

DESIGN AND IMPLEMENTATION OF A MODULAR
STUDENTS RESULTS MANAGEMENT SYSTEM
FOR A SENIOR SECONDARY SCHOOL

CASE STUDY: OLD KAMPALA SENIOR SECONDARY
SCHOOL

BY

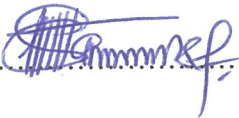
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A RESEARCH REPORT SUBMITTED TO THE COLLEGE OF
APPLIED SCIENCES AND TECHNOLOGY IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR
THE AWARD OF DIPLOMA IN COMPUTER
SCIENCE OF KAMPALA INTERNATIONAL
UNIVERSITY

AUGUST 2012

DECLARATION

I MUGISHA SAMUEL DCS/31256/102/DU, pursuing a Diploma in Computer Science of Kampala International University declares that this research report is mine, after undertaking a field attachment at Old Kampala Senior Secondary School, and that no plagiarism has been made and this work has never been presented to any other institution for any award.

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APPROVAL

This research report has been submitted for the award of Diploma in Computer Science of Kampala International University, with Miss Ruth Oginga as my supervisor.

Signature: 

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Supervisor

DEDICATION

In loving memory of my father Mr. Kadenesi Swizin, I dedicate this work which is part of an accomplishment of your dream of all of us bettering our lives through getting quality education so as to become responsible citizens.

To my late uncle Mr. Mugyenyi Stepher, this is a continuation of your long desire of giving me what you never had; university education. I promised myself never in my life time, to quash all your efforts of giving me the basic education. This is just one step in a very long journey.

To my brother Amany Yonah and sister Alikyiriza Sarah for all the support they rendered me throughout the course. To my relatives Mr. Mugyenyi N. Nelson and Mr. Sentongo Paul for the moral and financial support and friends kajumba doreen jackline, Kibiro Zakalia, Nyalwa Ezira, Atalyeba Abraham, Kabanankye Lucy and Kamagana Jovanice for being there every time I needed a shoulder to lean on during the compilation of this report.

Most importantly I dedicate all to the almighty God for it is through his will that everything is done.

ACKNOWLEDGEMENT

My sincere heartfelt thanks go to God for the protection and knowledge bestowed to me and the courage and will to endure all the hard times in producing this report and enabling me pursue my Diploma in Computer Science successfully. In addition, I owe much thanks to my beloved brother Mugyeny N with whom the course would have not been success without him lending me a hand.

Secondly I am grateful to Miss Ruth Oginga for the continuous advice that enabled me complete the writing of this report successfully. My special thanks also go to the respondents from Old Kampala Senior Secondary School for responding positively to my call. I also would not forget to give my gratitude to my fellow colleagues Mr. Kibiro Zakalia, Miss Kamagana J,Nyalwa E and kajumba doreen jackline for the continuous encouragement and advice that steered my will in completing the course.

I would not forget to sincerely thank my course/group mates and friends Ali Rose, Archer Scott Tabuley, Kamanzi Dickens and Mungani Gabriel for the constant encouragement and advice.

Lastly but most importantly I acknowledge my beloved mother for raising me up, encouraging me to work hard and never to shy away from problems but to instead take them head on.

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LIST OF ACRONYMS

ADO	-ActiveX Data Objects
ANSI	-American National Standards Institute
CLI	-Call-Level Interface
DAO	-Data Access Objects
DBA	-Data Base Administrator
DBMS	-Data Base Management System
DFD	-Data Flow Diagram
DOS	-Disk Operating System
ERP	-Enterprise Resource Planning
GUI	-Graphical User Interface
IDE	- Integrated Development Environment
ISO	-International Organization for Standards
MB	-Mega Byte
MIS	-Management Information System
MS	- Microsoft Access
RAM	-Random Access Memory
RDBMS	-Relational Data Base Management System
SDLC	- System Development Life Cycle
SPSS	-Statistical Package for Social Scientists
SSS	-Senior Secondary School
SQL	-Structured Query Language
TPS	-Transaction Processing System
VBA	-Visual Basic Application
VB	- Visual Basic

ABSTRACT

At the turn of this century, the government encouraged the use of computers and IT teaching in schools. It was prudent for Old Kampala SSS to embrace this innovation or else it lags behind. It was therefore due to this urgency to keep up with the pace that led to the development of a student results management system at Old Kampala SSS.

Traditional methods of recording, compiling and keeping student results were the norm for example the use of papers to record and store exam results in file cabinets, the manual compiling of students results was very slow, prone to errors and very tiresome which lead to late release of student results.

With the above background, a study had to carried out, whose main objective was to design and implement a modular student's results management system that would enable the staff of Old Kampala SSS to record, compile, process and store student results so as to increase efficiency and effectiveness.

System requirements were obtained using several techniques like sampling technique which was used to identify sample population from whom data was got. The sample population was then subjected to the data collection tools using Questionnaires. A Use case diagram, Class Diagram, Data Flow Diagram (DFD), and Flow Chart were used to analyze and design the system. The system was implemented using VB used to design the front-end user interfaces (forms), while MS Access was used for the database server.

CHAPTER ONE

INTRODUCTION

1.0Background

Old Kampala senior secondary school is one of the top performing schools in Uganda. This is due to their strict observance of the curriculum for higher education in Uganda; coupled with long serving and experienced teachers. Its main aim is to produce quality students to the various universities. The school is found in the central division of Kampala city. It is situated along Gaddaffi road opposite Diamond Trust Bank Old Kampala Uganda. It has a Population of around 1500 students, 135 staff including teachers, cleaners, guards and cooks. So, with this number of students, it's vital that they embrace the latest technological advancement.

The beginning of this 21st century saw the explosion in the use of information technology and computers for that matter. It led to the globalization of virtually everything leading to the transformation of people's daily lives. Uganda not to be left behind encouraged her schools to introduce computer studies in the schools.

In this dotcom era, there is high demand for computer based applications to increase speed, accuracy, storage and efficiency. In Old Kampala Senior Secondary School, in the office of Director of Studies, there is no database to handle the student results.

The staffs there, still manually recorded student marks, compiled marks for all classes; computed the grades then arranged them to ascertain the student performance.

The new information system had several advantages as envisioned below:

- i. Eliminated the delay in the publication of the student results for it is fast and efficient.
- ii. Reduced the problems of excessive paper work
- iii. The system would increase tremendously on the security of the data as it would not be possible for any unauthorized personnel to access the documents.
- iv. The system would reduce on the costs especially the monies spent on staffs.

1.1 Statement of problem

Old Kampala Senior Secondary like many such secondary schools in Kampala City is having a problem of having to rely on their staff to do all the work of managing all student results manually. There was no database to handle the students' results.

That problem led to wastage of time in recording the marks, redundancy of the marks and poor data storage since the file cabinets in which the marks are kept can be accessed by unauthorized personnel leading to loss of data.

The new system would solve all the fore mentioned problems that would lead to the marks being secured and there would be no redundancy of information.

1.2 Objectives of the study

1.2.1 Main Objectives

The main purpose of the project was to design and implement a modular student's results management system that would enable the staff of Old Kampala Senior Secondary School to record, compile, process and store student results so as to increase efficiency and effectiveness.

1.2.2 Specific objectives

- i. To study and analyze the existing system and identify its weakness.
- ii. To analyse the requirements of the student result management system to be designed.
- iii. To design and implement a modular student result management system that will enable staff at Old Kampala Senior Secondary School to record, compile process and store student results.
- iv. To develop a database that will store the results of students at old Kampala senior secondary school
- v. To evaluate how the proposed system will work.

1.3 Research Questions

- a) Will the analyzing of the existing system identify it's weakness?
- b) How will the designing and implementing of a modular student result management system enable the staff at Old Kampala Senior Secondary School compile, process and store students' results.
- c) How will the researcher develop a database that will store the results of students at Old Kampala Senior Secondary S database system developed affect the management of student results in Old Kampala Senior Secondary school?
- d) How will the researcher evaluate the proposed system?

1.4 Significances of the study

- a. The study would tremendously improve data recording, compiling, processing, computation and data access of the student results.
- b. The study would greatly reduce the cost of managing student results as they only needed one or two staff, additional stationary was not required as the data would be saved on the computer hard disks.
- c. It would enable students to get their results early and on time since its fast.
- d. It would morale boost the staff who would use this system as it saved their time for its fast, comfortable and job rewarding to use a computer

1.5 Scope

The scope of the study was divided into three aspects namely: time scope, geographical scope and content scope.

1.5.1 Time Scope

During this period the proposal would be submitted and the system would be ready. The final report would also be ready.

1.5.2 Geographical Scope

The research was conducted at Old Kampala Senior Secondary School which is located in the central division of Kampala along Gaddaffi Road.

1.5.3 Content Scope

The system would be restricted to only the management of student results in a secondary school. However, it was important to note that the system was not online so it could not be accessed on the internet.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Managing student results in secondary schools require complicated procedures. As a solution to these problems, there is a system that teachers could access. This system is connected to a server to which data are accumulated by the use of a computer which inputs test and exam result data. In this proposal, the researcher proposes such a management system using Visual Basic and Microsoft Access. The student results management system will enable the secondary school to input, analyze, and edit both assessment and exam results in an informed and defensible way.

2.1 Systems

According to Ralph M .and George W (2001) [7], system refers to a set of elements or components that interact to accomplish goals. The elements themselves and the relationships among them determine how the system works. Systems do have inputs, processing mechanisms, outputs and feedback.

2.2 Information Systems

According to James A. Obrien (2005) [3], an information system is defined as any organized combination of people, hardware, software, communications networks and data resources that collects, transforms and disseminates information in an organization.

According to Laudon J.P (2002) puts that an Information system is a system, whether automated or manual, that comprises people, machines and or methods organized to collect, process, transmit, store and disseminate data that represent user information. The information system can involve a combination of work practices, information, people and technologies organized to accomplish goals in an organization.

2.2.1 Information System Components

In Information Systems, components are elements or activities that when put together make up a system and provide information to the organization. They include:

- a) **Input**- the activity of gathering and capturing data. Involves assembling elements that enter the system to be processed for example raw materials, energy, data, human effort.
- b) **Processing**- this is the converting or transforming data into useful outputs. It involves making calculations, comparisons, taking alternative actions and storing data for future use. Can be manual or computerized.
- c) **Output** – this involves transferring elements that have been produced by a transformation process to their ultimate destination usually in the form of documents and reports. For example finished goods, human services, pay checks for employees, reports for managers, information supplied to human users.
- d) **Feedback**- an input that is used to make changes to input or processing activities. It is data about performance of a system for example data about sales performance is feedback to a sales manager.

2.2.2 Manual Information Systems

A manual information system is one that does not use any computer devices or application. Here information is kept on paper and stored in file cabinets.

Advantages of manual information systems

- i. They do not require a skilled employee.
- ii. There is no need for incurring costs in training staff.
- iii. There have very low setup costs.
- iv. Disadvantages of manual information system
- v. They are tiresome.
- vi. They are prone to human errors like double entry of records.
- vii. They are not secure; data in file cabinets can get into wrong hands.
- viii. Time consuming especially during recording and retrieval of data.

2.2.3 Computer-Based Information Systems

According to James .A(2005)[3], computer-based information system is defined as a single set of hardware, software, databases, telecommunications, people and procedures that are configured to collect, manipulate, store and process data into information.

The components of the computer-based information infrastructure include:

- a) **Hardware**- consists of all computer equipment used to perform input, processing, and other activities.
- b) **Software**- - the computer programs that govern the operation of the computer.

Has two basic types of software; system software which is controls basic computer operations and the application software which allows specific tasks to be accomplished.

- c) **Databases**- this is an organized collection of facts and information. It contains facts and information about customers, employees, inventory, and competitors' sales information.
- d) **Telecommunications, Networks and the Internet.**
- **Telecommunications** - an electronic transmission of signals for communications to enable organization to carry out their tasks through an effective computer network.
 - **Networks** - are used to connect computers and computer equipments.
 - **Internet**- a global interconnection of computer networks to freely exchange information.
- e) **People**- the most important element of the computer-based information system. These personnel include all those who manage, run, program, and maintain the system.
- f) **Procedures**- they include strategies, policies, methods, and rules for using a computer-based information system.

2.3 Tools

2.3.1 Visual Basic

Visual basic is a visual, events driven and high programming language which evolved from the earlier DOS version called BASIC. The researcher has observed that while many information systems are implemented using access, oracle, he has decided to use Visual Basic in the development of the forms, switch board (front end).

This is so due to the various advantages of visual basic which include:

- It is a very easy to use programming language for the codes look like English language.
- VB is both a programming language and interactive development environment (IDE)

- The programming is done in a graphical environment using any graphical object which can easily be changed using the properties windows.
- VB supporting resources are readily available.
- The graphical user interface of the IDE provides good views for the management of the program structure in the various types of entities (classes, modules, procedures and forms).

2.3.2 Microsoft Access

Microsoft Access, also known as Microsoft Office Access, is a database management system from Microsoft that combines the relational Microsoft Jet Database Engine with a graphical user interface and software-development tools. MS Access stores data in its own format based on the Access Jet Database Engine. It can also import or link directly to data stored in other applications and databases.

Like other Office applications, Access is supported by Visual Basic for Applications, an object-oriented programming language that can reference a variety of objects including DAO (Data Access Objects), ActiveX Data Objects, and many other ActiveX components. Visual objects used in forms and reports expose their methods and properties in the VBA programming environment, and VBA code modules may declare and call Windows operating-system functions.

I decided to use MS Access 2003 because it is a very powerful, yet easy to use relational database application that works well with Microsoft windows; the operating system that I am using.

2.4 Business Information Systems

According to Elizabeth H. (2008), Business Information system is defined as a group of interrelated components that work collectively to carry out input, processing, output, storage and control actions in order to convert data into

information products that can be used to support forecasting, planning, control, coordination, decision making and operational activities in an organization.

In terms of the components that undertake this activity, they can be classified into five basic resources of people, hardware, software, communications and data. People resources include the users and developers of information system and those who help maintain and operate the system such as Information System managers and technical support staff. Hardware resources include computers and other items such as printers. Software resources refer to computer programs known as software and associated instruction manuals.

Communications resources include networks and the hardware and software needed to support them. Data resources cover the data that an organization has access to such as computer databases and paper files.

2.5 Transaction Processing Systems, Workflow Systems and ERP

A transaction is any business-related exchange such as payments to employees, sales, to customers, and payments to suppliers. Thus, processing business transactions is the first application of computers for most organizations.

2.5.1 Transaction Processing Systems (TPS)

A transaction is any business-related exchange such as payments to employees, sales to customers, payments to suppliers.

The TPS is an organized collection of people, procedures, software, databases, and devices used to record completed business transactions. To understand a TPS is to understand basic business operations and functions.

2.5.2 Workflow Systems

A workflow system is rule-based management software that directs, coordinates and monitors execution of an interrelated set of tasks arranged to form a business process.

The primary purpose of the workflow system is to provide employees with tracking, routing, document imaging and other capabilities designed to improve business processes. The transactional workflow systems hold the promise of improving the productivity and dependability of business processes.

2.5.3 Enterprise Resource Planning (ERP)

An Enterprise Resource Planning (ERP) system is a set of integrated programs capable of managing a company's vital business operations for an entire multisite, global organization.

Most ERP do provide integrated software to support the manufacturing and finance business functions in an organization. ERP systems also have a purchasing subsystem that orders the items required.

In addition to these core business processes, some ERP systems are capable of supporting other business functions such as human resources, sales and distribution. The primary benefits of implementing an ERP system include easing adoption of improved work processes and improving access to timely data for operational decision making.

2.6 Management Information Systems and Decision Support Systems

The benefits provided by an affective TPS are tangible and can be used to justify their cost in computer programs and specialized personnel and supplies. They do speed the processing of business activities and reduce clerical costs.

Satisfying the needs of managers and decision makers continues to be a major factor in developing information systems.

2.6.1 Management Information Systems (MIS)

According to Ralph M .and George W (2001) [7], MIS is an organized collection of people, procedures, software, databases, and devices used to provide routine information to managers and decision makers. According to Uma Gupta, MIS is an information system that provides for management- oriented reporting based on transaction processing operations of the organization.

The focus of MIS is primarily an operational efficiency. Marketing, production, finance and other functional areas are supported by MIS and linked through a common database.

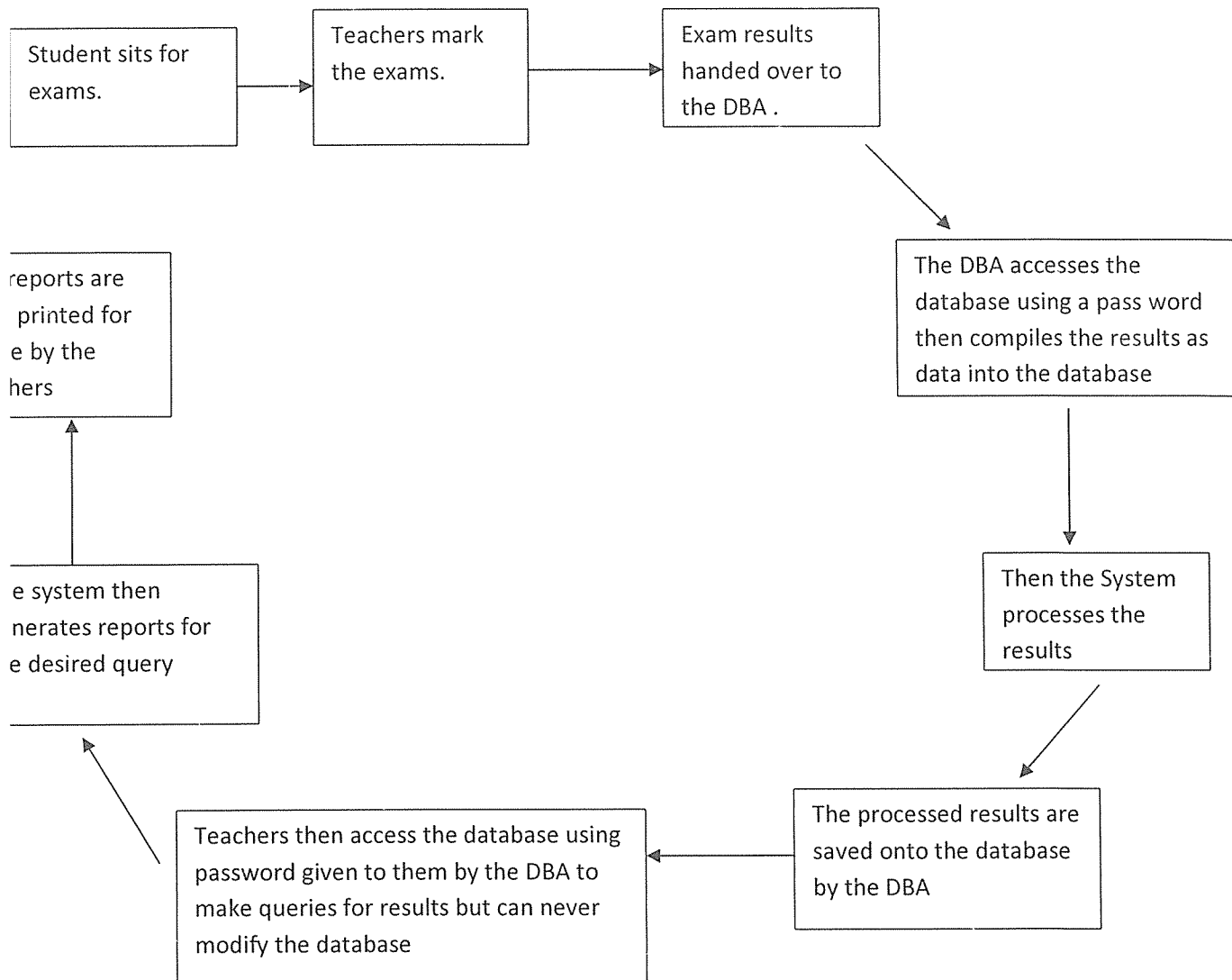
2.6.2 Decision Support Systems

DSS is an organized collection of people, procedures, software, databases and devices used to support problem-specific decision making. A DSS can provide immediate assistance in solving complex problems not supported by the traditional MIS.

A DSS operates from a managerial perspective, and it recognizes that different managerial styles and decision types require different systems.

The essential elements of a DSS include a collection of models used to support a decision maker (model base), collection of facts and information to assist in decision making (database) and systems and procedures (user interfaces) to help decision makers and other users interact with the DSS.

2.7 A conceptual framework for a modular student results management system



CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter explained the methodology or step by step approaches that were used in developing the project and at the same time satisfying user requirements. It also looked at the methods of data collection and data analysis. The researcher used a methodology called the system development cycle SDLC in the design, development and testing of the information system.

3.1 Methodology

(Irny, S.I. and Rose, A.A. 2005) [2] defined methodology generally as a guideline for solving a problem, with specific components such as phases, tasks, methods, techniques and tools. It could also be defined as "the analysis of the principles of methods, rules, and postulates employed by a discipline".

The SDLC was defined as a process used by a systems analyst to develop an information system, including requirements, validation, training, and user (stakeholder) ownership. Any SDLC would result in a high quality system that met or exceeded customer expectations, reached completion within time and cost estimates, worked effectively and efficiently in the planned Information Technology infrastructure, and was inexpensive to maintain and cost-effective to enhance.

3.1.1 System analysis

The goal of system analysis was to determine where the problem was in an attempt to fix the system. That step involved breaking down the system into different pieces to analyze the situation, analyzing project goals, breaking down what needed to be created and attempting to engage users so that definite requirements could be defined.

Requirements analysis sometimes required individuals/teams from client as well as service provider sides to get detailed and accurate requirements; often there had to be a lot of communication to and from to understand these requirements. Requirement gathering was the most crucial aspect as many times communication gaps arose in that phase and it lead to validation errors and bugs in the software program. What was the end user needs were also defined in this section.

3.1.2 Design

In systems design, the design functions and operations were described in detail, including screen layouts, business rules, process diagrams and other documentation. The output of that stage would describe the new system as a collection of modules.

The design stage took as its initial input the requirements identified in the approved requirements document. For each requirement, a set of one or more design elements would be produced as a result of interviews, workshops, and/or prototype efforts. These design elements were intended to describe the software in sufficient detail that skilled programmers might develop the software with minimal additional input design.

3.1.3 Implementation

The implementation stage was one where the system was put into operations without disrupting the daily operations of the school especially at the end of the terms when the advantages of the new system should be realized. The system implementation had several strategies including: parallel conversion, direct cut over, pilot study, phased conversion.

The researcher intended to use the direct cut over strategy where the old system is completely removed and replaced by the new modular student results management information system.

3.2 Area of Study

The researcher intended to carry out his research at a school called Old Kampala Secondary School found in old Kampala village opposite Gaddaffi mosque along Gaddaffi Road in Central division of Kampala.

3.3 Population of the study

A sample would be able to give a whole representation of a population in every aspect. Therefore the research would target at least 50 teachers of Old Kampala Secondary School and some staff.

3.4 Research Instrument

A research instrument was a survey, questionnaire, test, scale, rating, or tool designed to measure the variable(s), characteristic(s), or information of interest, often a behavioral or psychological characteristic. Research instruments were very useful tools to our research study.

Using previously validated data, collection instruments saved time and increased the study's credibility. Once the data collection procedure had been determined, a time line for completion had to be established.

3.4.1 Interviews

According to (Kvale, 1996), qualitative research interview seeks to describe the meanings of central themes in the life world of the subjects. The main task in interviewing was to understand the meaning of what the interviewees said. Interviews were a far more personal form of research.

The researcher decided to use interviews due to the several advantages.

Advantages of Interviews

- i) They established rapport with potential participants and therefore gained their cooperation.
- ii) These interviews yielded the highest response rates in survey research.
- iii) They also allowed the researcher to clarify ambiguous answers and to make any appropriate follow-up.
- iv) It saved time involved in processing the data, as well as saving the interviewer from carrying around hundreds of questionnaires

Disadvantages of interviews

- i. Interviews demand a lot of time in that appointments have to be made with the interviewees
- ii. Interviews in some cases are not possible because the interviewees may not focus fully especially if they have other things on their minds.
- iii. Language barrier may also hinder a successful interview.

3.4.2 Questionnaires

The researcher would give written questionnaires to the respondents in order to collect the researched data. The researcher chose this data collection technique.

Advantages of questionnaires

- i) It was less expensive since it did not necessarily require hiring of research assistants
- ii) It permitted anonymity and resulted in more honest responses.
- iii) Eliminated bias due to phrasing questions differently with different respondents
- iv) The questionnaire is answered quickly. People finish quickly and return them at their convenience.
- v) Questionnaires prove to be relatively cheap in gathering the information

Disadvantages of questionnaires

- i. The number of respondents is low because people tend to ignore them.
- ii. There is no guarantee that an individual will answer or elaborate on all questions.
- iii. There is no opportunity for a respondent to clarify on vague answers.
- iv. Good questionnaires are hard to design.

3.4.3 Observation

This method was achieved through observing and studying closely the existing system used by the secondary school. In seeking to explore the natural scene, the researcher aimed to be as unobtrusive as possible, so that neither his research presence nor methods disturbed the situation.

Here, the researcher adopted a recognized role within the institution or group in order to observe human behavior in our personal and professional lives.

The researcher intended to go to Old Kampala Secondary School and observe firsthand what happened with the manual way of recording, analyzing of students marks; whose conclusions could be useful in the design of the new system.

3.5 Analysis

Data to be gathered would be organized and analyzed systematically using qualitative data, frequency tables and figures with the aids of statistical package for social scientists (SPSS). SPSS would be used due to its wide set of variable option that includes editing, deleting, adding variables at various stages of analysis and testing various relationships. After data collection, the information would be formulated using qualitative analysis. The tool that would be used to analyze data would be descriptive statistic of frequency analysis. The result obtained after the analysis would be the basis of the development of a modular student results management system.

CHAPTER FOUR

SYSTEM DESIGN, ANALYSIS AND IMPLEMENTATION

4.0 Introduction

This chapter presented the design, analysis and implementation of the new system. It further described in detail the requirements, both user and system requirements that were present. System design was divided into Architectural, Data base design and Logical design. The chapter concluded by showing Implementation strategies.

4.1 System Design

4.1.1 Architectural design

The structure of a student result management system was divided into three components; that is (1) database, (2) security and (3) Graphical user interface. The user interface or front end was basically the forms designed in VB while the database is at the server side (the back end).

In between the user interfaces and database there was the security measure for authentication purposes. This produced the architectural design below.

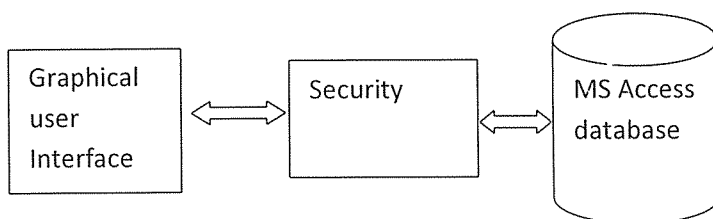


Figure 4.1

a) MS Access Database design

This was a relational database that consisted of data in the system and data about it (Meta data). It consisted of tables, which made up the database schema. Primary keys identified each entry in the table while foreign keys linked the tables with each other. Data consistence checks such as data types, illegal or null submissions or duplicate entries were checked at this level. It was designed based on the three structures; the Conceptual database, Logical database and physical database design phases.

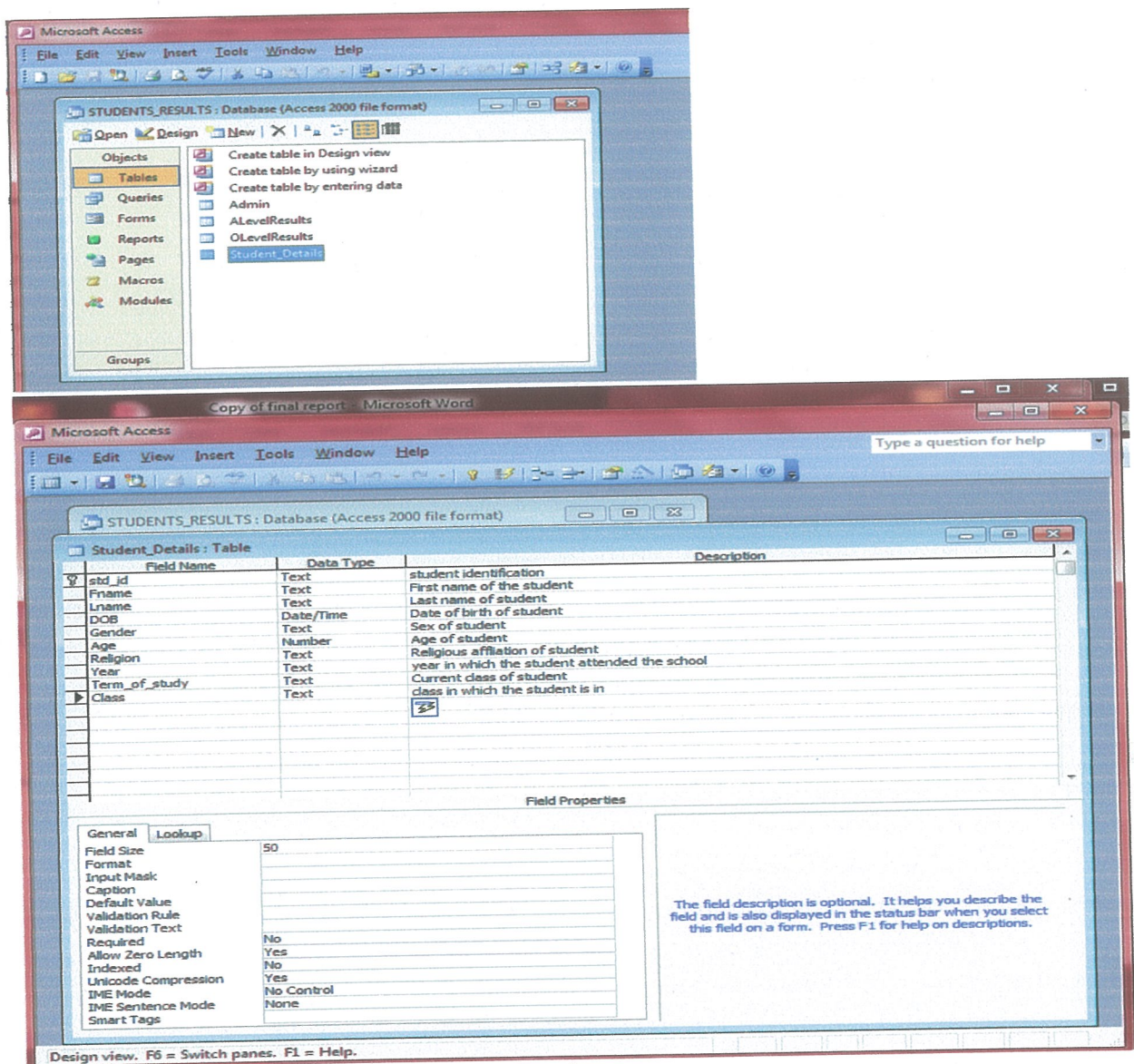
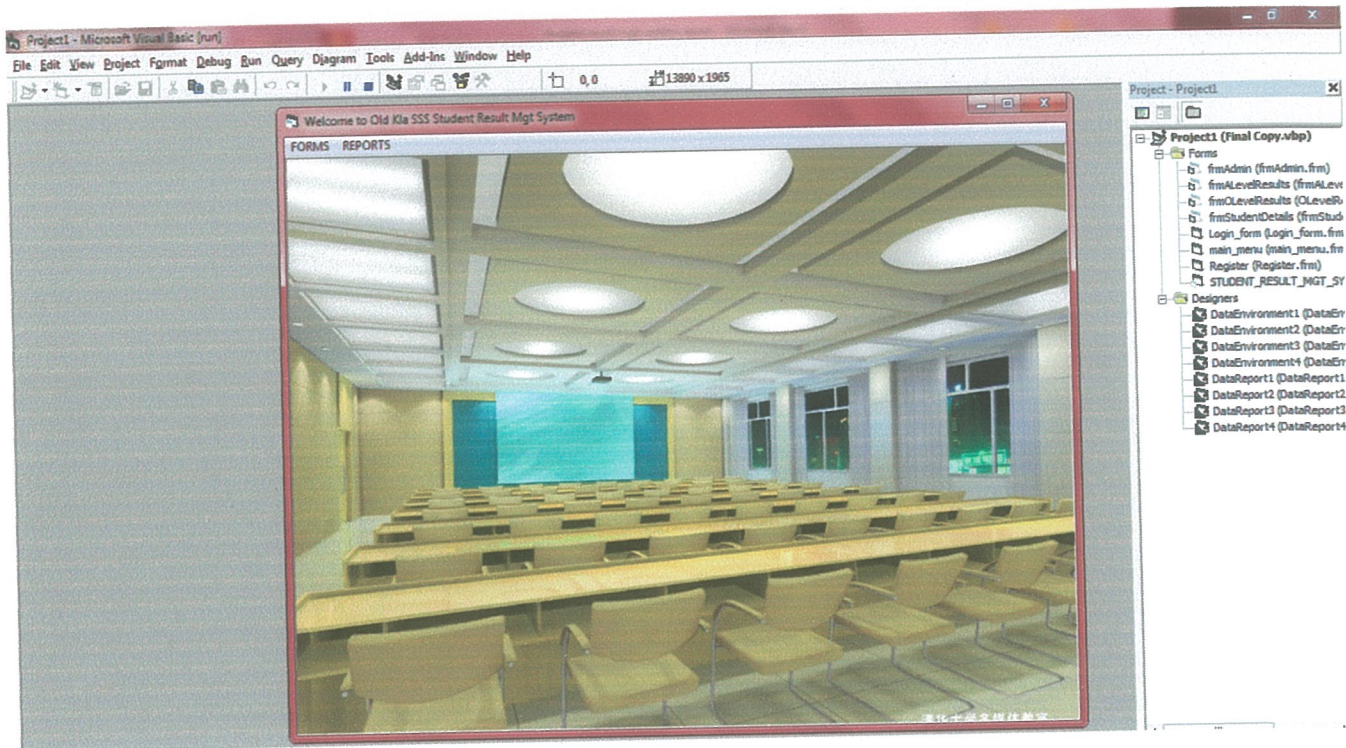


Figure 4.2 Relational Data base Design

b) Graphical user interface (GUI) – The forms

This provided a view of the information kept in the database. It consisted of the forms into which data were entered and saved into a database for further display from the database. The user interface was the medium of interaction between the user and the system. Any information entered into the system was stored in the database.

Figure 4.3: **The Multiple Document Interface (MDI) Form**



The MDI Form is that form which contains all other interfaces like forms and reports. After the user logs into system, the MDI pops up from which one chooses his/her desired action.

Student result mgt system report - Microsoft Word

Welcome to Old Kile SSS Student Result Mgt System

FORMS REPORTS

Administration

Employee Information

Staff_id	SF005	Nationality	Ugandan
First_name	magabo	Staff_address	Po Box57 Mbale
Last_name	Stephen	Staff_title	Maths Teacher
Date_of_birth	15-july-1984	Contacts	256793567898
Gender	Male	Religion	Catholic

ADD RECORD SAVE RECORD DELETE RECORD NEXT RECORD PREVIOUS RECORD EXIT RECORD GO TO

Figure 4.4: **The administration form**

The administration form is one that contains all the employee information about the teachers.

Student result mgt system report - Microsoft Word

Welcome to Old Kile SSS Student Result Mgt System

FORMS REPORTS

Students_Details

Std_id	23457	Age	32
Fname	Scott	Religion	Catholic
Lname	archer	Year	2010
DOB	7/23/1979	Term_of_study	Two
Gender	Male	Class	S3B

ADD RECORD SAVE RECORD DELETE RECORD NEXT RECORD PREVIOUS RECORD EXIT RECORD GO TO

Figure 4.5: **The students' details form**

The students' details form contains all the personal data about the students in the school.

Welcome to Old Kia SSS Student Result Mgt System

FORMS REPORTS

O'LevelResults

O'LEVEL STUDENTS RESULTS

Fname: Class:
 Lname: Term_of_study:
 Year: Student_id:

Subjects done	Beginning_of_term	Mid_term	End_of_term	Average	
History	45	64	74	61	Average Mark 62
English	76	94	75	82	ADD RECORD COMPUTE
Geography	94	34	78	69	SAVE RECORD
Mathematics	30	56	54	47	NEXT RECORD
Biology	65	76	74	72	PREVIOUS RECORD
Chemistry	92	58	63	71	DELETE RECORD
Physics	65	35	64	55	EXIT RECORD
Commerce	94	42	58	65	GOTO
Agriculture	56	18	90	55	
Literature	96	34	69	66	
Fine Art	74	53	56	61	

Figure 4.6: **The O'Level results form**

The above form has all the O' students results fed into the system by the DBA as given to him by the respective subject teachers. It also has the student class particulars.

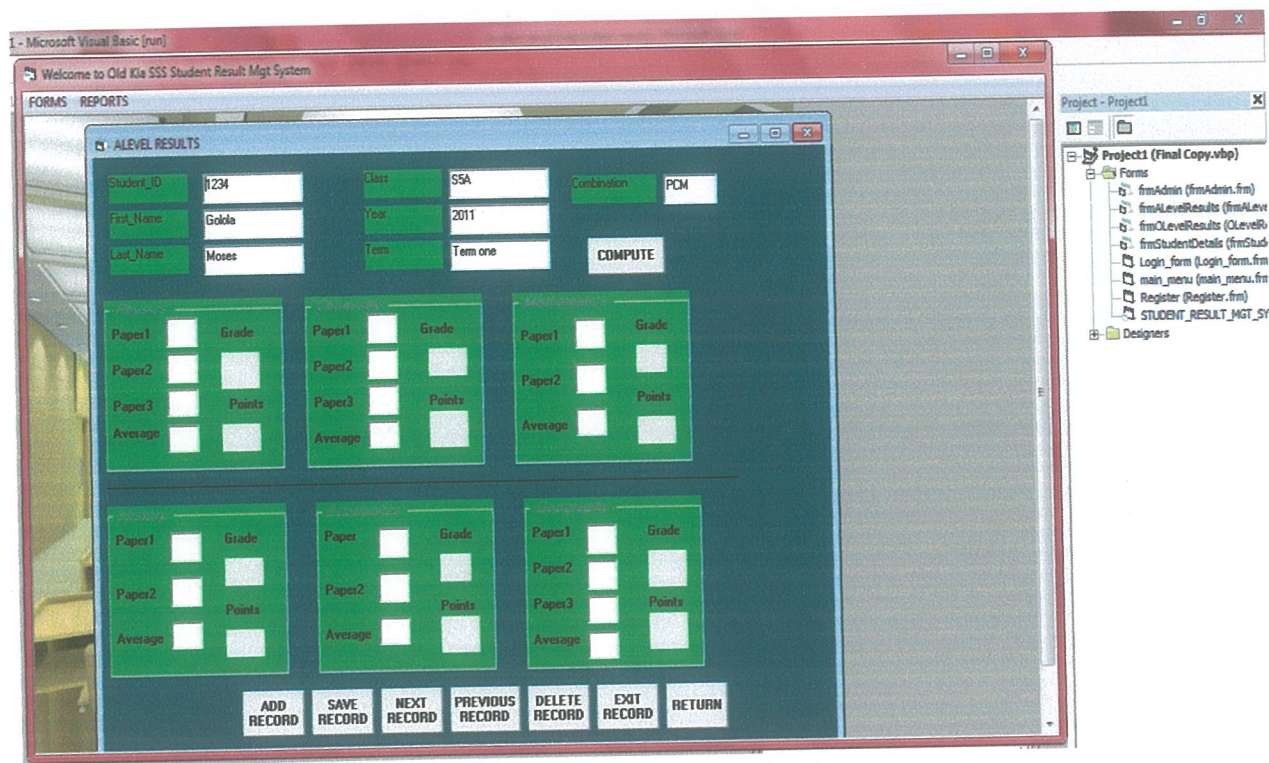


Figure 4.7: The A 'Level results form

This form has the A 'Level students results attained in a particular combination

c) Security

This ensured access rights to the information kept in the database. It allowed login details to the system for authentication.

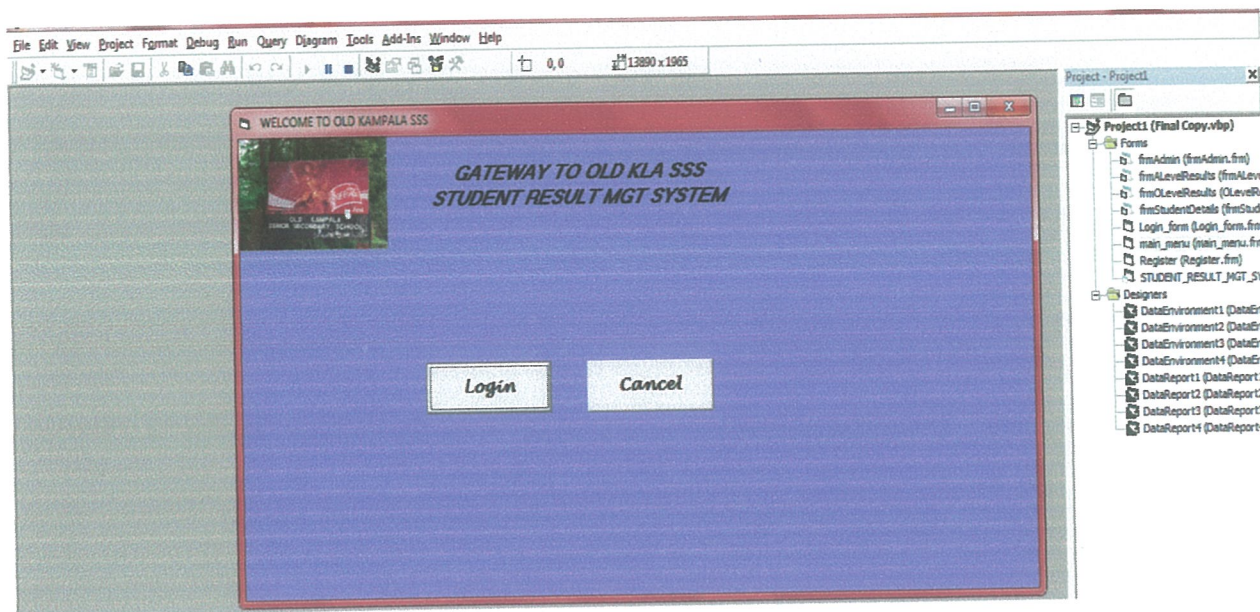


Figure 4.8: **The main menu form**

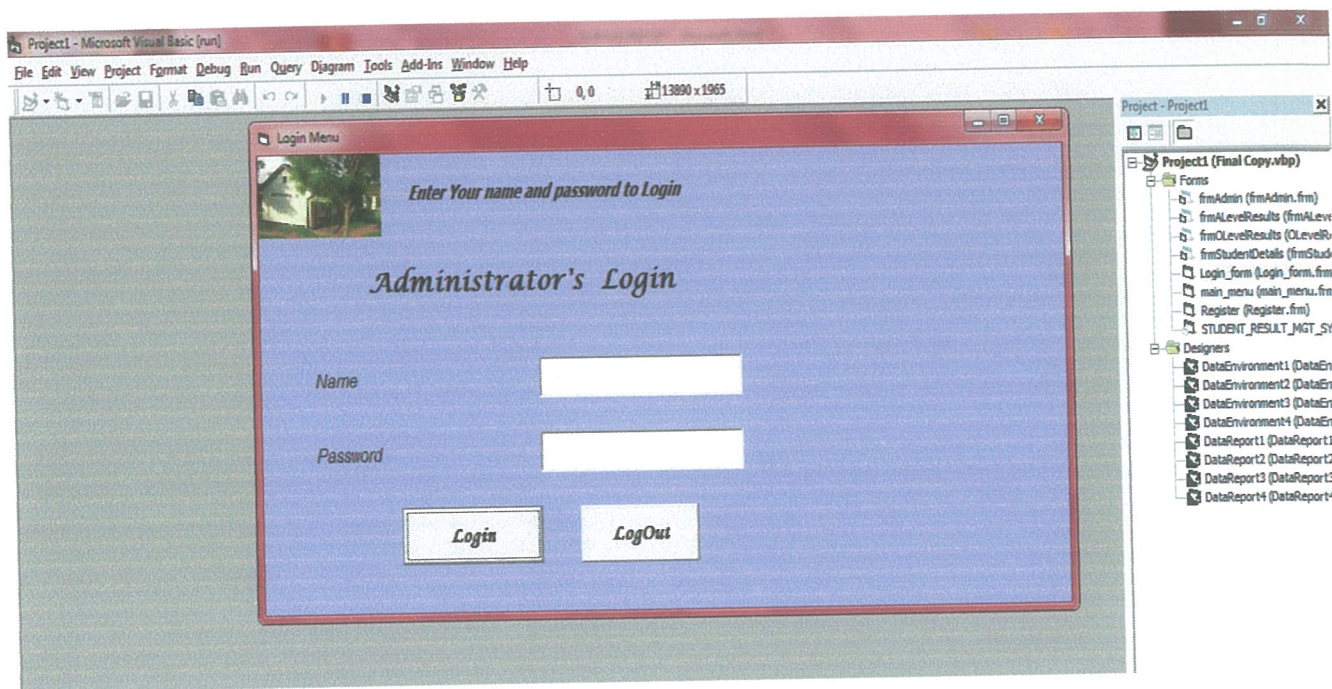


Figure 4.9: **The login form**

This is for the user authentication where only those with correct user names and pass word can access the system.

d) Reports

These are deliverables of the system. The reports are the final outputs desired by end users of the system

Data Report 1

The screenshot shows a window titled 'DataReport1' with a zoom level of 100%. The report content is as follows:

OLD KAMPALA S.S.S STUDENT RESULT MGT SYSTEM	
STAFF_REPORT	
Staff_id:	SF005
First_name:	magabo
Last_name:	Stephen
Date_of_birth:	15-july-1984
Gender:	Male
Staff_address:	Po Box57 Mbale
Nationality:	Ugandan
Contacts:	25679356
Staff_title:	Maths Teacher
Religion:	Catholic

At the bottom of the window, there is a page navigation bar showing 'Pages: 1' and navigation icons.

Staff Report of Old Kampala SSS

Data report 2

Student Details Report of Old Kampala SSS

The screenshot shows a window titled "DataReport2" with a "Zoom" dropdown set to "100%". The report content is as follows:

OLD KAMPALA S.S.S STUDENT RESULTS MGT
STUDENT_DETAILS REPORT

std_id:	23457
Fname:	Scott
Lname:	archer
DOB:	7/23/1979
Gender:	Male
Age:	32
Religion:	Catholic
Year:	2010
Term_of_study:	Two
Class:	S3B

At the bottom of the window, there is a "Pages:" section with navigation icons and the number "1".

Data Report 3

O'Level Results Report of Old Kampala SSS

DataReport3 Zoom 100%

OLD KAMPALA S.S.S STUDENT RESULT MGT SYSTEM
O'LEVEL RESULTS REPORTS

Fname: Kibiro Class: S.4E
Lname: Zakalia Term_of_Study: One
Year: 2008 Student_id: 1122

HistBegin:	45	EngBegin:	76
HistMid:	64	EngMid:	94
HistEnd:	74	EngEnd:	75
HistAverage:	61	EngAverage:	82

GeoBegin:	94	MathBegin:	30
GeoMid:	34	MathMid:	56
GeoEnd:	78	MathEnd:	54
GeoAverage:	69	MathAverage:	47

OLD KAMPALA S.S.S STUDENT RESULT MGT SYSTEM
O'LEVEL RESULTS REPORTS

AgricBegin:	56	LitBegin:	96
AgricMid:	18	LitMid:	34
AgricEnd:	90	LitEnd:	69
AgricAverage:	55	LitAverage:	66

FartBegin:	74	EntBegin:	52
FartMid:	53	EntMid:	36
FartEnd:	56	EntEnd:	34
FartAverage:	61	EntAverage:	41

Total_Average: 62

Data Report 4

A 'Level Results Report of Old Kampala SSS

OLD KAMPALA SSS STUDENT RESULT MANAGEMENT

ALEVEL_RESULTS REPORT

Student_ID:	1234	Year:	2011
First_Name:	Golola	Term:	Term one
Last_Name:	Moses	Class:	SSA
		Combination:	PCM

phy1:	chem1:	math1:
phy2:	chem2:	math2:
phy3:	chem3:	mathave:
phyave:	chemave:	mathematics:
physics:	chemistry:	mathpoints:
phypoints:	Chempoints:	

4.1.2 Testing

Testing is identification of a system weakness and errors by assessing system elements such as software and hardware under different situations and environments; this was done to see if the system performance matched the system requirements.

However, testing was one of the most daunting parts of the development process. It required creativity, persistence and a thorough understanding of the system to anticipate the many ways in which program might fail.

The system developers did not know how many errors were in the system. Before actually implementing the new system into operation a test run of the system was done removing all the bugs if any the activities during testing are as bellow.

- i. **Unit testing:** each form was individually tested with the prepared test data then all errors were removed from the system. Each program tested as a separate entity.
- ii. **Integration testing (System) testing:** tests on the entire system were performed using the actual data in the database. The researcher made sure that interactions between programs worked successfully. The results were analyzed at each stage of the execution and any errors again were corrected.
- iii. **Acceptance testing:** in this type of testing, developers and users tested the system under actual operating conditions. Users tested the system performance to ensure that the system met their requirements and expectations; for example a user tested to see if a standard report looked the way he/she wanted it to once all the data had been input.

4.2 System Analysis

The system that existed was paper based; records were printed on paper and placed in file cabinets. The rate at which records could be accessed was slow since a person had to go through piles of papers to get a specific record. Hence anyone from the external environment would have to wait for long hours to be given a record he or she requests for.

The system was tiring and labor intensive, teachers had to compute marks for each student grade and submitted them to the director of studies. This activity was tiresome and many mistakes were bound to happen.

No data backup methods were available this was very risky and could lead to data loss. Another very important factor to put into consideration was that access to the file cabinets was not hard.

4.2.1 Requirement Analysis

In order to document all end user requirements for the system, data collected was analyzed using structured analysis approach to rigorously specify the process. This section included requirements of the new system that the researcher categorized into user requirements, functional and non functional requirement as follows.

4.2.2 Functional requirements

These were specific functions, tasks or behaviors that the system had to support. Through the data gathering process the following stakeholders were identified students, teachers and high level school administrators with the following user requirements:

- i. A user friendly system, one that is easy to learn and use.
- ii. It should be able to authenticate users before its use.
- iii. The system should have available information like student details and marks.
- iv. A secure system where the DBA can manage system users.
- v. Allow data to be added into the system and easily retrieved through forms and reports respectively.
- vi. Automatically calculate the student marks to get average.
- vii. It should generate reports for the students.

4.2.3 Non Functional requirements

The non-functional requirements describe general conditions the software system must meet to satisfy the needs of the users. This section gives an overview about the most important issues and tries to explain their relevance.

- **System speed:** - Given the simultaneous multiple accesses and the time driven environment of the users of the system, the system should be fast enough to satisfy the users.
- **System availability:** - The system should be available at any time of the day so that users, at their convenience can have access to the system.
- **System accessibility:** - The system should be accessible in all places where there are computers at the school. It will require aDBA personnel to access information in the database.

4.2.4 System soft ware requirement

- ✓ Operating system for the computer (Windows 2003/2007)
- ✓ Data base management system Microsoft access
- ✓ Visual basic 6.0
- ✓ Microsoft office

4.2.5 System hard ware requirement

Hardware were the physical parts of a computer that one could see and touch, one had to be careful when buying the hardware requirements that they were in good conditions .The General hard ware requirements to the system were as shown in the table below;

- ✓ A hard disk with at least 256MB free space and 512MB of RAM.
- ✓ A key board terminal.
- ✓ A printer.

- ✓ A monitor or screen.
- ✓ Processor(Intel Pentium (iv) AMD Cyrix, Intel Celeron)with minimum speed of 700mhz

4.2.6 Conceptual Modeling

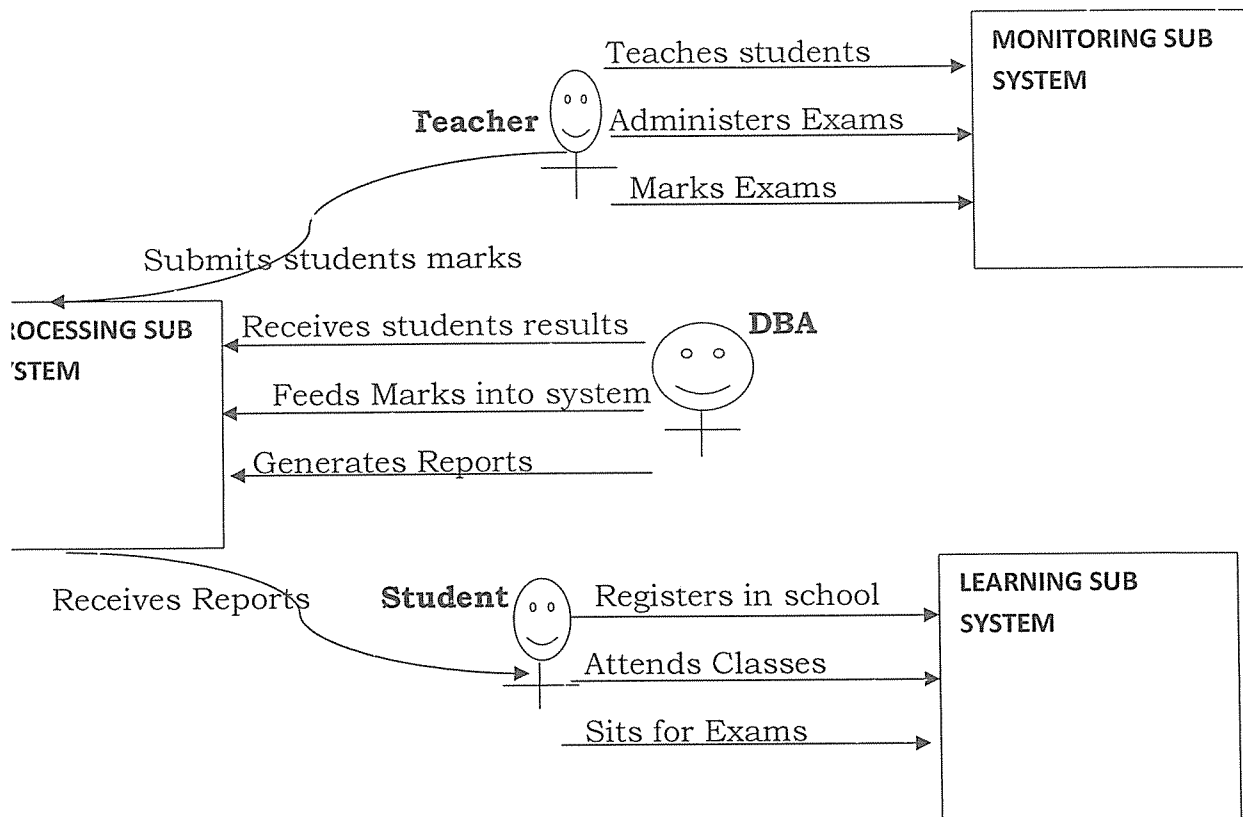
a) Use case diagram

Use case modeling is the process of modeling a system's functions in terms of business events, who initiates the events, and how the system responds to those events. Use case modeling identifies and describes the system functions from the perspective of external users using a tool called Use case.

There are two main components of a use case diagram are Use cases and actors.

- An Actor - represents a user or another system that will interact with the system you are modeling.
- A Use case- is an external view of the system that represents some action the user might perform in order to complete a task.

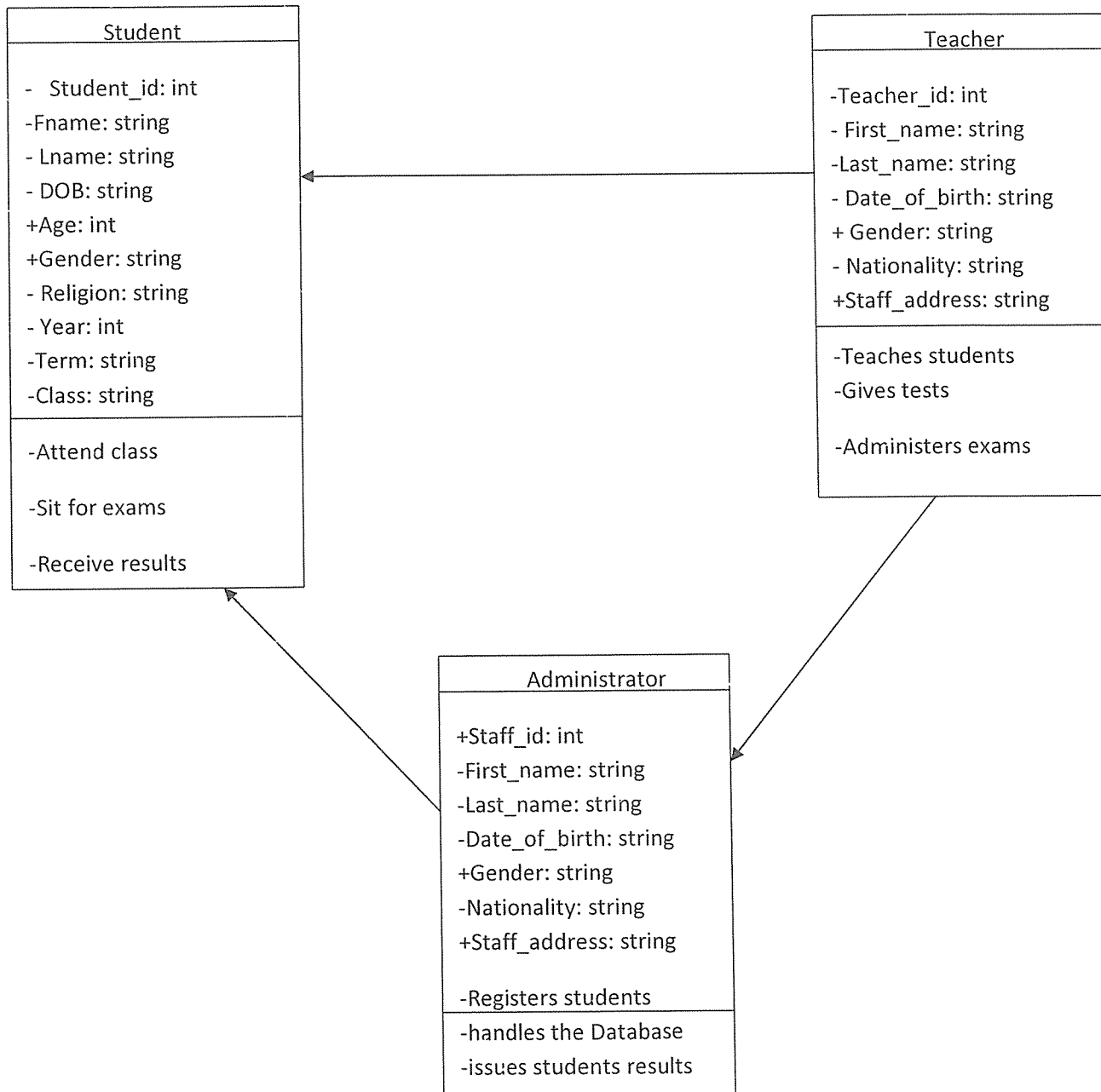
Figure 4.10: Use Case Diagram for Student Result Management System



b) Class Diagram

A class diagram defines a type of object and characteristics of its objects, and an object is an instance of a class. Class diagrams are widely used to describe the relationships of the different objects in a system and do model class structure and contents using design elements such as classes, packages and objects.

Figure 4.11: **Class diagram**



4.2.7 Logical Design

The logical design establishes the relationship among different elements in the system.

a) Data flow diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system. A data flow diagram can also be used for the visualization of data processing (structured design).

It is common practice for a designer to draw a context-level DFD first which shows the interaction between the system and outside entities.

The overall design of a student result management system in the form of a context-level DFD is illustrated below. Inputs to the process are received from students (through student info), from staff (who request subject info they would like to teach) from administration (who provide employee info). Outputs from examination process which include queries and reports by students. It is this context-level DFD that is then "exploded" to show more detail of the system being modeled.

Context diagram for student result management system

Figure 4.12 (a)

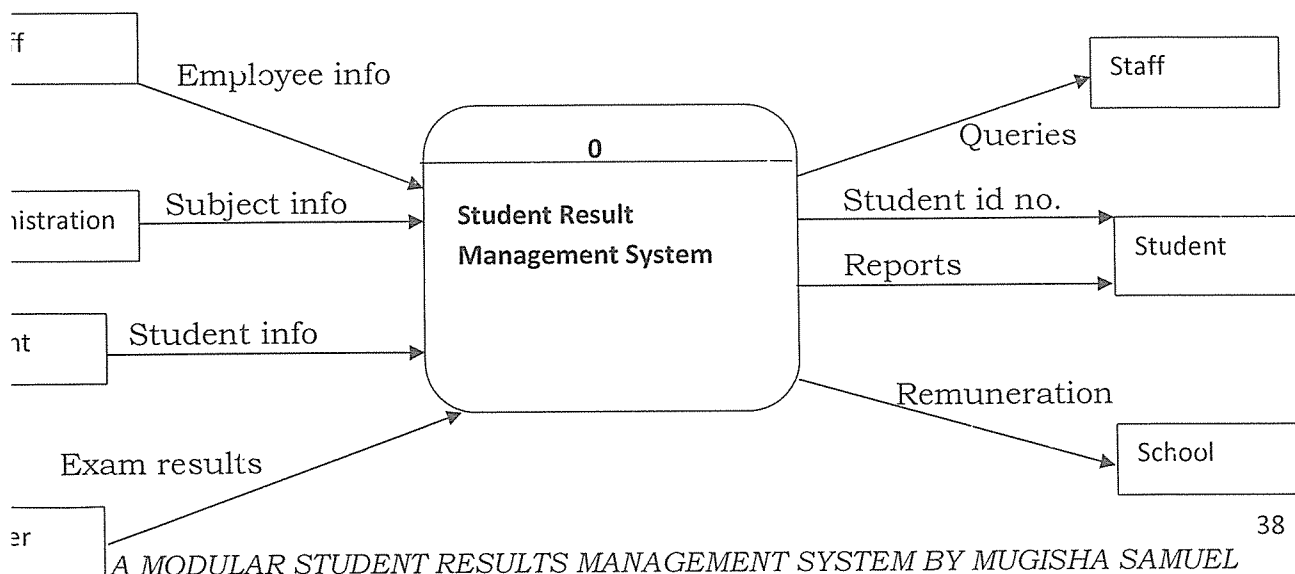
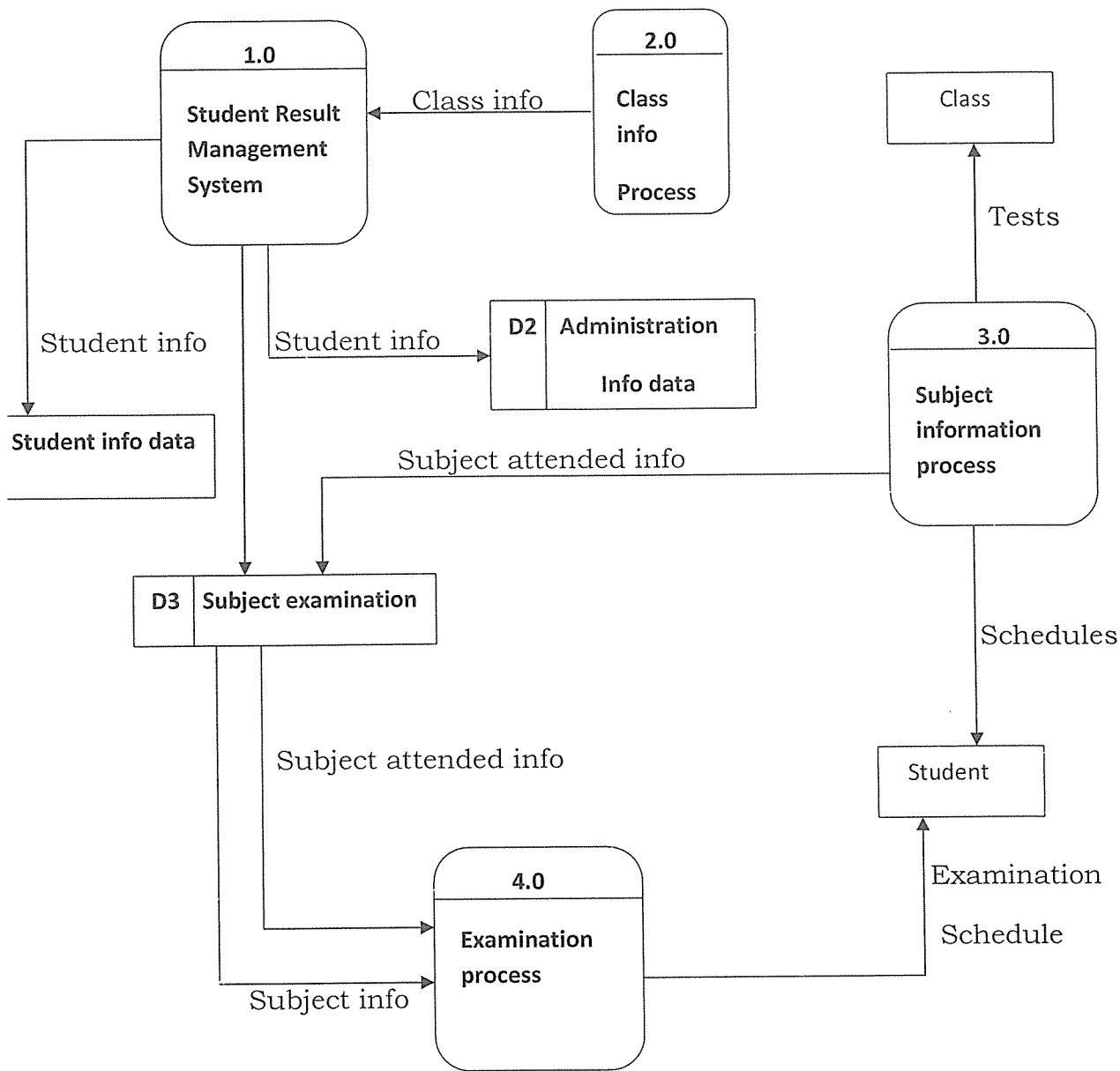
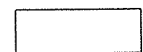
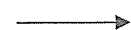
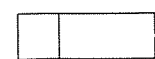


Figure 4.12 (b) **Level- 0 Data Flow Diagram**



Key Symbols

-  Entity
-  Process
-  Data Flow
-  Database

Flow chart

A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flow chart symbols are linked together with arrows showing the process flow direction. They are used to Define and analyze processes, build a step-by-step picture of the process for analysis, discussion, or communication and to define, standardize or find areas for improvement in a process

Common Flowchart Symbols

Terminator: An oval flow chart shape indicating the start or end of the process.

Process: A rectangular flow chart shape indicating a normal process flow step.

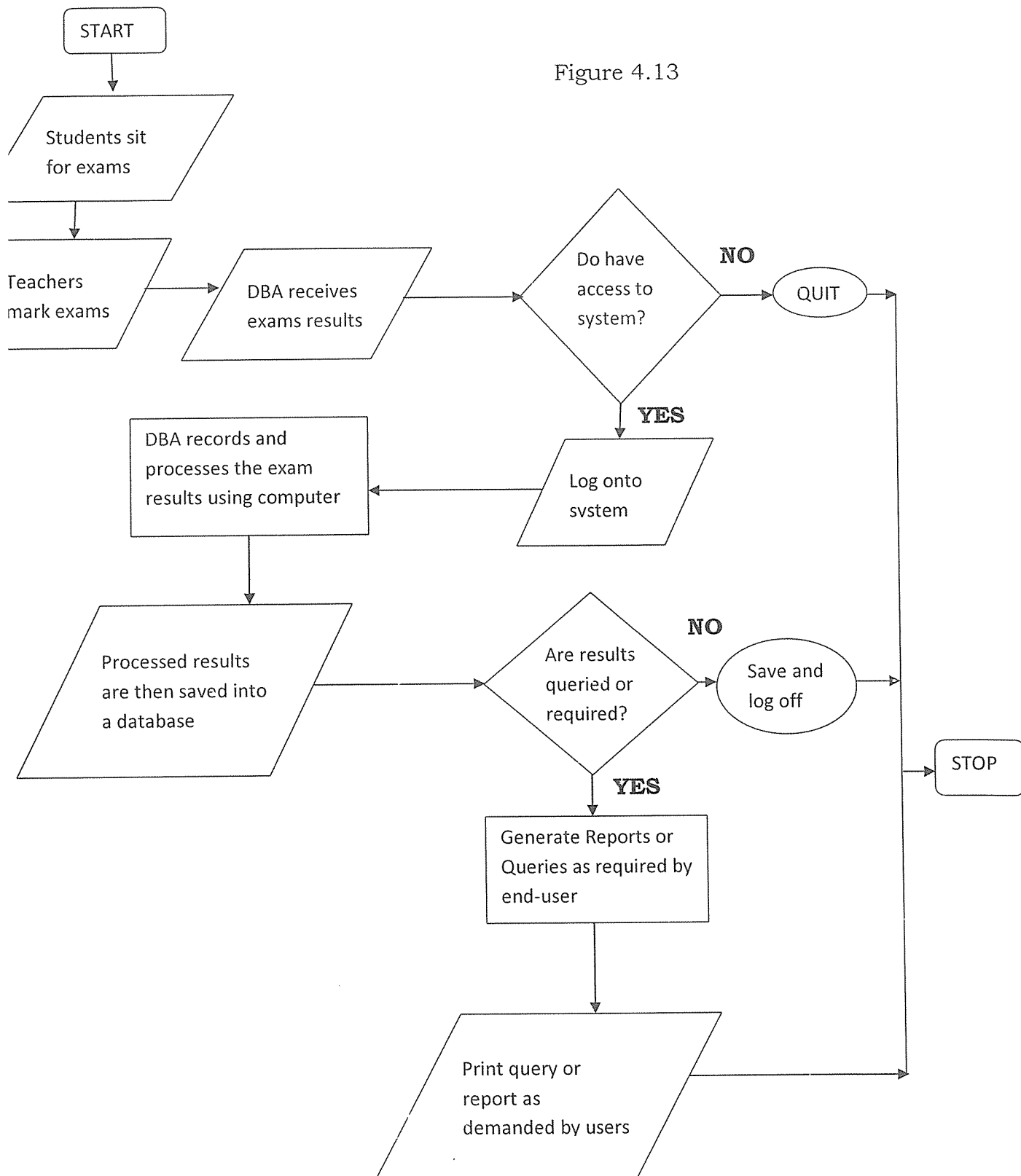
Decision: A diamond flow chart shape indication a branch in the process flow.

Connector: A small, labeled, circular flow chart shape used to indicate a jump in the process flow.

Data: A parallelogram that indicates data input or output (I/O) for a process.

Flow Chart for a student results management system

Figure 4.13



4.3 System Implementation

This phase involved the actual putting into use of the new system with such activities as installation, testing and delivery of the system. Here the researcher tested the user acceptability and security of system. To ensure that the new computerized system met the user specification, the researcher used the following tasks:

4.3.1 System Conversion

Once the testing was done, the researcher next needed to implement the new system without disrupting the daily operations of the school. There were four types of implementation strategies (conversion) in which to accomplish this, namely; parallel, direct cut over, pilot study and phased conversion.

The researcher recommended that the school use the parallel conversion strategy; this ensured that both systems (manual and computerized) were used concurrently until such time when all bugs are identified and eliminated and the users were more familiar and comfortable with it. This also ensured that early stage failures didn't affect the normal operations of the school.

4.3.2 System-user training

The researcher ensured that users (teachers) were selected and trained in a training-of- trainers (TOT) project. They would then be asked to test the interface of the new computerized system and familiarize with its usability. It was those teachers who would become administrators of the system.

- The users were taught how to:
- Log onto a computer and subsequently its usage.
- Log into the system using a user name pass word.
- To enter the data using the designed interface (the forms).

- To process the data (adding, saving, deleting, renaming and compiling).
- To print out the desired reports from the system.

4.3.3 System Documentation

The researcher ensured that the system flow was well documented right from system login, entering of data in user interfaces, saving the data into the data base, making the necessary processes like compiling and finally to printing of required reports.

That served as the future reference manual to the users in my absence.

CHAPTER FIVE

EVALUATION OF THE SYSTEM

5.0 Introduction

This chapter gives a detailed account of the researcher's analysis about the data gathered. The researcher validates this data to come up with their logical conclusions crucial to the entire research study conducted.

5.1 Analysis of data collection

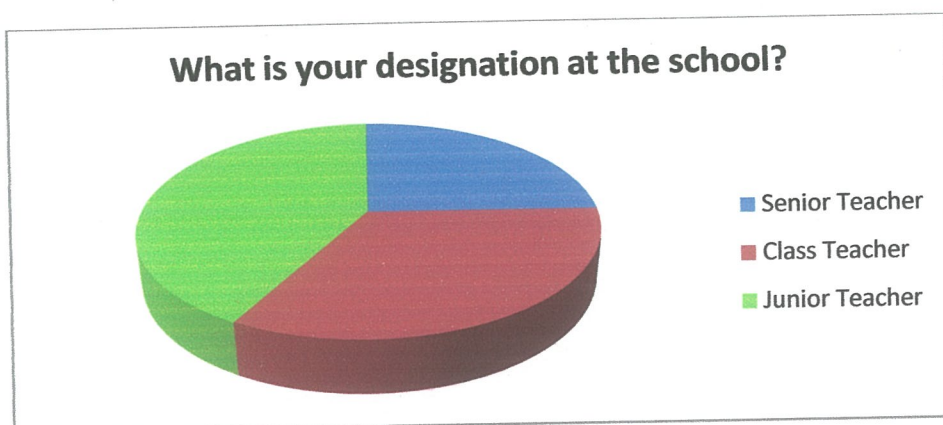
5.1.1 Teachers

The researcher, after studying and analyzing the data collected from the study, could clearly establish that of the respondents at Old Kampala S.S.S, 25% were senior teachers, 33.3% were class teachers and 41.7% were junior teachers.

Table1 *Designation of respondent*

Response	Frequency	Percent	Valid Percent
Senior teacher	3	25.0	25.0
Class teacher	4	33.3	33.3
Junior teacher	5	41.7	41.7

Figure 5.1



Using the figure above, the researcher made an analysis that there were more class teachers among the respondents during the research.

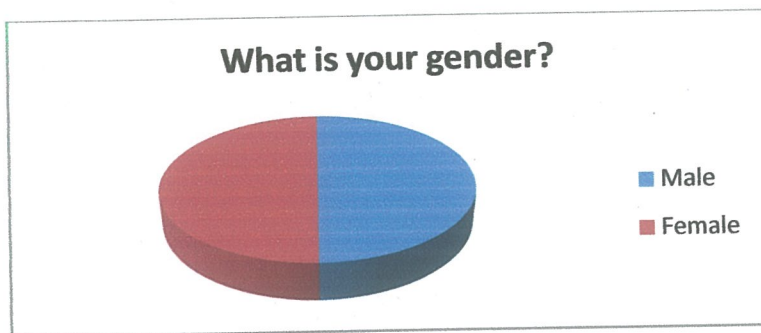
5.1.2 Gender

On analyzing data gathered from the respondents, it is evident that 50% that is half of the sample were male and the other half were female.

Table 2 ***Gender of respondent***

Response	Frequency	Percent	Valid Percent
Male	6	50.0	50.0
Female	6	50.0	50.0

Figure 5.2



After data analysis, it is evident that the gender of the respondents (teachers) was evenly divided between male and female.

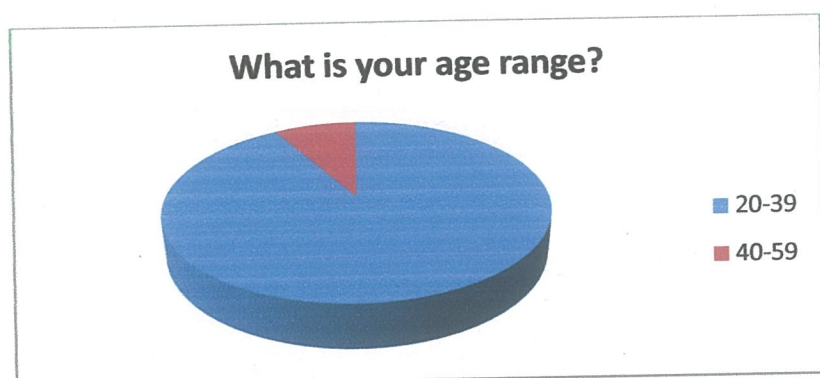
5.1.3 Age

The researcher, after studying and analyzing the data collected from the study, it was clearly established that of the respondents at Old Kampala S.S.S, 91.7% ad an age range of 20-39 and 8.3% were between 40 and 59.

Table 3 *Age range of the respondent*

Response	Frequency	Percent	Valid Percent
20-39	11	91.7	91.7
40-59	1	8.3	8.3

Figure 5.3



The researcher therefore concluded that there were more young respondents than their older counter parts.

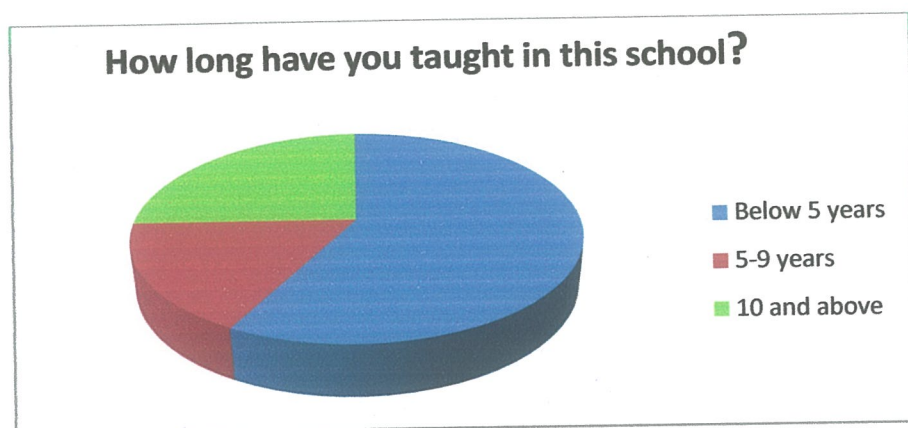
5.1.4 Duration

The researcher, after studying and analyzing the data collected from the study, found out that 58.3% of the respondents at Old Kampala S.S.S had taught for less than 5 years, 16.7% had taught in the school between 5 and 9 years and 25% had 10 years and above teaching experience.

Table 4 Respondents duration at the school

Response	Frequency	Percent	Valid Percent
Below 5 years	7	58.3	58.3
5-9 years	2	16.7	16.7
10 and above	3	25.0	25.0

Figure 5.4



There were less experienced teachers who answered the questionnaire

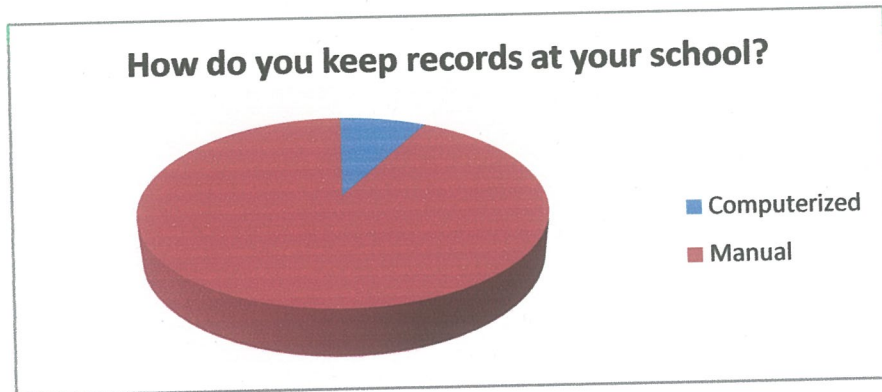
5.1.5 Records

The researcher, after studying and analyzing the data collected from the study, could clearly establish that of the respondents at Old Kampala S.S.S, 91.7% said their records were kept manually with 8.3% saying it was done using computers.

Table 5 how records are kept at the school

Response	Frequency	Percent	Valid Percent
Computerized	1	8.3	8.3
Manual	11	91.7	91.7

Figure 5.5



The researcher established that the student records at Old Kampala SSS were stored using the manual system

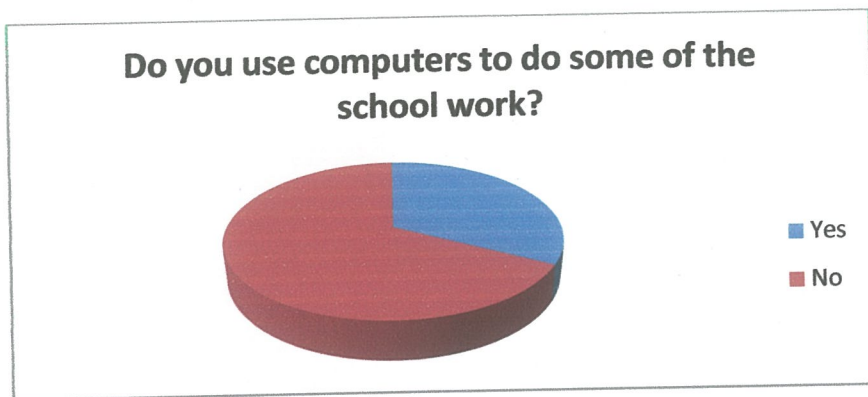
5.1.6 Work

On studying and analyzing the data collected from the study, the researcher established that 66.7% of the respondents at Old Kampala S.S.S believed that computers were not used at the school while 33.3% said that computers were being used.

Table 6 use of computers at school

Response	Frequency	Percent	Valid Percent
Yes	4	33.3	33.3
No	8	66.7	66.7

Figure 5.6



The researcher concluded that computers are not used to do some school work.

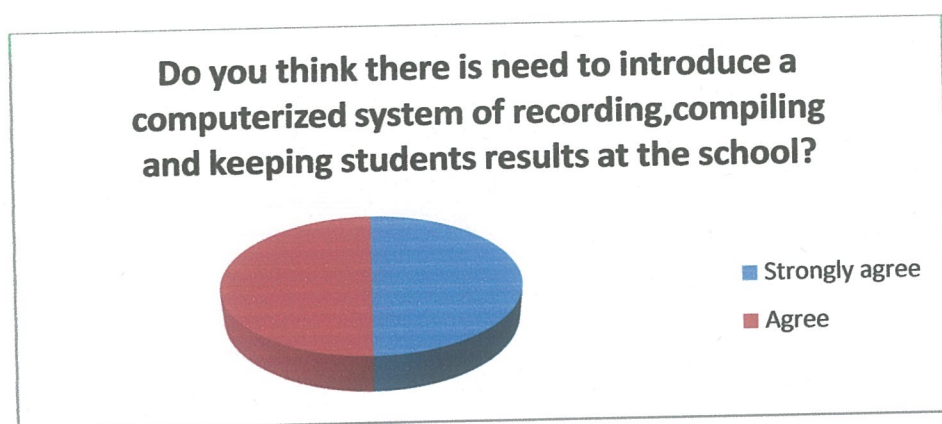
5.1.7 Introduction

The researcher, after studying and analyzing the data collected from the study, it was established that 50% (half) of the respondents at Old Kampala S.S.S either strongly agreed or agreed with the idea of introducing a computerized system at the school.

Table 7 introduction of a computerized system

Response	Frequency	Percent	Valid Percent
Strongly agree	6	50.0	50.0
Agree	6	50.0	50.0

Figure 5.7



Using the above analysis, it is clear that all the respondents in this study were all in agreement in introducing a new computerized system to the school.

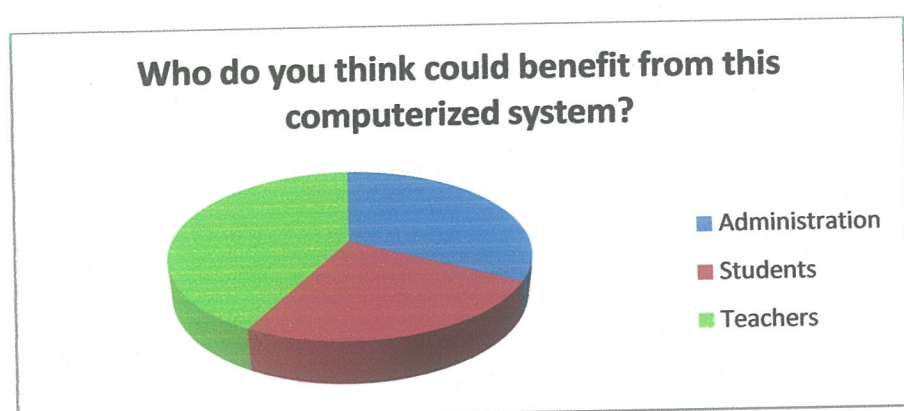
5.1.8 Beneficiary

On studying and analyzing the data collected from the study, the researcher found out that 41.7% of the respondents would benefit teachers, 33.3% thought it would benefit the administration while 25% thought the students were the beneficiaries.

Table 8 beneficiaries of the computerized system

Response	Frequency	Percent	Valid Percent
Administration	4	33.3	33.3
Students	3	25.0	25.0
Teachers	5	41.7	41.7

Figure 5.8



After data analysis as shown in the figure, the researcher concluded that the new computerized system was to benefit teachers, followed by the school administration and students were likely the least beneficiaries.

CHAPTER SIX

DISCUSSION, CONCLUSION AND RECOMMENDATION

6.0 Introduction

This chapter gives an overview of the research discussions, conclusions about the study and provides recommendations put forward by the researcher.

6.1 Discussion

Discussion can be subdivided into two; benefits and limitations of the system. In the following sub sections, the researcher gives a detailed account of the two mentioned above about the system.

6.1.1 Benefits of the system

The new system had several benefits like:

- a) The system tremendously improved data recording, compiling, processing, computation and data access of the student results.
- b) The system greatly reduced the cost of managing student results as they reduced on cost of stationary and staff
- c) The system enabled students to get their results early and on time since its fast.
- d) The new system increased security of the student results as its users could s only access it through authentication by use of user names and pass words.

6.1.2 Limitations of the research

The researcher encountered a number of hurdles during the study some of which include:

- a. Finances- the researcher would sometimes lack enough funds to acquire some of the things like software since the study was self sponsored.
- b. Accessing respondents- the stake holders the researcher intended to interview were always busy and this made the work of the researcher difficult especially during data collection.
- c. Time constraints- the time allocated to finish the research seemed appropriate, however given that the researcher had to attend lectures and finish course works during the same period; it was very tedious to meet the deadline.

6.2 Conclusion and Future Work

6.2.1 Conclusion

That study was undertaken to find ways of designing and implementing a modular student result management system for a secondary school. Basing on the research Findings and Analysis, implementation of a computerized student result management system was the way to go in this 21st century.

When the school administration embraced the new system, they stood a lot to benefit. Everybody would feel its effects for example; teachers' work would be eased, the administration would save resources, increased security and students' results would be released on time.

The researcher had a well thought-out background study of the problem statement and both main and specific objectives. The researcher further assessed both the advantages and disadvantages of manual and computerized

system of recording students' records; therefore the system came with a lot of integrity.

6.2.2 Future Work

The new computerized system could be further developed to enable the DBA to grade the students according to their performance; for both O and A Level one would be to generate a report showing in ascending order the best to the worst student (position in class) according to average mark and total points respectively.

There should be continuous maintenance through upgrading of system in order to do eliminate the security shortcomings by enabling the frequent changing of user names and passwords.

6.3 Recommendations

The researcher strongly recommended that the school administration should immediately embrace the new computerized system for managing student results due to its enormous benefits. Furthermore, the researcher encouraged the administration to enlarge the system so as to cover all other departments of the school for example student admission, staff enrolment, and the school fees payment.

Lastly the researcher recommended that the school management to provide enough funds towards the development of a more efficient database application like Oracle for it has high storage capacity which would enable automation of all the school departments leading to resource sharing hence operational success.

CHAPTER SEVEN

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APPENDICES

7.1 APPENDIX A:

Questionnaires

Preamble

I **MUGISHA SAMUEL** conducting a research study as a requirement for the award of a Diploma in Computer Science kindly request you to spare some of your valuable time and fill this questionnaire.

The questionnaire items are about a study on “Students Results Management System for a Secondary School”. The researcher has purposely selected you to participate in this study because you are an integral part of the organization chosen for the case study.

The information given will be used for academic purposes only and will be treated with utmost confidentiality. Your participation and cooperation is voluntary and will be highly appreciated.

Section A

Profile of respondents

1. What is your designation in this school setting?

Senior teacher ☐ Class teacher ☐ junior teacher ☐

2. What is your gender? Please tick box

Male ☐ Female ☐

3. What is your age range? Please tick box

Age 20-39 ☐ 40-59 ☐ 60 and above ☐

4. How long have you taught in this school?

Below 5 years ☐ 5-9 years ☐ 10 and above ☐

Section B

1. How do you keep your records at your school? Please tick box.

a) Manual ☐ b) Computerized ☐

2. Who is responsible for keeping students records in the school?

3. Do you use computers to do some of the school work?

Yes ☐ No ☐

If yes, please state for what purposes.

4. Do you think there is a need to introduce a computerized system of recording, compiling and keeping students results at this school?

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐

For your selected answer above, state the reasons why.

5. Who do you think could benefit from the computerized system?

Administration ☐ Students ☐ Teachers ☐

6. What difficulties do you find when recording, compiling and keeping students' results using the manual system? Please elaborate.

7.2 APPENDIX B

Budget of the graduation report (Uganda shillings)

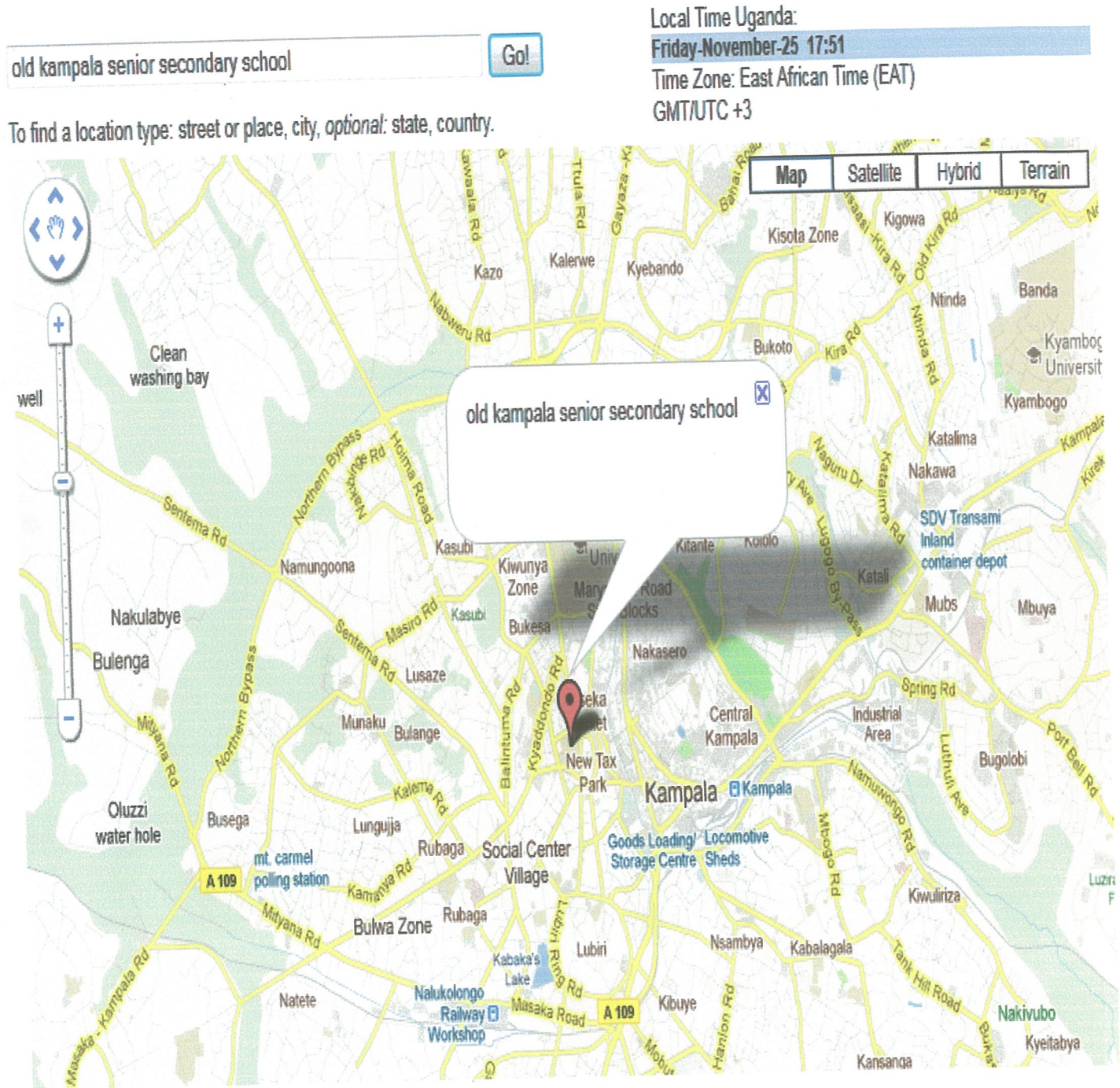
Table 9

ITEM	AMMOUNT
COMPUTER SET	1,700,000/=
SOFTWARE	120,000/=
PAPERS	15,000/=
PENS	2000/=
FLASHH DISK(2GB)	30,000/=
INTERNET CHARGES	45,000/=
AIR TIME	150,000/=
PRINTING (4 Copies)	40,000/=
BINDING (4 Copies)	60,000/=
TOTAL	2,162,000/=

7.3 APPENDIX C

Map of Kampala showing the location of old Kampala senior secondary school

Figure 7



7.4 APPENDIX D

Time schedule

Table 10

schedules	Weeks															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Data collection																
Analyzing the Data collected																
Hard/soft ware installation																
Project design begins																
Report writing commences																
Conclusion & Summarizing report writing																
Proof reading of report																