KYAMBOGO UNIVERSITY

SCHOOL OF COMPUTING AND INFORMATION SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

UNDERGRADUATE RESEARCH PROJECT/ REPORT GUIDELINES

VERSION 2022

Contents

1. GENERAL RESEARCH GUIDELINES AND REGULATIONS FOR UNDERGRADUATE RESEARCH

i. These guidelines shall be published to all undergraduate students during or immediately after an introductory course in "*Research Methodology*", normally in **Second year Second semester** (for **degree students**) or **second year first semester** (**diploma students**).

ii. An undergraduate diploma and degree student is required to carry out **a fieldwork research** as a partial fulfillment requirement for the award of the diploma or degree.

iii. The fieldwork research **is a compulsory course** for all (undergraduate) students pursuing either a diploma or a degree study programme at the University.

iv. Field-work research shall be undertaken **individually** at this level.

v. The deliverable of the research methodology course may be a **research proposa**l on which the fieldwork research will be based.

vi. All students shall **submit** their research proposals to their **supervisors** on a set deadline.

vii. The research proposal will have to be **approved by the research supervisor** before embarking on the fieldwork research. The proposal will have to be **signed** by the allocated **supervisor** and the **student** before submitting it to the department.

viii. The **graduation research project/report** will be one of the core courses done by the student is his/her final year of study and will be awarded credit units.

ix. It is the responsibility of the student to **identify a case** (where applicable, e.g., organization, company, industry, institution, school, etc.) in which **the problem will be investigated and/or studied**.

x. The **research process** and **write-up** will be **supervised by a staff member** who has been assigned to the student by **research committee** of the department.

xi. No student will be allowed to submit a graduation project/report that **has not been supervised by the assigned supervisor**. To avoid this, supervision will be done **page-by-page** and **chapter-by-chapter** by the supervisor. Where a student does not feel comfortable for some "**strong reasons**" to continue being supervised by the assigned supervisor, he/she should report these reasons (**in writing**) to the Head of Department.

xii. The **Research Supervision Record Sheet** shall keep track of the student's progress on the research process. Dates (submission dates, consultation dates) and return of the

individual chapters/draft shall be entered on this sheet. Both the **student** and the **supervisor(s)** will have to **counter-sign** (on a **weekly** or **fortnightly**) a form indicating when the student **consulted the supervisor**, when the chapter (or draft) **was submitted to the supervisor**, and when **it was returned to the student** for effecting the corrections, if any. This form has to be kept by the supervisor.

xiii. The **individual draft chapters** and the **final draft** should be submitted **to the supervisor** by the **dates stipulated in the schedule** by the department.

xiv. Normally, the **assessment** (marking of the project/report) will initially be done by the **allocated supervisor**, and then by another **internal examiner,** where time allows**.** Each will mark the research project/report **out of 100%**. Their **average** will be taken and this will constitute **80%** of the **final mark**.

xv. Where a **working system or its prototype** has been developed, this has to be defended, orally, before **a committee of examiners (not less than three)**. Each examiner on the committee will award a mark (**out of 20%**) and the **average will be taken as the final mark**.

xvi. A graduation project/report will be assessed, evaluated and marked using the assessment/evaluation mark sheet developed by the department. It shall be assessed out of 100%. The **write-up** will constitute **80%** and the **oral defense/presentation** of the system will constitute **20%**.

2 COMPONENTS OF A RESEARCH PROJECT AND REPORT

This section discusses the components of a research Project/Report, which include the following chapters and sub-sections/sub-headings.

Front Page: Title/Topic, author info, partial fulfillment statement (**Title page not numbered**)
Preliminary Pages: Include the following (each on its own page).

Declaration
Approval
Dedication (**Optional**)
Acknowledgement
List of Acronyms
Definition of Terms Used (**Optional**)
Table of Contents
List of Figures
List of Tables
Abstract (**Optional**) (All these pages should be numbered in **roman system**)

CHAPTER ONE: INTRODUCTION

1.0 Introduction/ description of the sector /industry of your study
1.2 Background to the Study
1.3 Problem Statement
1.4 Objectives
    1.4.1 General Objective/Purpose
    1.54.2 Specific Objectives of the Study
1.5 Research Questions
    1.5.1 General Research Question
    1.5.2 Specific Research Questions
1.6 Scope of Study
    1.6.1 Subject Scope
    1.6.2 Geographical Scope
    1.6.3 Time Scope
1.7 Significance of the Study
1.8 Chapter Summary

CHAPTER TWO: **LITERATURE REVIEW**

A student is expected to review the literature based on the variables in the Topic/title of the research, conceptual frame work variables and in relation to your objectives or based on theories, models and frameworks underlying your research.

For example, if the Title/Topic is:

An Inventory Control and Management System for Drugs in the Pharmacy Department of a Hospital

The following are sample/possible sub-sections/sub-headings

2.0 Introduction
2.1 Types of Information Systems
    2.1.1 Management Information Systems
    2.1.2 Enterprise Information Systems
    2.1.3 Decision Support Systems
2.2 Inventory Control Systems
    2.2.1 Types of Inventory Control Systems
    2.2.2 Inventory Control Systems for Hospitals
2.3 Database Systems
    2.3.1 Advantages of Database Systems
    2.3.2 Disadvantages of Database Systems
2.4 Database Management Systems
    2.4.1 Components of a DBMS
    2.4.2 Functions of a DBMS
2.5 Comparison of a Database System and an Inventory System
2.6 Chapter Summary (Each chapter should be **summarized/concluded**)

CHAPTER THREE: RESEARCH METHODOLOGY

Sample sub-sections/sub-headings for this chapter could be (this concerns the computing disciplines: Computer Science, Information Technology, Information Systems, Computer Engineering, Business Computing, Software Engineering and related disciplines, e.g., Information Sciences).

3.0 Introduction
3.1 Research Design (**Optional**)
3.2 Population and Sample Selection (**Optiona**l)
  3.2.1 Sampling Strategy
  3.2.2 Sample Size Determination
3.3 Research Instrument Design and Testing (**Optiona**l)
  3.3.1 Reliability Testing
  3.3.2 Validity Testing
3.4 Data Collection and Analysis Methods (**Describe only those to be/that were used**)
  3.4.1 Interview Method
  3.4.2 Questionnaire Method
  3.4.3 Document Review Method
  3.4.4 Focus Group Method
  3.4.5 Experimental Design
  3.4.6 Data Analysis Methods (**optional**)
    (Quantitative (statistical) methods: e.g., SPSS; Qualitative methods: Content Analysis, e.g., Atlas.ti, Nvivo,

(**The following sub-sections should be based on the Systems Development Life Cycle (SDLC**) **see SAD**)

3.5 Systems Study and Analysis Methods (**Describe methods to be /that were used**)
  3.5.1 Systems Study Methods
  3.5.2 Systems Analysis Methods
3.6 System Requirements and Specification (**Describe methods to be /that were used**)
  3.6.1 User Requirements
  3.6.2 Functional Requirements
  3.6.3 Non-Functional requirements
  3.6.4 System Requirements
3.7 Systems Design and Modeling Methods (**Describe only methods to be /that were used**)
  3.5.1 System Design and Modeling Using Entity –Relationship (E-R) Diagrams
  3.5.2 System Design and Modeling Using Unified Modeling Language (UML)
  3.5.2 System Design and Modeling Using Data Flow Diagrams (DFDs)
  3.5.3 System Design and Modeling Using the CISCO Packet Tracer, etc.

3.8 System Implementation, Testing and Validation Methods (**Describe only methods to be /that were used**)
  3.8.1 System Implementation Method(s)
  3.8.2 System Testing Method(s)
  3.8.3 System Validation Method(s)
3.9 Chapter Summary

CHAPTER FOUR: SYSTEMS ANALYSIS AND REQUIREMENTS COLLECTION

Sample sub-sections/sub-heading of this chapter are:

4.0 Introduction

4.1 Description of the Current System (**Describe the current system using SAD/SWOT Analysis**)

- 4.1.1 Strengths of the Current System
- 4.1.2 Weaknesses of the Current system
- 4.1.2 Comparative Analysis of the Strengths and Weaknesses

4.2 Requirements of the New System

- 4.2.1 User Requirements
- 4.2.2 Functional Requirements
- 4.2.3 Non-Functional Requirements
- 4.2.4 System Requirements

4.3 Chapter Summary

CHAPTER FIVE: SYSTEM DESIGN, IMPLEMENTATION, TESTING AND VALIDATION

5.0 Introduction

5.1 System Design Using Data Flow Diagrams (**Describe this if it is what was used)**

- 5.1.1 Context Diagram
- 5.1.2 Level 0 Diagram
- 5.1.3 Level 1 Diagram etc.

5.2 System Design Using Entity-Relationship Diagrams (**Describe this if it is what was used)**

- 5.2.1 Identified Entities and their Attributes
- 5.2.2 Entity Diagram

5.3 Database Design (**or whatever is appropriate here**)

- 5.3.1 Database Tables
- 5.3.2 Data Descriptions

5.4 System Implementation

(**Describe how the system was implemented, the platform on which it was implemented and the tools used in the design and implementation, and give about 5 Screenshots/snapshots of your system**)

- 5.4.1 System Graphical User Interfaces (**or whatever is appropriate**)
  - Home Page
  - Login Screen/Form, etc.
- 5.4.2 Sample Code (**Give sample code from your system, not exceeding 2 pages, put the rest in the appendices**)

5.5 System Testing and Validation (**Describe the methods used to test and validate your System, i.e., how the system was tested and validated**)

- 5.5.1 System Testing
- 5.5.2 System Validation

5.6 Chapter Summary

CHAPTER 6: DISCUSSION, RECOMMENDATIONS, AND CONCLUSION

6.0 Introduction
6.1 Discussion
6.3 Recommendations
6.4 Limitations of the Study
6.5 Area for Further Research
6.6 Conclusion

REFERENCES/BIBLIOGRAPHY

(Should be written down in alphabetical/ascending order, without numbers/being numbered)

APPENDICES

Sample Appendices may include:

Appendix I: Permission Letter
Appendix II: Questionnaire
Appendix III: Interview Schedule
Appendix IV: Budget
Appendix V: Time Line/Schedule
Appendix VI: Sample Code

Note:

THE RESEARCH PROPOSAL

The research proposal consists of:

Front Page: Title/Topic Page
Preliminary Pages: Include the following (each on its own page).
Declaration Page: where both the student/researcher and supervisor sign
List of Acronyms
Definition of Terms Used (**Optional**)
Table of Contents
List of Figures (**Optional**)
List of Tables (**Optional**)

Chapters One: Introduction
Chapter Two: Literature Review
Chapter Three: Methodology

References/Bibliography
Appendices (including Research Instruments (Questionnaire, Interview Schedule, etc, if these are to be used), Budget, and Time Line/Schedule

It uses future tense for chapters 1 and 3

3. FRONT (TITLE) PAGE AND PRELIMINARY PAGES

The ***title/topic*** normally appears on what is referred to as the **"*front page or title page*"** of the project/report, which, in addition to the title/topic, includes the following:

- *Title/Topic:* which should contain and provide sufficient information to the reader to enable him/her make well-informed judgment about the topic, level of study and what will be/was researched on.
- *Author's (researcher's) name*
- *Author's (researcher's) registration number*
- *Author's (researcher's) previous qualification(s) (optional)*
- *Author's contact E-mail and/or Telephone number (optional)*
- *A partial fulfillment requirement* statement.

Sample Front Page/Title Page

AN INVENTORY CONTROL AND MANAGEMENT SYSTEM FOR DRUGS IN THE PHARMACY DEPARTMENT OF A HOSPITAL

CASE STUDY: ABC INTERNATIONL HOSPITAL

BY

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19/U/ITD/500/GV

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A RESEARCH REPORT SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, SCHOOL OF COMPUTING AND INFORMATION SCIENCE IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE BACHELORS DEGREE IN INFORMATION TECHNOLOGY AND COMPUTING OF KYAMBOGO UNIVERSITY

JANUARY 2022

The ***preliminary pages*** include the following as **headings**, each ***on its own page***, ***on top of the page***, and ***centered*** on that page.

DECLARATION

The following text should be on this page:

I, **Okello Peterkin Darlington**, declare that the work presented in this research project/ report is my original work and has not been submitted to any University or Institution of Higher Learning for any academic award. All work from other authors has been fully and properly acknowledged and cited.

Signature :……. Date:……

Okello Peterkin Darlington
(Researcher)

APPROVAL

The following text should be on this page:

This is to certify that this research project/report titled: "***An Inventory Control and Management System for Drugs in the Pharmacy Department of a Hospital"*** has been carried out under my/our supervision and is now ready for submission to the Examinations Board and Senate of Kyambogo University.

Signature :……. Date:……

Assoc. Prof. Kaly'amaggwa Isaac
(Supervisor)

Signature :……. Date:……

Ms. Akech Sauya Turyagenda
(Supervisor)

DEDICATION (Optional)

You may (optionally) dedicate this to those persons dear and close to you, who have made some sacrifice/contribution towards your academic and/or life success.

ACKNOWLEDGEMENT

You may acknowledge/thank/appreciate all those persons that have helped you with your research or with your studies generally. People who were interviewed, filled the questionnaire (not to be acknowledged individually, but collectively), those who helped you with reading resources, equipment, advice and guidance about the research/studies, the sponsors of your studies, etc., may be acknowledged here.

LIST OF ACRONYMS

Any acronym/abbreviation used should be explained here, e.g.,

CAD	Computer Aided Design
SWOT	Strengths, Weaknesses, Opportunities and Threats
EPC	Event-driven Process Chains
ICT	Information Communication Technology
UCC	Uganda Communication Commission

etc.

DEFINITION OF TERMS USED (Optional)

Terms that have been operationalized in your research should be defined here.

Mobile Application Use Mobile application or information systems use refers to the utilization of mobile technologies to send services to the customers, and receive services from the organization through mobile applications (mainly mobile phones) (Davies, 1986; Davies et al., 1989). In this research, we define mobile application use as the utilization of mobile applications, technologies, etc., by financial institutions or their customers to send or receive services via these mobile applications/technologies, e.g., phones.

E-Learning E Learning refers to the use of information and communication technologies (ICT) in different processes of education to support and enhance learning (Fredericksen et al., 2000; Maeroff, 2004; Leasure et al., 2000). In this research, E-Learning refers to the learning process delivered via online methods and ICT resources rather than the "Chalk-and Talk method".

LIST OF TABLES

List all the tables that appear in your different chapters on this page. They should be in the format of table of contents. For example:

LIST OF FIGURES

List all the figures that appear in your different chapters on this page. They should be in the format of table of contents. For example:

TABLE OF CONTENTS

Generate a **Table of Contents** (TOC) from your marked headings and sub-headings, including the **preliminary pages**, **chapters headings and sub-headings;** and **appendices**.

Note: Table of Contents, List of Tables and List of Figures are all automatically generated (in MS-Word) if your have marked your **headings**, **sub-headings** (in the preliminary pages, chapters and appendices), **figure captions** and **table captions**.

ABSTRACT (Optional)

You may (optionally) summarize your research in an abstract which is sort of an **executive summary** of your research. In the **1st paragraph** briefly talk about the **problem** that your research attempted to address and the **purpose** or **main objective**. In the **2nd paragraph** briefly talk about the **methodology and methods** used to address the problem. In the **3rd paragraph** talk about the **major findings or results** (this could be a system developed or any other important findings). In the **4th paragraph** talk about your main **recommendations**.

Note: The Language used is **past tense**, except **recommendations**.

Sample Abstract

This research (or study) investigated the problem of drug purchasing, storing/keeping and dispensing in hospital pharmacies using ABC Hospital pharmacy as a case study. One of the major problems cited in hospitals pharmacies is that they lack an efficient and effective method of ordering, storing and distributing drugs to the different wards. The main purpose of the study was to develop a drugs inventory system to overcome these problems.

A System Engineering methodology using the System Development Life Cycle (SDLC) approach was used to analyze, design and implement the developed system. Methods of Systems Analysis and Design (SAD) were used to collect and elicit the different requirements and to specify them; as well as collecting other relevant data through interviews, questionnaires, observations and document reading.

One of the major findings of this study was that the developed inventory system can effectively and efficiently track all the drugs in a hospital pharmacy from the point of entry up to the when these drugs are distributed to the different hospital wards. The inventory system can as well help pharmacies know when stocks have gone below the threshold value so that they initiate the ordering process of new consignments of drugs from the medical stores.

This study recommends that pharmacies should use the developed system for proper management of the drugs in their stores.

4. THE CHAPTERS

CHAPTER ONE: INTRODUCTION

Introduction

The introduction section briefly overviews what the chapter contains and creates interest for reading further. It further discusses the sector/industry the study/research is focusing on. The sector could be banking, school, industry or may focus on the social services in the country, etc. The introduction section should provide evidence and conditions of the existing situations to make the reader feel the urgency of the problem and the need to study it, in order solve it.

The introduction section may have any number of paragraphs but should not exceed 1 page. The first paragraph shall normally give an overview of what the chapter contains and the second paragraph should discuss the sector/industry the research is focusing on.

Background to the Study

This section provides evidence and conditions of the existing situations highlighting the gap(s) to make the reader feel the urgency of the problem, the need to study it in order to solve the problem or contribute to its solution. The background gives rationale of the study and briefly interweaves this with some reviews of previous work that has been done on the topic and its current status as research and conceptual problems. If a case has been selected (e.g., company or organization, etc.), the background should be situated within this case in view of the problem being investigated. The background should also focus on the *constructs/variables* of your study which are in the title of your study, where, and if, this is applicable.

Research Problem/Problem Statement/Statement of the Problem

The problem statement is the focal point of the research and is usually stated in one sentence with a number of paragraphs that give more details or elaboration. In the problem statement you state: something missing in the knowledge-base, something that is wrong, something that needs to be investigated, or existing methods that no longer seem to be working and need to be re-defined, etc..

The problem statement:

i. Presents the reason behind the study/research, i.e. what will change when this research is done or what would happen if the research is not done.
ii. Is an existing negative state not absence of a solution.
iii. Refers to what has been detected and needs a solution in the practical or theoretical world.

iv. Should clearly state the nature of the problem and its known or estimated magnitude / extent.
v. Should be concise and brief (not more than 1 page).

General Objective/Aim/Purpose

The objective refers to the general intention/goal of carrying out the study. The research objectives may be split into:

- *General Objective,* and
- *Specific Objectives*.

The general objective may be a general statement which explains what the research intends to accomplish. That is, it refers to the general intention or goal of the research and should spell out what the research is supposed to accomplish. Normally, the general objective has a relationship with the title of the research.
Where the general objectives is too broad, it may be split into sub-objectives (or specific objectives) arising directly from the general objective/purpose/aim of the study.
The general format of an objective (general or specific) is as follows:

The goal of this research is:
To analyze……...
To evaluate …….
To establish……..
To determine……
To design…….

Example of general objective/purpose/goal/aim:

The main objective (purpose, goal) of this research was to design a computerized inventory system for the pharmacy department of Gwattiro Hospital so as to track and trace the distributions of drugs to the different wards in the hospital.

Example of specific objectives:

(i) To study and analyze the strengths and weaknesses of the current inventory system.
(ii) To determine and specify the requirements of the new inventory system.
(iii) To design a new inventory system for Gwattiro Hospital pharmacy.
(iv) To implement, test and validate the new system.

Note:
Give **four (4)** specific research objectives only. **Not more not less.**
Objectives should be:

S.M.A.R.T (Specific, Measurable, Attainable, Realistic, Time-bound)

Specific – short, precise and concise. Communicates very clearly and explicitly the research outcome. Avoids words that can lend it to several interpretations.

Measurable – It is stated in terms of an outcome that can be **observed** and/or **measured**.

It uses active verbs, that **imply action** and which can be **measured** or **observed**, such as:

Attainable – It is **feasible** (can be answered through collection of data) and **manageable** (can be accomplished within the constraints of the available resources, e.g. finances, equipment, manpower, and even time).

Realistic – It has **reasonable level of difficulty.** It should neither be too hard nor simple.

Time-bound – It can be accomplished **within the available time**.

Research Questions

These are investigative questions or assumptions which guide the study. Research questions are stated to **realize the general objective** and **specific objectives**. For each stated objective there should be a corresponding research question. This means that a research question can be split into:

- *General Research Question, and*
- *Specific Research Questions*

Example of general research question:

How can a computerized inventory system for the pharmacy department of Hospital that can track and trace the distributions of drugs to the different wards in the hospital be designed?

Example of specific objectives:

(i) What are the strengths and weaknesses of the current inventory system?
(ii) What are the requirements of the new inventory system?
(iii) How can a new inventory system for Gwattiro Hospital pharmacy be designed?
(iv) How can the new system be implement, test and validate?

Significance/Importance/Relevance/Justification/Contribution

This refers to the relevance of study in terms of academic contributions and practical use that might be made of the findings. It should reflect on knowledge creation, technological or socio-economic value to the community.
The significance of the study answers the questions:

Why is your study important?
To whom is it important?
What benefit(s) will occur if your study is done?

Scope

The scope provides for the boundary of the research in terms of depth of investigation, content, and sample size, geographical, time frame and theoretical coverage.
The scope may be split into:

- **Content/Subject/Academic Area Scope**
  Example
  This study only looked at the design of a computerized inventory system of the pharmacy department of a hospital. The design was done using dataflow diagrams (DFDs) and it was implemented on a windows platform using tools such as MYSQL, Apache server and php.
- **Geographical Scope**
  Example:
  This study was carried out at Gwattiro Government Hospital, Bweyogerere Town Council, Kira Municipality, Wakiso District.
- **Time Scope**
- **Example:**
  This study looked at documents spanning a period of five years (2009 – 2013) and lasted for six (6) months (February – July 2014).

CHAPTER TWO: LITERATURE REVIEW

The chapter of literature review or related work describes what has already been done in the area and demonstrates one's understanding of the problem and related issues. It deals with the analysis of existing literature on the subject with the objective of revealing contributions, weaknesses and gaps. In literature review, one attempts to synthesize previous work rather than merely recount what has been done.

Citation (quoting and acknowledging works of other authors) in the literature review should be according to the approved format, i.e., **Harvard, APA, MLA, IEEE/ACM, Chicago** citation system etc.

Note: The recommended citation system for undergraduate research is **Harvard Citation System**.

The following examples illustrate the different citation styles of Harvard Citation System

Service quality refers to ……...(Beckham et al., 2008).

Smith, Johnson and Kelly (2005) define service quality as…….

According to M'Cain (2011), service quality is ……..

The Thesaurus Online Dictionary (2014) defines service quality as……

Note: All cited authors/works in the main text of the chapters **MUST** appear in the **REFRENCES/BIBLIOGRAPHY** Section normally after the very last chapter in your project/report.

CHAPTER THREE: RESEARCH METHODOLOGY

This is a detailed description of selected methodology and should be presented in unambiguous terms.

The chapter comprises:
The methodology chapter explains how you carried out the research.
In general the methodology is concerned with some of the following:

i). ***Research Design****:* which describes the nature and pattern the research followed e.g. whether it was qualitative or quantitative, historical, descriptive survey, experimental or quasi experimental and location (optional), case study, cross-sectional, etc.

ii). ***Description of the Geographical Area*** : where population of the study was based (optional).

iii). ***Population and Sample Selection****:* Description of the population from which samples were selected (*simple random sampling, cluster sampling, stratified sampling, systematic sampling, quota sampling, purposive sampling,* etc.).

iv). ***Sampling Strategies****:* by which the researcher selected representative elements/subjects from the population.

v). ***Research Instrument Design****:* explaining which research instruments were used in data collection and how they were designed.

vi). ***Data Collection Methods****:* explaining the methods that were used to collect data including instruments and procedures used in the research described. Data is collected using instruments.

Primary Sources

Data for the research may come from either primary sources or secondary sources. You may be required to use primary sources of data for your research. Primary sources are works created at the time of an event, or by a person who directly experienced an event. Primary data is data collected by (you) the researcher.

Methods for collecting, and sources of, primary data include:

- *Focus Group*
  These are individuals with specialised knowledge on a particular topic. They may include academic specialists, community leaders, etc. These are small (5-15 individuals) and composed of representative members of a group whose beliefs, practices or opinions are sought.
- *Telephone Interview/ Personal Interview*
  In interviews, information is obtained through inquiry and recorded by enumerators. ***Structured interviews*** are performed by using ***survey forms***, whereas ***open interviews*** are ***notes*** taken while talking with respondents. The notes are subsequently structured (interpreted) for further analysis.
  As in preparing a questionnaire, it is important to pilot test forms designed for the interviews.

- *Mail/Post Questionnaires (may be closed or open-ended)*
  In contrast with interviews, where an enumerator poses questions directly, questionnaires refer to forms filled in by respondents alone. This can be handed out or sent by mail and later collected or returned by stamped addressed envelope. This method can be adopted for the entire population or sampled sectors. Questionnaires may be used to collect regular or infrequent routine data, and data for specialized studies.
  it is important to pilot test forms designed for the questionnaires.

  A questionnaire requires respondents to fill out the form themselves, and so requires a high level of literacy.

- *Door-to-Door Survey*
- *Mall Intercept*
- *Observation*
  In practice, observers do not only make direct measurements (observations), but also conduct interviews and surveys using questionnaires.
- *Experimental designs*

Secondary Sources
Secondary data is data obtained from already existing sources.

Sources of secondary data include:

- Textbooks
- Journal articles, conference papers
- Review articles and critical analysis essays
- Biographies
- Art, photographs, films, maps, fiction, and music
- Articles about people and events from the past
- Government documents and public records
- Newspaper and magazine clippings
- Diaries, letters, speeches, autobiographies, and witness statements
- Original hand-written manuscripts

vii). ***Data Analysis Methods*:** methods that are used to analyze the collected data, e.g. *statistical methods (SPSS) for quantitative data*, or *content analysis methods* for *qualitative data*.

viii) ***Reliability and Validity Research Instruments**:* describes how data quality control was attained, that is, how reliability and validity of data and instruments were measured.

ix). ***Measurements***, describes the formulae or scales that were used in the study.

x). ***Data analysis Methods:*** describes data organization methods used and interpretation of the data generated.

xi) ***Ethical Considerations*:** explains how ethical issues related to respondents, their disclosure of information and their acceptance of, or willingness to be used as subjects, etc., were addressed. Ethics of the research here refers to the morals of the investigation or intervention as regards the minimal abuse, disregard, safety, social and psychological well being of the person, community and /or animals i.e. how the principles of consent, beneficence and justice are handled in the study. Include a statement of where ethical clearance has been or will be obtained.

Note:
Since in computing (including computer science, information technology, information systems, computer engineering, software engineering, business computing, information science, etc) we use the **SDLC Approach** this chapter should structured as shown on **page 5.**

CHAPTER FOUR: SYSTEM STUDY, ANALYSIS AND REQUIREMENTS ELICITATION

Content in this chapter include the following:

Description of the Current System (**Describe the current system using SAD/SWOT Analysis**)
The description should include how data flows in the organization, the users of the system, how data/information is kept, processed and disseminated, etc. Describe how people do whatever they do.
Note:
The tense should be **continuous/present tense or passive language** is used for this description.
Example:
When drugs are below the threshold level in the inventory, the in-charge fills-in an order and requisition form. This form is signed and approved by the pharmacist before it is sent to the procurement officer. The procurement officer contacts potential suppliers for possible quotations and invoice. When drugs are received by the pharmacy department, the details are recorded on a form, before they are entered into a computerized inventory system. ……

Strengths of the Current System
Here you should give the advantages/strengths of the current system being used. Describe what it is able to do.

Weaknesses of the Current system
Her you should describe the disadvantages/limitations/weaknesses of the system current system being used.
Use the **SWOT** (**Strengths, Weaknesses, Opportunities and Threats (SWOT))** method to analyze the current system

Comparative Analysis of the Strengths and Weaknesses
Compare the gravity of the weaknesses with respect to the strengths so as to just coming up with a new system. Do the weaknesses outweigh the strengths.

Requirements of the New System

Having determined that there is need to design a new system give the requirements of this new system. These should include:

i. *User Requirements*
ii. *Functional Requirements*
iii. *Non-Functional Requirements*
iv. *System Requirements*

CHAPTER FIVE: SYSTEM DESIGN AND IMPLEMENTATION

In this chapter you should describe how the new system was designed, modeled, implemented, tested and validated.
Issues discussed in this chapter may include:

System Design/Modeling

If you used:

a. *Data-flow diagrams (DFDs)*
b. *Entity-Relationship diagrams (ERDs)*
c. *Unified Modeling Language (UML) diagrams*, etc., then these should be described.

Data Definitions: give and describe the different data definitions for the new system

System Implementation

Here you describe how the new system was implemented, the platform on which it was implemented: (Windows, UNIX, Linux, etc), the tools used in the implementation (MySQL, php, Apache Server), Programming Language used (C, C++, Java, C#, etc), Visual Basic, Scripting Language/web-page language used (php, HTML, CSS, XML,
e-XML, JavaScript, Macromedia tools (Dreamweaver, cold-fusion, flash, etc).

System Testing and Validation

Describe how the new system was tested and validated (refer to your SAD of software engineering knowledge)

Note:
The tense should be **past tense**.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Issues to be discussed in chapter include the following:

Discussion

You should discuss your results/findings/new developed system with respect to what was known before and what your research has found out/developed. If a new system has been developed, discuss its **strengths over the old system** as well as its **limitations**. What is it that it can do better than the old system? What can't it do?

Recommendations

In this section you should recommend your new system to be used by a number of people or organizations. While giving your recommendations, you have in mind the significance/contribution of your research.

Limitations of the Study

Here you mention what your research or you yourself failed to accomplish. Mention, e.g. the problems you encountered in data collection, during the collection of questionnaires, interviews. People in the organization you used as your case may have been reluctant to give information; you might have lacked transport, money to buy the required equipment/software, etc.

Areas for Further Research

This comes from those objectives which you had initially and thought you could realize them. But due to some constraints (time, monetary, etc) you could not. Give these are areas that could be studied in future.

Conclusion

Give an overall summary of your research in this section. The problem you set out to investigate, the objectives/achievements that have been realized, etc, should be briefly mentioned here.

5. REFERENCES/BIBLIOGRAPHY

References (Bibliographies) appear at the end of your text. Each reference has a number of parts which must be written in the correct order using the correct layout. The order of reference elements in the **Harvard system** are given below:

- *Author(s) name*
- *Year of Publication*
- *Titles of the publication*
- *Place of publication and publisher*
- *Numeration of the item (e.g., volume and Edition and page number)*
- *Location or type of the item. If rare or non print format (website, archive film, TV programme)*

Examples:

Baumann, C., Burton, S., Elliott, G. & Kehr, H.M. (2007). Prediction of Attitude and Behavioural Intentions in Retail Banking. *The International Journal of Bank Marketing*, 25(2):102-116.

Davis, F. (1989). Perceiced Usefulness, Perceived Ease of Use and Acceptance of Information Technology. *Management Information System Quarterly , 13* (3), 319 - 340.

Field, A. (2009). Discovering Statistics with SPSS. Third Edition. Sage Publications.

Ajzen, I. (1980). Understanding the Attitudes and Predicting Social Behavior. Englewood Cliffs, New Jersey: Prentice-Hall Inc.

Pedersen, P.E. (2003). Adoption of Mobile Internet Services: An Exploratory study of mobile commerce early adopters. Retrieved June, 2, 2013 from http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.20.2805

6. APPENDICES

The appendix section includes all the material that can not be put in the main text of the proposal. For the research project, report, the appendix comprises of the explanatory notes and instruments used in/during the research.

Explanatory Notes

Maps, and lists of areas visited.

Instruments/Tools

These are details of tools used in the research e.g., equipment, questionnaire, interview schedule, scales and tests, etc.

Budget

Include a budget if this is available

Time Line/Schedule
Include a time schedule that shows the activities that you looked, the period and the duration. You may use MS-Project Management for this.

Sample Code
You may put some sample code in the appendices. Not covering more than 3 pages.

7. GUIDELINES FOR MANUSCRIPT (PROJECT, REPORT, DISSERTATION, THESIS) PREPARATION

Adopted from the 6th Edition of the Publication Manual of the American Psychological Association (APA), 2010

Abbreviations

Abbreviations can be avoided, but necessary abbreviations must be written out completely on first appearance and followed immediately by the abbreviation in parentheses. Thereafter, the abbreviation is used in text without further explanation or alternation between the abbreviated and full forms of the term. *'The National Development Plan (NDP) is the government framework for socio-economic transformation to prosperity in Uganda'* (UNDP, 2010). Abbreviations that appear in the dictionary as words (and are not labelled abbreviation) may be used without being written in full such as *AIDS, ESP, HIV, IQ, REM.* Standard Latin abbreviations may appear in parenthetical material but English translations should be used in non-parenthetical material. Examples are: *compare for cf., example for e.g., and so forth for etc., and that is for i.e.*

Bias

Avoid bias of language regarding **gender**, **racial** or **ethnic identity**, **disabilities** or **age**.

Citations

Harvard referencing uses the author - date method of citation. For example:
The last name of the author and the date of publication are inserted in the text in the appropriate place.
When referencing or summarizing a source, provide the author and year. When quoting or summarizing a particular passage, include the specific page or paragraph number, as well. When quoting in your paper, if a direct quote is **less** than 40 words, incorporate it into your text and use quotation marks. If a direct quote is **more** than 40 words, make the quotation a free-standing indented block of text and DO NOT use quotation marks.

- **Citation of works by one author**
  In one developmental study (Smith, 1990), children learned... OR In the study by Smith (1990), primary school children... OR In 1990, Smith"s study of primary school children…

- **Citation of works by multiple authors**
  When a piece of work has 2 authors cite both names every time you reference the work in the text. (Owens & Munene, 2007). The **ampersand** (**&**) is used in place of "**and**" when the full citation is within parenthesis When a work has **three to five authors** cite all the

author names the **first time the reference occurs** and then subsequently include o**nly the first autho**r followed by **et al.**

Example:

First citation: Olwari, Kaaya, Busikwa and Okello (2010) state that..... ……

Subsequent citations: Olwari et al. (2010) state that... ……

For **6 or more authors**, **cite only** the name of the **first author** followed by **et al.** and the year.

Example:

A recent study by Nsobya et al. (2010) showed that cultured malaria parasites exhibited a wide range of sensitivities to chloroquine (CQ).

- **Citation of works by no identified author**

When a resource has no named author, cite the first few words of the reference entry (usually the title). Use **double quotation mark**s around the title of an article, chapter, or Web page. **Italicize the title** of a periodical, book, brochure, or report.

Example:

The site seemed to indicate support for homeopathic drugs ("Medical Miracles", 2009). The brochure argues for homeschooling (*Education Reform,* 2007).

NB: Treat reference to legal materials such as court cases, statutes, and legislation like works with no author.

- **Citation of two or more works in the same parenthetical citation**

Citations of two or more works in the same parentheses should be listed in the order they appear in the reference list (i.e., alphabetically, then chronologically)

Example:

Several studies (Jones & Powell, 1993; Peterson, 1995, 1998; Smith, 1990) suggest that...

- **Citation of specific parts of a source**

Always give the page number for quotations or to indicate information from a specific table, chart, chapter, graph, or page. The word **page** is **abbreviated** but **not chapter**.

Example:

The painting was assumed to be by Matisse (Powell, 1989, Chapter 6), but later analysis showed it to be a forgery (Murphy, 1999, p. 85).

If, as in the instance of **online material**, the source has **neither visible paragraph nor page numbers**, cite the heading and the number of the paragraph following it. This allows the reader to locate the text in the source.

Example:

The patient wrote that she was unimpressed by the doctor's bedside manner (Smith, 2006, Hospital Experiences section, Para. 2).

Copyright

Written permission to use previously published text, tables, figures, or tests should be available on request and acknowledged in reference to the text, table, figure, plate or tests using asterisk.

Footnotes

Because they are distracting to readers, footnotes should be included only when necessary. In most cases, important information is best presented in the text, not in a footnote.

8. ORGANISING AND STRUCTURING DOCUMENTS WITH HEADINGS

Documents are organized and structured by dividing them into different levels. Levels are divided into sections. The sections are given headings. Divisions or sections of the same importance are given same headings. For example, research proposals are usually divided into Background to the study, Literature Review, and Methodology. These three sections belong to the same level and are equally important. All documents should have a hierarchical (top-down) arrangement. Each section or divisions of the document should begin with the highest level possible, then lower and the lowest levels should be given. The headings (titles) given should also begin with the highest level possible, then lower and the lowest headings should be given. Harvard (2010, p.91) proposed five levels into which documents can be divided or sectioned.

Spacing

Line **spacing** for should be **1.5** throughout, which includes all quotations and references.

Font Type and Size

For uniformity, use **Times New Roman font size 12** throughout the text.

Tables and Figures

Tables and figures are effective when a large amount of data is to be presented in a small space. Tables also have limitations and should be reserved for crucial data that is directly relevant and for text that would be dense with numbers. The APA Publication Manual has useful information on preparing tables. They should not repeat what is clearly shown on figures or already described in the text.

The **Table caption** should be placed **at the top** of the table while the **figure caption** is placed **at the bottom** of the respective figure. The captions should be in **bold and indented** (**5 spaces**). Explanatory notes (footnotes or legends) of the table or figure should be in **Times New Romans size 11**.

Examples:

Table 4.8 Relationship between Variables using Pearson Correlation

	E_Learning_ Adoption	Learning_ Culture	ICT_Infrastructure	Competitiveness
E_Learning Adoption	1			
Learning_Culture	.556**	1		
ICT_Infrastructure	.213*	.265**	1	
Competitiveness	.321**	.212*	.447**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

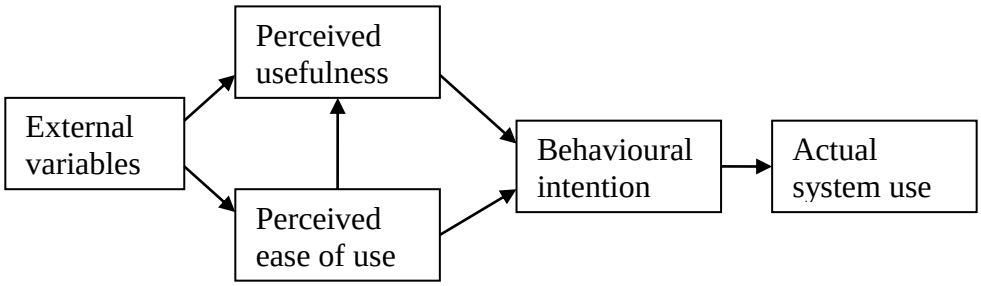

Figure 2.1: Refined Technology Acceptance Model (Venkatesh & Davis, 1996)

Titles

Titles should be a concise statement of the main topic and should identify the actual variables or issues under investigation, and the relationship between them. The recommended **length is 10** to **12 words**, but not more than **20 words**.

9. EXAMPLES OF REFERENCES

[*Alphabetise **Corporate Authors** by first significant word of the name. When the author and publisher are **identical**, **use the word author as name of publisher.** Note the way editions are written(ed.)*]
American Psychological Association. (2010). Publication Manual (6th ed.). Washington, D.C: Author.

*[Journal article with **three to five authors cite all authors** in the **first textual citations**, then subsequent citations may use the surname of the **first author followed by et al.** (Baker, et al ", 1983)*].
Barker, B.L., Jones, W., Oscar, B. B. & Harris, D. P. (1983). Effect of intertribal delays on retardation of learning. *Journal of Experimental Psychology: Animal Behaviour Processes*, 9, 581-593.

[*Magazine articles include **month of issue***.]
Carver, H.C. Jr. & White, C. (1981, December). Do babies sing a universal song? Psychology Today, pp.70 – 76.

[*If **only the abstract is used** as the source, cite all the collection of abstracts in parentheses at the end.*]
Fujita, J.& Misumi, M. (1982). Effects of organisational development in market organisation. *Japanese Journal of Experimental Social Psychology*. 21: 93 – 111. (From Psychological Abstracts, 1982, 68, Abstract No. 11474)

[***Edited book,** both city of publication (New York), and publisher Praeger listed*.]
Grant, S. Jr. & Cannon, C.R. (Eds.), (1960). Billingual education: A Whole language approach. New York; Praeger.

[*Several volumes of an edited book. In text, use the parenthetical citation: (Heath & Fraser, 1977 – 1978.)]*
Heath, J.G. & Fraser, F.C (Eds.). (1977 - 1978). Handbook of teratology (Vols. 1 New York: Plenum Press).

[*A **Chapter** in an **edited boo**k*].
Merman, A. S. & Kniskern, D.P. (1981). Family therapy outcome. Merman, A.S. & Kniskern, D.P. (Eds.) Handbook of family therapy (pp. 742 -775). New York: Avon.

[*If a **dissertation/thesis** does not appear in Dissertation abstracts international, use this format.]*
Musisi, J.F.G. (1997). Academic achievement as a function of career guidance.Unpublished masters thesis, Makerere University, Kampala, Uganda.

[***Newspaper articles** with **no author** are alphabetized by the first significant word in the title and cited in text with a short title: (PLE Results, 1996*].
PLE results are out. (1996, March 19). New Vision, p.1