular entity.

Reports: It is a printed document, output for the system in a paper. It's especially applicable in VB.

2.8.5 Characteristics of Database management systems

According to Elmasri (2000); a number of characteristics distinguish the DB approach from programming of files.

1. **Self-Describing Nature of DBS:** The DB system contains not only the DB itself but also a complete definition of the DB structure and constraints.
2. **Insulation between programs and Data abstraction:** In files system, the structure of the file may require changing all the programs that access the file. By contrast, DBMS, access program do not require such changes. The structure of data file is stored in the DBMS catalog separately from the access programs.
3. **Support of Multiple Views of the data:** A database typically has many users of who may require a different perspective or view of the DB. A view may be a subset of the DB or it may contain virtual data i.e. desired from the database file but not explicitly stored.

4. **Multiple users to access the database at the same time.** The DBMS include; concurrent control software to ensure that several users are trying to update the same data that the result is correct.
5. **Database Administrator:** In a database environment, the primary resources it the database itself and the secondary resources are the DBMS and related software.

2.8.6 Types of database management systems

DBMS categorized into forms, a database management system can either be open source or proprietary. Examples of open source database management systems include: MySQL and PostgreSQL. Others are proprietary and they include: Oracle, Microsoft Access, IBM DB2, Sybase, MS-SQL Server, Informix, MS-Access among others.

a) Open source database management systems

● My structured query language(MySQL)

Among the open source database management system's, MySQL is the most commonly used. MySQL database management is most popular because of the advantages that it poses, and this include;

- It has the advantage of being open source software hence it is free to use and it is also widely available
- MySQL also has a very broad range of connectors and adapters to a wide set of programming languages through: ODBC, JDBC, plus direct C libraries and routines in Java, .NET, PHP, Perl, Ruby, and VB. So MySQL has one of the broadest reaches of the free databases.
- MySQL is stable based on the fact that it is a well used database solution.
- MySQL has a very high performance and stability
- It is easy to configure and learn
- A MySQL application can be created in any programming language for example C, Java, C#, Perl, VB, VB.NET, C++, Python and PHP.
- It is robust
- MySQL is easier to set and it's portable
- The source code for MySQL is available therefore it can be obtained and modified
- It is available at no cost under an open source license, or at low cost under a commercial license.

● Postgresql

Postgresql is an enhancement of the Postgresql database management system, a next-generation database management system prototype. Features of Postgresql include;

- Postgresql is designed for high volume data environments.
- It has several GUI tools for database design and administration.
- It has better support than the proprietary vendors.
- It is immune to over deployment.
- Postgresql is an extensible database and it is cross platform database.

b) Proprietary database management systems

Proprietary database management systems include; Oracle, Microsoft Access, IBM DB2, Sybase, MS-SQL Server, Informix, MS-Access among others.

● Oracle

Oracle is the dominant database management system currently used. Oracle is a database management system that handles large amounts of data hence its vast use in big companies. It is very robust and also cross platform.

In this project, the researcher will use MySQL because it has more promising strengths over other database management systems.

2.9 Microsoft Visual Basic

This is a programming language that is event driven and is able to be used by non programmers.

It's mostly used for designing graphical user interfaces, linking to databases

2.9.1 Microsoft Access

This is a development environment used to create computer database for Microsoft Windows family of operating system (Blue Claw 1990). It's a very powerful relational database product that both stores data for all sorts of reasons and purposes and allows users with skills ranging from beginner to world expert to input, extract and manipulate data into different forms that people need.

- It is used by small business to create customized systems for handling small tasks.
- It combines the jet relational database with the graphical user interface and provides productivity-enhancing features.

2.9.2 Advantages of Microsoft Access

- Microsoft Access is a user friendly language.
- It is used to design tables build relationships between tables, create common visual basic code, Improve data speed and write reports for information retrieval.

- It contains a security system whereby permissions are granted to access the database as a group or individual to update, insert and delete.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter explains the choice of the research area, the criteria by which the data was generated; it further explains how the various research tools or the techniques that were applied in data collection were used to acquire the details, data management and analysis, research tools, steps that were followed in executing the study to the fullest and problems that were encountered while carrying out the whole exercise.

3.1 Choice of the research area

Information system is a wide topic, if entirely covered; it will be generate a lot of data. This report was limited to; the Evolution of the internet, definition of information system and the basic functions of the system, hardware and software components. An information system the types of information system, benefits, advantages and disadvantages of information system. The research talks about, the concept of the database, database models, Database Management System, Sample Interactive database management System, Advantages of Database Management System(DBMS), lastly, Records and Records management System

3.2 The overall research design of the case study

3.2.0 Study area

The research was based on Rick ICT Laboratory, located on Andrea olal road, opposite mega shoppers in Gulu town, in order to find out the challenges of the existing computer troubleshooting system. This area was used as a case study because the researcher is familiar with the place. The researcher intended to find out the challenges faced by the existing computer troubleshooting system, and then designs and implements a reliable and flexible information system.

3.2.1 Research method

It involved both qualitative and quantitative methodology because the researcher wanted to understand the people he was interviewing and at the same time acquire numerical data.

3.2.2 Study population

The study was carried out at Rick ICT Laboratory whose population is approximately two hundred people.

3.2.3 Sampling and sampling techniques

The researcher targeted the staff of Rick ICT Laboratory and the students. The researcher used the purposive sampling strategy because the findings had a purpose. The researcher mainly chose the staff mainly involved in training students, thus making it simple for acquisition of new and reliable information.

3.2.4 Sample size

The researcher considered students, staff working in the laboratory, and the administrators office of the institution, so as to have a mode of comparison to give a clearer view of responses.

3.3 Data collection techniques.

In order for the researcher to get enough information on the existing advertising and marketing strategies, various methods were used. Data was collected using the most commonly used fact finding techniques. Both the primary and secondary sources were significant.

3.3.1 Primary data sources

Primary sources were divided into two categories such as, face- to- face interviews, and observation of the existing Troubleshooting system.

3.3.2 Face- to- face interviews

During week days and busy weekends, the researcher used this tool as a fact finding technique where he got an opportunity to talk to persons individually. This helped the researcher to improve on the project

design. Questions asked were open ended. The advantages of the interview are as follows;

- They gave up to date information as the researcher directly gets data from the respondents.
- Cheap method of data collection, the researcher did not spend a lot of money on printing question sheets.
- It is a fastest technique of data collection.

3.3.3 Observation

The researcher took a step forward to look at existing system used to troubleshoot computers at the institution. This was of great impact towards the system design of the information system for Rick ICT Laboratory.

3.4 Secondary data sources.

3.4.1 Document Review

The researcher used secondary sources which include;

Library material sources that involved reviewing of different types of books about system design, Information systems, and database management, among others from Kampala International University main library.

The library was of great importance towards the design of this project. Information was got from various resources like Internet, Text books etcetera.

The data collection gave the general outlay of the existing troubleshooting system and processes and how it works and favours users.

3.5 Data analysis technique

Data collected was verified for accuracy and the most useful were selected, coded, edited and recorded for analysis.

3.6 Testing and validation.

At this stage we tested the system using sample/test data and eventually with actual data from expert

computer technicians and computer repair books. This will helped to eliminate the errors and faults in the prototype hence giving us a system good enough.

3.7 Limitations of the study

- The researcher failed to get some data due to inadequacy of the sources of such data which arose from purposeful denial of data by some respondents.
- The respondents became suspicious of the goals of the study which resulted into insufficient cooperation thus holding back information.
- The researcher was limited by financial resources as the research needed a lot of funds to make it more successful.

3.8 System Development

This part of the research will focus on the development tools and techniques the researcher is used for the design, development and implementation of the computer troubleshooting system.

3.8.1 Systems Development Life Cycle (SDLC)

This is a traditional methodology used by many organisations to develop and design a system. It features several phases that mark the progress of the system analysis and design effort. The researcher chose this methodology because it is accepted universally.

- **Planning** This is the first phase in SDLC, all the information the system needs are identified, analysed, prioritised and arranged so that the needs of the project are identified.
- **Analysis.** This is the second phase in SDLC, during this phase; the system requirements are studied and structured. During this process, a careful study of any current system, manual and computerised systems that might be replaced or enhanced as part of the project.
- **Design.** During this phase of SDLC, the descriptions of the recommended solution is converted into logical and the physical system specifications.
- **Logic design** (all the functional features of the system are chosen for development is analysed and described independently of any computer platform.)
- **Physical design** (logical specifications of the system from logical design are transformed in to technology specific details.)

- **Implementation:** This is the forth phase in SDLC, during this phase, the website or system is coded, tested, installed, that is to say put into use.
- **Maintenance,** The is system is systematically repaired and improved

3.9 Conclusions

This chapter has dealt with issues concerning the choice of the research area, the criteria by which the data was generated; it further explained how the various research tools or the techniques that were applied in data collection were used to acquire the details, data management and analysis, research tools, steps that were followed in executing the study to the fullest and problems that were encountered while carrying out the whole exercise. The next chapter will show the current system analysis and new system design.

CHAPTER FOUR

SYSTEM DESIGN & IMPLEMENTATION

4.1.0 Introduction

This chapter explains the current system, analysing its Objectives, and the new system design; which will include; functional design, logical and physical design, database planning and Implementation. The design of the system produces the details that state how the system will meet the requirements identified during system analysis. (Senn. pg 30, 1989)

4.2.0 Analysis of the current system

This was concerned with analysing the actual system, what it did and how it worked, that is, the strength and weakness of the system. The analysis was aimed at identifying the problems that the proposed computer troubleshooting system is expected to overcome and contributes to the development and access of the organization. In analysing the present system, I collected a lot of relatively unstructured data through face to face interviews, and observation as already shown in the previous chapter. (Chapter three). With in this chapter, we shall see all the design tools used in the design and implementation of this project in the development platform form.

4.2.1 Strengths and Weaknesses of the current system

4.2.1.1 Strengths

The current system is affordable since it does not consume a lot of computer resources for example RAM, CPU.

4.2.1.2 Weaknesses in the current system

- Time wastage. There are always delay to fix a particular problem in case a system breaks down, which slows down work and hence time wasting.
- Insecurity of organization and students information. Records are kept in only one office. In case of

any system break down, there will be no back up data.

4.3.0 Desired system

4.3.0.1 Functional requirements

- This is system functionality that is essential for the system. They include the followings.
- The system should have a login functionality to allow only access by authorised users.
- The system should allow a user to connect to the database.
- It should not allow a user to delete, and update the database.
- Automatic report generation should be allowed by the system.
- The users should be allowed to logout after system use.

4.3.0.2 Non-Functional requirements

These are systematic qualities that defined the system properties and constraints. They include the following,

- **Performance.** The system will be expected to have good response time in order to successfully perform data manipulation.
- **Security.** The system will be expected to have security functionalities like the user name and Password to avoid unauthorised users from accessing the system.
- **Accessibility.** Efficiency, reliability, speed and retrieval of information needed will be made easier for the system users.
- **User friendly.** The system uses commands, radio and drop down menus for system navigation that the user will find it easy to learn, because of reduced complexity.
- **Versatility.** The system will be designed to fit on other types of operating systems such as window vista, xp, Linux, etc.
- **Availability.** Access to the system is a bit simplified to allow users to be able to start work as smoothly as possible. Maintenance by system administrator should be done regularly to keep the

system available to the users.

4.4.0 Hardware and software requirements

4.4.0.1 Software

The requirements for the system to provide the required services to the system users include;

- operating system windows/XP/ME/VISTA
- anti-virus software
- Visual Basic software
- Microsoft office word software 2003/2007

4.4.0.2 Hardware

The system is designed to run on multiple platforms as long as they have the required software to support the system.

- Minimum of 125MB RAM
- Uninterruptible Power Supply(UPS)
- 20GB minimum storage space(Hard Disk space)
- External Storage for backup of information
- Pentium III processor or better.
- Monitor resolution of 800*600

4.5.0 Organisational Requirements

With the new system in place, there will be a need to maintain the database. Therefore some cost will need to be budgeted for in terms of operational and maintenance cost.

4.6.0 User requirements

An agreement was reached upon with the help of the system administrator and the general manager that user requirements and system constraints shall define the system services and functionality. They included the functional and non-functional requirements of the system.

4.7.0 Target users

These will be technical users who are well acquainted with the system. Possibly, these will be the Manager, Receptionist, Database Administrator and Systems Administrator.

4.8.0 System user

These are the users who will be using the system daily to carry out their responsibilities. These users will need training on how to properly use the system during the implementation of the system. They will carry out the following activities in the system.

4.8.0.1 System administrator

The System administrator will use the system to troubleshoot the computer in the Institution in case of any breakdown or failure.

4.8.0.2 Receptionist

The receptionist will use the system to troubleshoot his computer in case of any breakdown.

4.8.0.3 Manager

The Manager will use the system to troubleshoot his computer in case of any breakdown. This simplifies and fastens work.

4.9.0 Technical users

Database/system administrator

- Monitor the progress of the system
- Troubleshooting of system breakdown
- Protect the entire system from external threats
- Maintenance and Repair
- Provision of new types of security features for the system.

4.9.1 Final system

From the research and documentation that was done in this chapter the researcher was able to develop the proposed system.

4.9.2 SYSTEM DESIGNS

Components of a data flow diagram

Source or sink (Square)



This is the origin or destination of data.

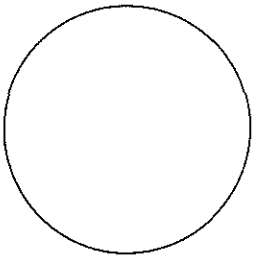
Data flow (arrow)



This shows the direction of data that is how it moves from one place in the system to another.

It can be between processes and data stores or sources and processes.

Process (circle)



This indicates transformation of data.

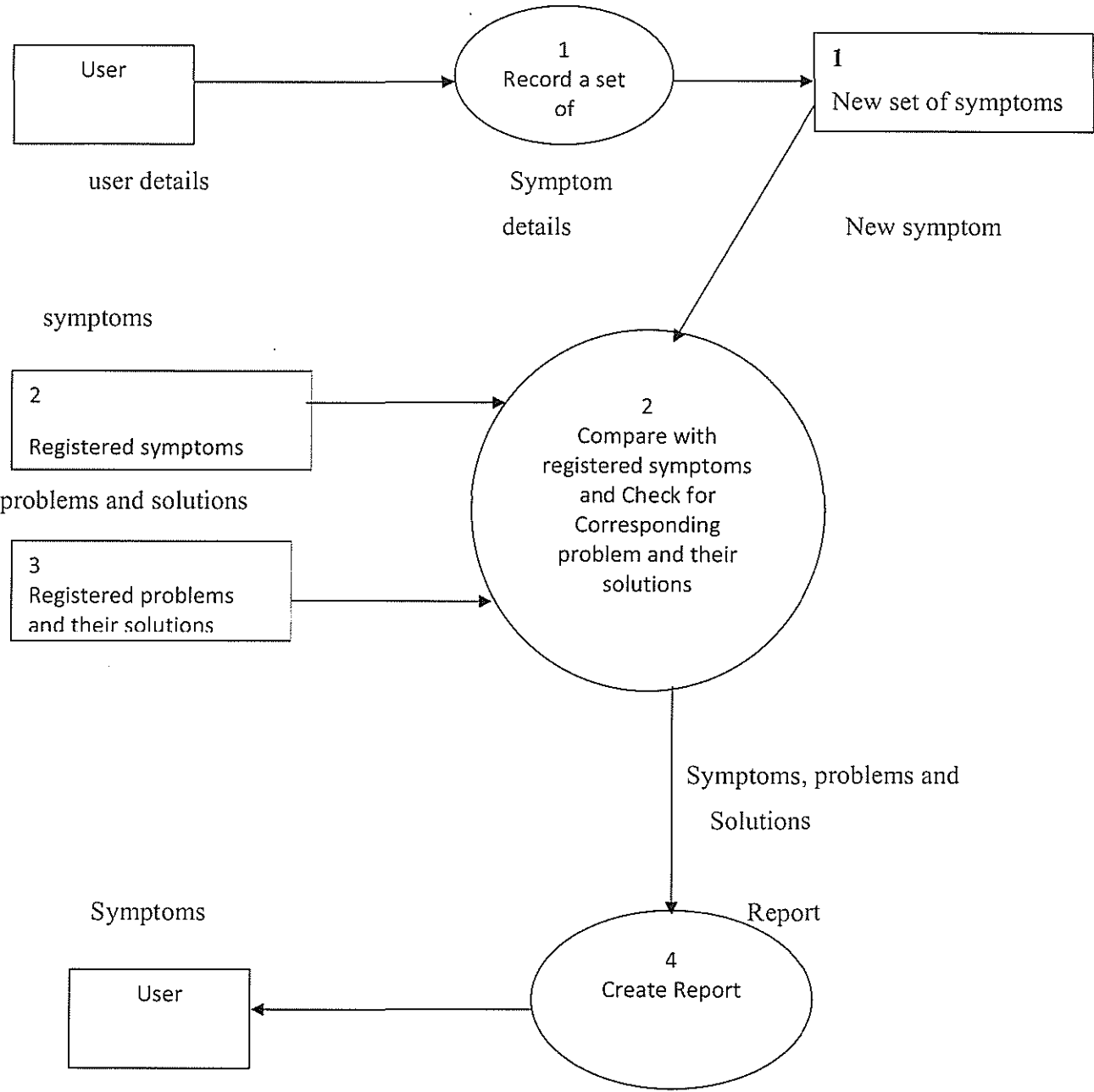
It's an action performed on data when input and output occur.

Data store (Open ended rectangle)



This defines data at rest or may represent one or more different physical locations for data. A data store can be a file folder, computer based file or a notebook.

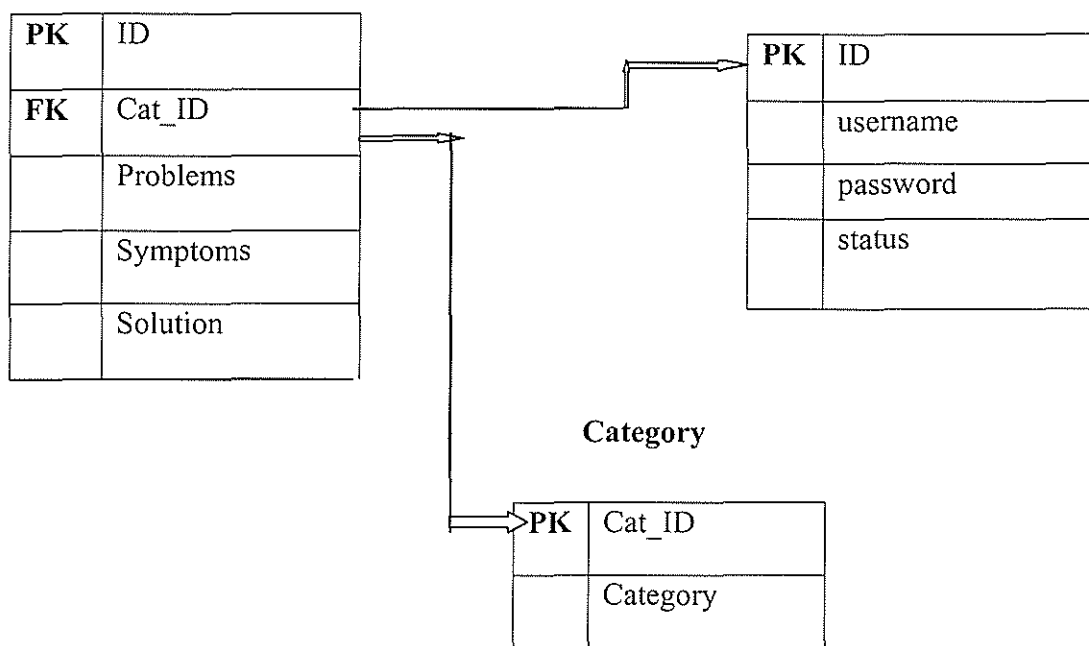
4.9.3 Conceptual Frame work showing the data flow diagram of the computer troubleshooting system.



4.9.4 The Logical Model showing the three tables created for the computer troubleshooting system and how they are related. The tables are to be created using access DBMS.

symptoms

users



4.9.5 Description of the Table Fields

Table for Symptoms			
Attribute	Data field	Constraints	Description
ID	Auto-increment	Primary key	Uniquely identifies the goods/ items in store.
Cat_ID	int	Foreign key	Relates to the category table and uniquely identifies records in the category table.
problem	Text		
symptoms	Text		
solution	Text		

ble for system users.			
Attribute	Data field	Constraints	Description
	Auto-increment	Primary key	Uniquely identifies the system user.
Username	Text		
Password	Text		
Status	Text		

4.9.6 The Entity Relationship Diagram.

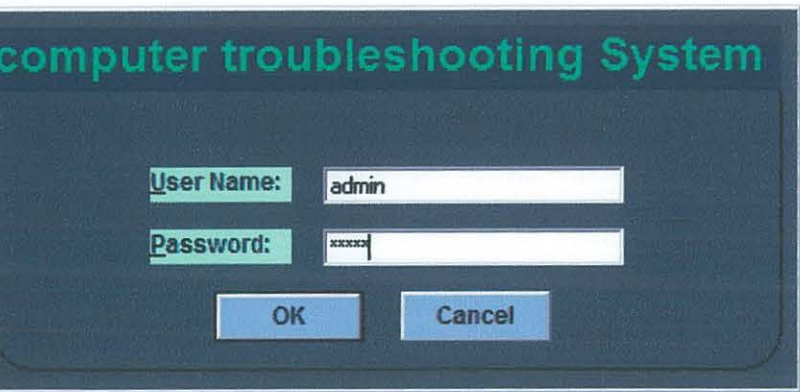


Relationship type 1 : * (One problem to many symptoms)

9.7 SYSTEM USER INTERFACES.

9.7.1 The login Form

From this same form you can login as the system user or system administrator.



7.2 Administrator interface with all the features enabled.

In this form the administrator can make some changes such as adding and deleting information's to from the system respectively.

The screenshot shows a web application titled "Computer Troubleshooting System". The interface includes a header with "e Search Help" and a main content area with a dark blue background. On the left, there is a sidebar with a photo of a person working on a computer. The main area contains a "computer troubleshooting system" title, a "Switch system user" button, and a "User" input field. Below this, there are sections for "Problem:", "Category:", "Symptoms:", and "Solution:". The "Problem:" section has a dropdown menu with options like "External cables", "Internal cables", and "Pro". The "Category:" section has a dropdown menu with "Connectivity". The "Symptoms:" section has a list of symptoms: "Device not working", "Device not found", "Intermittent errors on a device", and "Device failure or failure to boot". The "Solution:" section has a list of solutions: "Check if improperly connected or real failure or warning" and "fix tightly the connectors or replace if necessary." On the right side of the main area, there is a "Report" button and a set of navigation buttons: "<<", "<", ">", ">>". Below these are four buttons: "Add", "Save", "Delete", and "Exit".

Computer Troubleshooting System

e Search Help

computer troubleshooting system

Switch system user

User

Problem: External cables Internal cables Pro

Category: Connectivity

Symptoms:

- Device not working
- Device not found
- Intermittent errors on a device
- Device failure or failure to boot

Solution:

- Check if improperly connected or real failure or warning
- fix tightly the connectors or replace if necessary.

Report

<< < > >>

Add

Save

Delete

Exit

7.3 The system search where by you can search following two criteria that is field and example.
g “Problem” - “Electrical”

The screenshot shows a window titled "Computer Troubleshooting System" with a menu bar containing "File", "Search", and "Help". The main header area features a small image of a person working on a computer, the text "computer troubleshooting system" in green, and a small image of a circuit board. Below the header, there is a search section with a "Search by:" label, a dropdown menu currently showing "Problem", and a text input field containing "Electrical". A "Search" button is next to the input field. To the right of the search section is a "Switch system user" button with a "User" label. Below the search section, there are four input fields: "Problem:" with "Electrical", "Category:" with "Electrical", "Symptoms:" with "Dead computer", and "Solution:" with "Consider replacement." A "Report" button is positioned to the right of the "Problem:" field. To the right of the input fields is a navigation area with four buttons: "<<", "<", ">", and ">>". Below these buttons is a vertical stack of four buttons: "Add", "Save", "Delete", and "Exit".

Computer Troubleshooting System

File Search Help

computer troubleshooting system

Search by: Problem Electrical Search

Switch system user User

Problem: Electrical Report

Category: Electrical

Symptoms: Dead computer

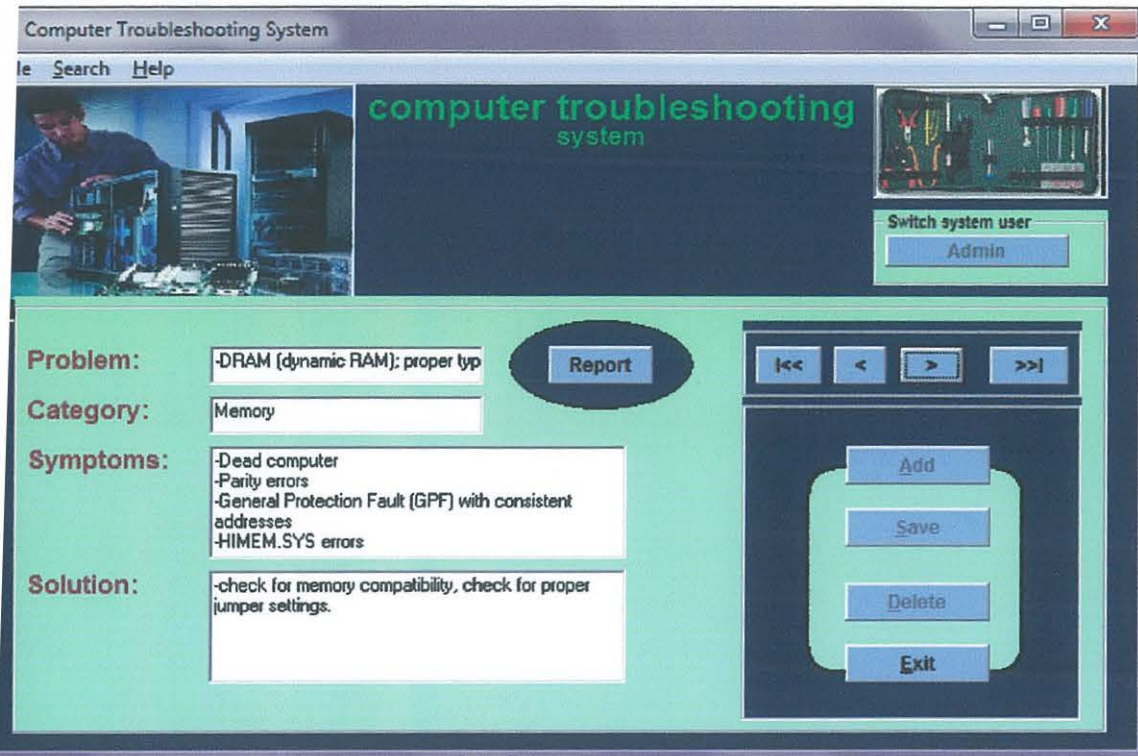
Solution: Consider replacement.

<< < > >>

Add Save Delete Exit

7.4 User interface with some features disabled.

In this form users can only search for problems/solutions by either problem category or symptoms but not Add or Delete any information.



7.5 Form for editing system user information.

n this form the system administrator can make changes to system users either by Adding or Deleting.

users

computer troubleshooting system

Back

ID: 3

Username: user

Password: user

Status: user

Report

Search

ID	username	password	status
3	user	user	user
4	admin	admin	admin
1	roy	1specialist	admin
2	kajungo	kajungo	admin

Add

Save

Delete

Exit

.6 Form for system help.

1 this form users are able to search for help on System Users, System search, Report button, gation buttons and Data button respectively.

help

computer troubleshooting system

Back

☒ System Users.

☐ System Search.

☐ Report button.

☐ Navigation buttons.

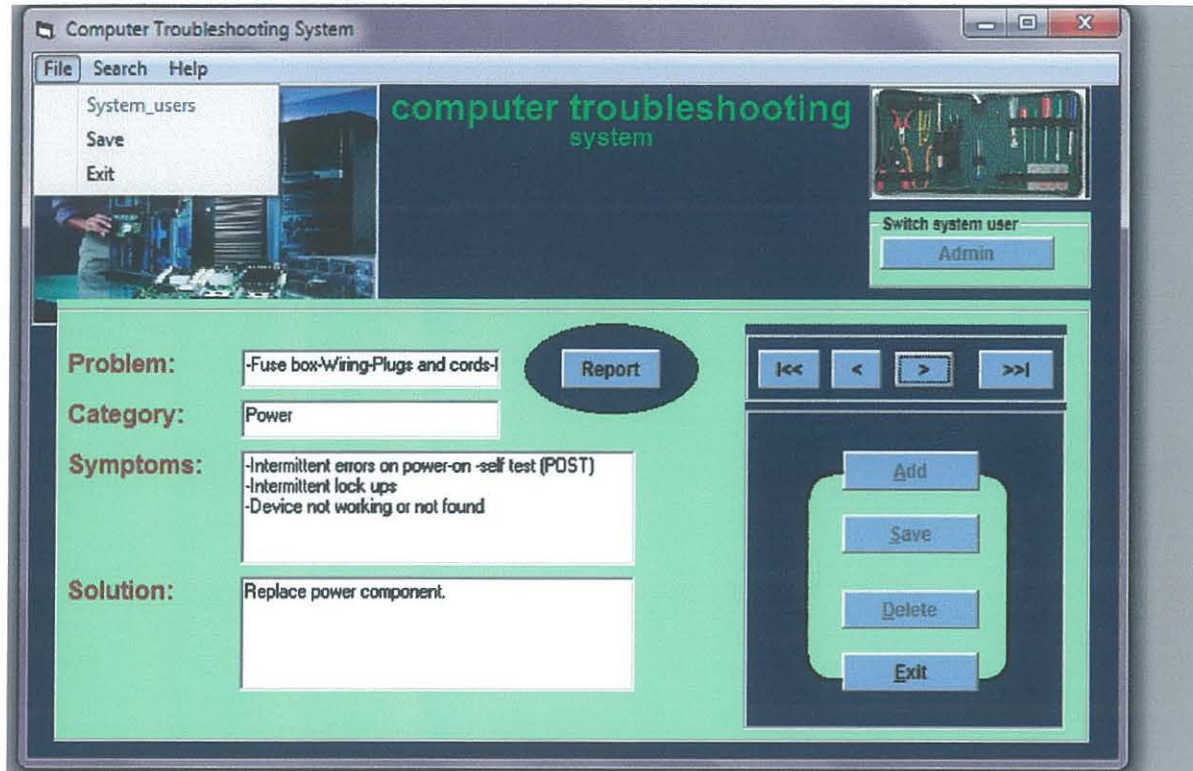
☐ Data buttons

computer troubleshooting system

Depending on the type of user, deferent privileges are availed:

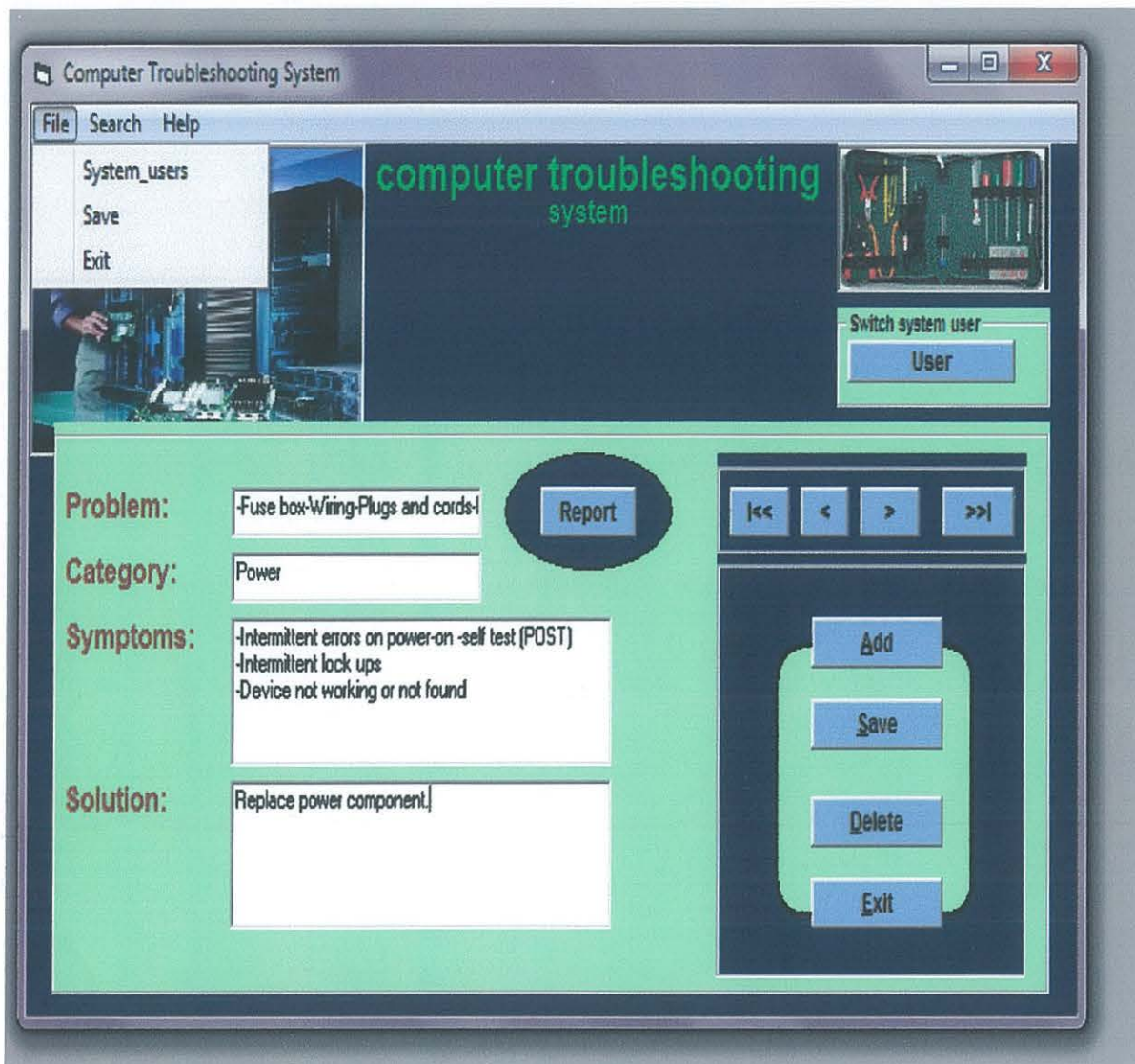
4.9.7.7 User Interface with the menu bar activated.

If you login as a user and you go to file on the menu bar you can only save and exit but you cannot open system users to make changes to users.



4.9.7.8 Administrators Interface with the menu bar activated.

If you login as Admin and you go to file on the menu bar you can open the system user and make the necessary changes on them.



4.9.8Report

COMPUTER TROUBLESHOOTING RESULTS.

ID:	problem:	category:	symptoms:	solution:
1	Electrical	-Electrical	Dead computer	Consider replacement.
2	-Fuse box	Power	-Intermittent errors on power-on -self test (POST) -Intermittent lock ups -Device not working or not found	Replace power component.
3	-External cables	Connectivity	-Device not working -Device not found -Intermittent errors on a device -Device failure or failure to boot	-Check if improperly connected or real failure or warning -fix tightly the connectors or replace if necessary.
4	-Boot ROM	Boot	-Dead computer If not, may not be supported with proper drivers -Consistent errors on POST Beep errors	-check for dead components like memory, harddisk drive, processor or power supply. -replace faulty components.
5	-DRAM (dynamic	Memory	-Dead computer -Parity errors -General Protection Fault (GPF) with consistent addresses -HIMEM.SYS errors	-check for memory compatibility, check for proper jumper settings.
6	-Hard disk drives	Mass storage	-Error messages: -Missing Operating System -File Not Found -No Boot Device -Abort, Retry, Fail	-fix tightly data cables connecting to the disk drives. -format and re-install windows.
7	-IRQ (interrupt	Input/output (IO)	-System locks up -Device not responding -Bizarre behavior from a device	-consider upgrading memory, increase storage space, processing speed etc.

CHAPTER FIVE

CONCLUSION & RECOMMENDATION

5.0 Introduction

This chapter lays out the system being delivered and talks about the limitation faced when developing the system. It also includes the system installation, maintenance and conclusion to the document.

5.1 Recommendation and future works

- After the completion of system implementation we would recommend the institute to employ a technician to monitor the system as stated below.
- The system administrator should be interviewed and asked several questions about his experience in his field of system administration and with at least a 2 years experience.
- His work at the institution should not be undermining as it ensures the smooth operation of the system.
- The system administrator should be able to identify all the hardware and software requirements according to the company's budget.
- The system administrator should be able to periodically maintain, update or improve the system where necessary.

5.2 Training

The purpose of the training will be to get the users familiar with the system. The system users, manager and administrators will all be trained differently since they all perform tasks. Training has been estimated to last about three weeks so as to resume for work as soon as possible.

5.3 Implementation

Now that the system has been developed there is need for it to be tested. This requires the institution to organise a budget for the purchase of hardware and software as stated the requirements. Serious measures should be taken to protect the system from any external threat.

The implementation process will include installing the system on a computer with an operating system that is compatible plus other system and user applications

5.4 System evaluation

The system is easy and secure since relatively unskilled programmers and non programmers 'power users' can use it to troubleshoot their computers without having to deal with features they do not understand.

5.5 Conclusion

The design, development and implementation of the Rick ICT labs Computer troubleshooting system were successful. Although there were hindrances to the research almost all the requirements and objectives were achieved. The system can insert, Delete, Update and generates reports for later analysis as mentioned in the functional requirements.

ICT labs that have a large number of students and are admitting more students are advised to

Acquire this type of troubleshooting system.

APPENDIX

Codes for login button (Ok button)

```
Private Sub cmdOK_Click()  
Dim RESPONSE As Integer  
Adodc1.Recordset.MoveFirst  
While Not Adodc1.Recordset.EOF  
If Adodc1.Recordset.Fields("username") = Trim(txtUsername) And  
Adodc1.Recordset.Fields("password") = Trim(txtPassword) Then  
GoTo msg:  
End If  
Adodc1.Recordset.MoveNext  
Wend  
RESPONSE = MsgBox("YOUR USER NAME OR PASSWORD IS INCORRECT.", vbRetryCancel +  
vbCritical, "ACCESS DENIED")  
txtUsername = ""  
txtPassword = ""  
Exit Sub  
msg:  
Select Case Trim(Text1.Text)  
Case "user"  
frmLogin.Hide  
frmDataEnv.Show  
frmDataEnv.mnuSystem_users.Enabled = False  
With frmDataEnv  
    .cmdAdd.Enabled = False  
    .cmdSave.Enabled = False  
    .cmdDel.Enabled = False  
    .cmdUser.Visible = False  
    .cmdAdmin.Enabled = False  
End With
```



```
Case "admin"
frmLogin.Hide
frmDataEnv.Show
End Select
End Sub
```

Codes for the search button.

```
Private Sub cmdSearch_Click()
Select Case Combo1.Text
    Case "ID":
Dim ID As Integer
Dim strsearch As Variant
strsearch = spec.Text
retryID:
Adodc1.Recordset.MoveFirst
While Not Adodc1.Recordset.EOF
If Adodc1.Recordset.Fields("ID") = Trim(strsearch) Then
GoTo msg:
End If
Adodc1.Recordset.MoveNext
Wend
Label7.Visible = True
Label7.Caption = "Not found!!"
If ID = vbRetry Then
GoTo retryID:
End If
Exit Sub
msg:
Label7.Visible = True
Label7.Caption = "search successful!"
    Case "Problem":
Dim prob As Variant
```

```

Dim searchprob As Variant
searchprob = spec.Text
retryprob:
Adodc1.Recordset.MoveFirst
While Not Adodc1.Recordset.EOF
If Adodc1.Recordset.Fields("problem") = Trim(searchprob) Then
GoTo msg:
End If
Adodc1.Recordset.MoveNext
Wend
Label7.Visible = True
Label7.Caption = "Not found!"
If prob = vbRetry Then
GoTo retryprob:
End If
Exit Sub

```

```

    Case "Category":
Dim cat As Variant
Dim searchcategory As Variant
searchcategory = spec.Text
retrycat:
Adodc1.Recordset.MoveFirst
While Not Adodc1.Recordset.EOF
If Adodc1.Recordset.Fields("category") = Trim(searchcategory) Then
GoTo msg:
End If
Adodc1.Recordset.MoveNext
Wend
Label7.Visible = True
Label7.Caption = "Not found!"
If cat = vbRetry Then
GoTo retrycat:
End If

```

```
Exit Sub
Case Else
Print ("it is working")
End Select
End Sub
```

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