SUCCESS FACTORS FOR INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGY IN THE MANAGEMENT OF SECONDARY SCHOOLS IN UGANDA

BY

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A THESIS SUBMITTED TO THE SCHOOL OF EDUCATION, DEPARTMENT OF EDUCATIONAL MANAGEMENT AND POLICY STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF EDUCATION IN RESEARCH

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DECLARATION

Declaration by Candidate

This thesis entitled "Success factors for integration of Information Communication Technology in the management of secondary schools in Uganda" is my original work and has not been presented for academic purposes in any other university or institution of higher learning. No part of this work may be reproduced manually, electronically or otherwise without the prior permission from the author and/or Moi University.

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DEDICATION

This thesis is dedicated to my loving wife Edith Orikiriza whose love, patience, understanding, and profound moral support during my period of study enabled me to come to the completion of this thesis, my lovely daughter Hannah Amumpeire with a prayer that she will follow my footsteps in pursuit for knowledge that will transform the livelihood of many generations after her, lastly to my mother, Mrs. Molly Turinawe for she has been my mentor. Her inspiration and encouragement which propelled me to the finish line is unforgettable.

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ABSTRACT

Integration of Information Communication Technology in educational management is a paradigm shift that promises fundamental change in quality and service delivery in schools. ICT integration in education refers to the use of technology in communication, data processing, and data storage to achieve the goals of educational programs for several reasons. However, management structures in most secondary schools today still use inefficient traditional management approaches in managing administrative and academic functions. Therefore, the purpose of this study was to examine success factors for ICT integration in the management of secondary schools in Kanungu District, Uganda. Specifically, the study examined the relationship between users' attitudes and ICT integration, users' competencies and ICT integration, facilitating conditions and ICT integration as success factors for ICT integration in the management of secondary schools. The Unified Theory of Acceptance and Use of Technology guided the study. This mixed methods study adopted the pragmatism paradigm and employed a convergent (concurrent triangulation) research design. From a total population of 354 respondents from the ten purposively selected government aided secondary schools in Kanungu District, Uganda, five head teachers, five directors of studies, and five non-academic staff members were purposively selected, while simple random sampling was used to select 179 teachers. Quantitative and qualitative data were collected using questionnaires and semi-structured interviews respectively. Quantitative data were analyzed using descriptive, factor and multiple regression analysis while qualitative data were thematically analyzed. Quantitative data revealed that Users' Attitudes (β = .677, $p=<0.05$) and Facilitating Conditions (β = .619, $p=<0.05$) had significant positive relationship with ICT integration while Users' Competences (β = .020, $p=>0.05$) was not significant. Regression results gave a coefficient determination of R^2 = .459 which means 45.9% variation in ICT integration can be explained by the three predictor variables combined. Qualitative findings revealed positive users' attitudes toward ICT integration in the management of secondary schools, while the majority of respondents perceived that facilitating conditions influenced ICT integration in the management of secondary schools; some revealed that resources especially computers were not enough, users' competencies were low and depended on age and the training received by the individual. It can be concluded that users' attitudes were positive and facilitating conditions quite favorable for ICT integration, while users' competencies were low, especially among the older staff. The users' attitudes and facilitating conditions showed a direct relationship with ICT integration while users' competencies depended on the age and type of training of the individual. The researcher recommends that the government through the Ministry of Education and Sports should provide enough ICT resources to secondary schools, ensure more in service training, and incorporate ICT training in all teacher training courses. Besides ICT awareness and integration strategies should be prioritized by school managers to arouse and maintain positive staffs' attitudes and ensure the availability of resources as they were significant for ICT integration. This would help secondary schools in their long-term, continuous efforts for the integration of ICT and its improvement.

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ABBREVIATIONS

COMM.	Community
DEO	District Education Officer
DLI	Digital Learning Integration
ESP	Economic Stimulus Package
FAWE	Forum for African Women Educationists
ICT	Information and Communication Technology
ICTs	Information and Communication Technologies
MDGs	Millennium Development Goals
MOES	Ministry of Education and Sports
NEPAD	New Partnership for Arica Development
RCDF	Rural Communication Development Fund
SCH.	School
SEC.	Secondary
SPSS	Statistical Package for the Social Sciences
UCC	Uganda Communications Commission
UNESCO	United Nations Educational Scientific and Cultural Organization
USA	United States of America
USE	Universal Secondary Education
UTAUT	Unified Theory of Acceptance and Use of Technology
UPPET	Uganda Post Primary Education Project

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Integration of ICT in educational planning and management is a paradigm shift that promises fundamental change in quality and service delivery in schools. ICT integration in education refers to the use of technology in communication, data processing, and data storage to achieve the goals of educational programs for several reasons. Therefore, it is imperative to research about integration of ICT in the management of secondary schools in Uganda. Under this study, this chapter entails the background of the study, statement of the problem, purpose of the study, study objectives, research questions, significance of the study, limitations and delimitations, study assumptions, theoretical framework, conceptual framework and operational definitions of key terms and concepts.

1.2 Background of the Study

The management of secondary schools occupies a central position in the education systems of various countries today. Undoubtedly, without management, schools may cease to exist as their operations would weaken at all levels and times. Educational management is a field which is majorly concerned with operation of educational organizations/institutions. It is the act of planning, organizing and directing activities and tasks in a school or any educational organization/institution, more efficiently and effectively while utilizing the available resources that are both human and materials, so as to achieve the set institutional objectives. Therefore, education institutions are expected to command effective and efficient information management systems as well as highly credible supervision and monitoring strategies in their administrative and academic functions in order to have high quality and sound

management. Nevertheless, management of secondary schools in many countries has not yet reached the ideal levels expected (Akyeampong & Adzahlie-Mensah, 2018). Indeed, administrative and academic information management as well as supervision and monitoring have remained less effective the world over.

In Africa, countries have been putting in efforts to improve on management of schools. For example, in South Africa, the approach to strategic management in South African schools has been given added incentive by the shift to greater self-management (Bush & Glover, 2016). In Uganda, school management has proved to be a critical aspect. The global partnership for education Uganda as cited in Menashy (2017) identifies issues of management structures as the ones eating up the education system. The schools are being led almost informally with less attention being given to structures. In Uganda, the issue of school management has been and is central to the survival of the education system. School management has been challenging leading to concerns that the standard and quality within secondary schools has gone down. The researchers meanwhile, contend that as a way of curbing down the situation, crucial transformation points have been thought of to transform school management including transfer of head teachers, requirement to have a master's degree qualification in education by every head teacher as well as specialized training in educational leadership (New Vision, 2016). Nevertheless, this has not produced the best outcomes as required. The educational managers have continued to apply the same old leadership styles as well as using the same old managerial tactics especially in information management as well as supervision and monitoring in as administrative and academic functions are concerned (Nsubuga, 2008).

Many educationists and policy makers thus focused on the integration of Information Communication Technology into school systems to improve on the management of

secondary schools. ICT is defined as technological tools and resources which are used to communicate, create, disseminate, store, and manage information. ICT does not only comprise computers and their accessories or peripherals but also multimedia devices such as mobile phones, television, radio to mention but a few. According to (UNESCO, 2015) the current African education status requires innovative ways to support it in achieving the Sustainable Development Goals (SDGs).

Economic development and social change all over the world has been driven by the use of ICT, including educational change in a number of countries (Vanderlinde et al., 2012). In the past decade, there has been an increased growth in the use of information communication technologies which have had incredible effect on both society and our daily lives. ICT has become one of the basic pillars of modern-day society and therefore, many countries are looking at its better understanding and mastery as a core of education (Adu & Olatundun, 2013). In Africa, rapid growth in information and communication technologies came along with the 21st century (World Bank, 2016).

The use of ICT was first implemented in educational institutions in North America and Europe in 1970s (Stromquist & Monkman, 2014). Since then, a number of countries in Africa have established complementary or supplementary plans or policies to support ICT integration in education. For instance, Burundi, Benin, Botswana, Cape Verde Cameroon, Central Africa Republic, Madagascar, Comoros, Ghana, Djibouti, DRC Congo, Gambia, Guinea, Lesotho and South Africa have national broadband policies. This is according to the state of broadband report (2018). The complexity of technological changes has led to wide-ranging developments in managerial systems especially on management tasks both at individual and institutional levels (Makhanu & Kamper, 2012). ICT has been considered as a tool for improving school management

just like other institutions with the hope that its integration into school operations will increase the efficiency of the processes hence making it easy for the system to achieve its set goals and objectives. Uganda's Vision 2040, identifies ICT among the key fundamentals as well as an opportunity to spur Uganda's transformation into a modern and prosperous country (Mugizi, 2018).

Despite the rapid growth and use of ICT in other sectors of the economy especially health sector, military, industry and business, the same cannot be said about the education sector. Worldwide, the education sector has lagged behind in the usage and application of ICT in its management and administration (Midoro, 2013). For ICT integration programs to be effective and sustainable, education managers themselves need to be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education (Susan Chepkonga, 2015). ICT plays an important role in the planning and management of complex information flow and integration of such information towards effective policy formulation and planning towards the utmost maximization of human capital and potential in the school environment. It is necessary that information of high quality is available always for proper decision-making.

The reality for schools is that present management styles require modification to accommodate ICTs following the advent of computers and internet that requires school managers to apply computers as a management tool (Makhanu & Kamper, 2012). School heads therefore, have no option but to embrace ICT integration in their schools for purposes of coordination and achieving educational goals. This helps schools to effectively meet management tasks together with flexibility in academic and administrative functions that are essential in enhancing efficiency in educational

institutions (Adila, 2017). In a survey carried out in Sweden by Nordholm (2015), it was established that ICT provide positive impact on school administration when integrated in the management of schools. Oguta et al. (2014) asserted that ICT integration improves routine management of education institutions and permits schools to improve on efficiency and survive with rapidly changing world in implementing management tasks. In support of this argument, Ngugi, (2012) in a study on the extent of use of ICT in education management in public secondary schools in Naivasha District in Kenya, stated that cost-effective application of ICT related technology joined with flexibility in academic and administrative activities is essential in improving efficiency in secondary schools.

In the literature, the question is repeatedly put forward about what variables determine technology integration and usage in education. Over the last decades, a series of models have been proposed by various protagonists to describe the mechanism behind and factors affecting technology adoption and use, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM). These models have emerged from well-established psychological theories, including the Theory of Reasoned Action (Fishbein, 1979) and the Theory of Planned Behavior (Ajzen, 1991). The UTAUT, for example, describes four core determinants of the user intentions and the actual use of technology, namely performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). The effects of these determinants are hypothesized to be moderated by respondents' gender, age, experience, and the voluntariness of technology use (Dwivedi et al., 2019). The setup of the UTAUT is so comparable to that of the TAM because their determinants share similarities in their conceptualization (Nistor & Heymann, 2010). Although it is more challenging to test UTAUT than the TAM (due to the hypothesized

moderation effects). The Technology Acceptance Model (TAM) developed by Davis (1996) deals more specifically with the prediction of the acceptability of an information system. The purpose of this model is to predict the acceptability of a tool and to identify the modifications that must be brought to the system in order to make it acceptable to users. This model encompasses several variables explaining behavioral intentions and the use of technology either directly or indirectly (i.e., perceived usefulness, perceived ease of use, attitudes toward technology), and has been extended by external variables, such as self-efficacy, subjective norms, and facilitating conditions of technology use (Schepers & Wetzels, 2007). The three aspects of users' attitudes, users' competences the facilitating conditions like technical support, administrative support and availability of ICT resources that have been coined as the key variables of ICT integration in the management of secondary schools by this study, will be mapped onto the variables of the Unified Theory of Acceptance and use of Technology (UTAUT) model to predict ICT integration in administrative and academic functions of management of secondary schools in Uganda.

In Uganda, the Ministry of Education and Sports (MOES, 2004) launched the education sector strategic plan. This plan was to cater for four different sub sectors whereby ICT was one of them. Under this plan, Ministry of Education and Sports in collaboration with Uganda Communication Commission (UCC) provided 1,037 computers to different government aided secondary schools country wide. Ministry of Education and Sports went further to provide to those schools without electricity with a package of solar capacities to help them to utilize the computers (Andrew, 2014). Training of teachers and school head teachers has been carried out as a way of promoting ICT integration in schools. Despite such efforts, ICT usage among management of secondary schools is still low (ibid). Many school administrators still use manual

systems in record keeping of both students and staff information. For example, in some schools, end of term report cards for students are still prepared manually. Head teachers still use the arrival book as a monitoring tool of teacher's attendance. This manual system in schools has in most cases led to loss of documents, students changing marks on their report cards as well as recording of wrong arrival and departure time in the arrival book by some teachers.

Given the situation in question, it was imperative to examine the success factors for ICT integration in the management of secondary schools in Uganda especially in Kanungu District which is both an urban and rural setting. This was suited for this study since most studies about ICT integration in education in Uganda have been carried out in urban set up and a few studies have been carried out about success factors for ICT integration in the management of schools. This study was premised on the fact that ICT integration in schools has been highly lauded as a mechanism for transforming the management of secondary schools (MOES, 2004). Researchers argue that for ICT to have a desirable effect on educational management, attention must be given to utilization of ICT in information management as well as supervision and monitoring within schools (Lutalo & Bisaso, n.d.). This can improve on the process of service delivery in the schools as well as ensuring total quality management. Therefore, the researcher deemed it necessary to examine success factors for ICT integration in the management of secondary schools by considering aspects of users' attitudes, users' competences, and facilitating conditions as success factors for ICT integration in the administrative and academic functions of management of government-aided secondary schools in Kanungu District, Uganda.

1.3 Statement of the Problem

Ideally, schools are expected to have effective and efficient information management systems as well as highly credible supervision and monitoring strategies for easy management. However, management structures in most secondary schools today still use inefficient traditional means in management (Maduakolam, 2016), such as use of paper work in information management. This leaves a lot to be desired especially in relation to compatibility and compliance with the modern technology regimes. The situation in Kanungu District is even more wanting as most secondary schools regardless of being equipped with computers from the government, over 50% of them lately submit reports to authorities due to employing traditional ways of information management as well as poor supervision and monitoring (Kanungu District inspection report, 2017). Many factors have been considered feasible for transformation of management of schools most significantly being ICT integration in school systems. Ugandan government has made huge investments in ICT in education as many government-aided secondary schools were provided with computers and many teachers have been trained in ICT. Unfortunately, ICT usage in the management of most schools has remained low, with most school managers still using traditional systems of communication, evaluating students, record keeping, as well as monitoring and supervision. The resultant effect is that the quality of the education system in general will continue deteriorating (Fomba et al., 2022). While several scholars have studied ICT integration in education (Omogi, 2016; Gupta et al, 2020; Meijer, 2021), emphasis has been laid on ICT integration in teaching and learning. Little is still known about success factors for high level integration of ICT to better manage secondary schools, thus this study sought to examine success factors for ICT integration in the management of Government–aided secondary schools in Kanungu District, Uganda.

1.4 Purpose of the Study

The purpose of this study was to examine success factors for integration of ICT in the management of government –aided secondary schools in Kanungu District, Uganda so as to understand the relationship and the influence of these success factors on integration of ICT in the context of selected government–aided secondary schools. Gaining an understanding of these factors would help secondary schools in their long-term, continuous efforts for the integration of ICT and its improvement.

1.5 Specific Objectives

The study was guided by the following objectives:

1. To examine the relationship between users' attitudes and ICT integration in the management of secondary schools in Kanungu District, Uganda.

2. To examine the relationship between users' competencies and ICT integration in the management of secondary schools.

3. To examine the relationship between facilitating conditions and ICT integration in the management of secondary schools.

1.6 Research Hypotheses

Ho$_1$. There is no statistically significant relationship between users' attitudes and ICT integration in the management of secondary schools in Kanungu District, Uganda.

Ho$_2$. There is no statistically significant relationship between users' competencies and ICT integration in the management of secondary schools in Kanungu District, Uganda.

Ho₃. There is no statistically significant relationship between facilitating conditions and ICT integration in the management of secondary schools in Kanungu District, Uganda.

1.7 Research Questions

1. What are the users' perceptions about their attitudes towards ICT integration in the management of government-aided secondary schools?

2. How do ICT users describe their competencies in integration of ICT in the management of government-aided secondary schools in Kanungu District, Uganda?

3. What are the users' perceptions about the facilitating conditions for ICT integration in the management of their schools in Kanungu District, Uganda?

1.8 Justification of the Study

A number of schools in Kanungu District continue to execute management tasks manually (Kanungu District inspection report, 2017), leaving a lot to be desired especially in relation to compatibility and compliance with the modern technology regimes. Additionally, this leads to poor information management as well as inefficiency in supervision and monitoring of both administrative and academic functions in schools leading to mismanagement. In Uganda, the education digital agenda Strategy 2021 - 2025 provides a rationale and action plan for integrating ICT into Educational tasks (Ministry of Education and Sports, 2020). However, much emphasis is laid on integrating ICT into the curriculum (teaching and learning). It is believed that investment in ICT in education planning and management in schools can cause a substantial impact (FAWE, 2015). Current research in the area of educational management encapsulates that the major questions of resource utilization and improved education management are better understood in the context of ICT integration (Lutalo

& Bisaso, n.d.). However, there is limited empirical literature on success factors for ICT integration in the management of secondary schools in the context of Kanungu District. While several scholars have studied ICT integration in education (Omogi, 2016; Gupta et al, 2020; Meijer, 2021), emphasis has been laid on ICT integration in teaching and learning. In addition, the methodological approaches used in the previous researches about success factors for ICT integration adopted either qualitative or quantitative approaches, Therefore, this study adopted multiple approaches to examine success factors for ICT integration in the management of secondary schools in Kanungu District, Uganda.

1.9 Significance of the Study

This study examined success factors for integration of ICT in the management of government-aided secondary schools in Uganda and thus the results from this study were expected to provide both practical and theoretical significance in the following ways:

The results were anticipated to help education stakeholders like policy makers, school heads to gain an understanding of users' attitudes and their effects on ICT integration in the management of secondary schools. The results were anticipated to also help education stakeholders to gain an understanding of users' competencies in ICT integration in the management of secondary schools. The results were also anticipated to help education stakeholders to gain an understanding of the nature of facilitating conditions in selected secondary schools towards ICT integration in their management. These would help in shaping the long-term, continuous efforts for the integration of ICT and its improvement. The results of this study were also to serve as a basis for intervention programmes to policy makers and school administrators by understanding how to introduce ICT related innovations in schools hence enhancing integration of ICT

in the management of secondary schools. Furthermore, conclusions and findings from the study were expected to serve as a useful base to researchers for further research studies in the area and also add to the existing literature in the area.

1.10 Scope of the Study

1.10.1 Content scope

The study examined success factors for ICT integration in the management of government-aided secondary schools in Kanungu District, Uganda. The independent variable was success factors where the study focused on users' attitudes, users' competencies, and facilitating conditions as the success factors for ICT integration in the management of secondary schools in Uganda. The dependent variable was ICT integration in the management of secondary schools in the aspects of information management as well as supervision and monitoring of both administrative and academic functions of secondary schools.

1.10.2 Geographical scope

The study was carried out in selected government-aided secondary schools in Kanungu District in Uganda. Kanungu is one of the Districts in the South Western region and found in the Kigezi Sub-Region of Western Uganda. It is located between 29050'E and 0045'S of the Equator, bordering the Districts of Rukungiri in the north and East, Kabale in South East, Kisoro in the South and the Democratic Republic of Congo in the West.

1.10.3 Time scope

The study was carried out focusing on a period 2017-2021. During this period, the general management of secondary schools in Kanungu District especially in the aspects of information management as well as general supervision and monitoring has been

deteriorating (Kanungu District inspection report, 2017). This was worsened by the Covid – 19 pandemic between 2020 – 2021 where all schools went into lock down and most of both the administrative and academic functions in schools were to be executed with the help of ICT much more than ever before (Tumwesigye, 2020).

1.10.4 Methodological scope

This study adopted the pragmatism paradigm while using mixed methods research approach and employed a convergent (concurrent triangulation) research design.

1.10.5 Theoretical scope

The study used The Unified Theory of Acceptance and Use of Technology to provide a framework for the explanation of the variables that were involved in the study.

1.11 Limitations of the Study

The study used a questionnaire as data collection tool, however, a questionnaire had limitation with regards to the expected outcome, which for instance highlighted trends of attitudes, but failed to explain the underlying reasons for such a trend (Motl et al., 2001). Triangulation was employed to solve this limitation by using 'multi-method' approach where qualitative data helped to support quantitative data. Also questionnaire method that was employed in this study limited the researcher the opportunity to follow up ideas and clarify issues being studied. This was mitigated by the researcher considering all aspects of the questionnaire, from design to selecting the correct respondents, in order to obtain the maximum amount of reliable and valuable data. The researcher also used the interview to clarify issues that were being studied.

The perceptions of the respondents may be limited to their levels of training and experience in school management. To obtain a balanced objective representation of participants, the study sample targeted those respondents who had long-time experience

in school management, and were directly involved in the management of the schools where they worked.

1.12 Assumptions of the Study

An assumption is something that one accepts as true without questioning or proof. In this study, assumptions were statements or ideas that were accepted as true. They served as the foundation upon which the study was based.

The assumptions of this study were that the target population would operate within the same environment conditions, hence giving related responses that were true and reliable concerning the study variables. Secondly, the participants in the study that is, head teachers, teaching and non-teaching staff like bursars would cooperate during the course of the study hence being able to give required information without hesitation.

1.13 Theoretical Framework

In research, a theoretical framework is the justification that assist in clarifying the phenomena that occurs in the world (Creswell, 2014). (Kerlinger, 1973) defines a theory as a set of interrelated variables, propositions and definitions that present a systematic view of a phenomenon by specifying relations among variables to explain natural phenomena.

The theoretical framework that was adopted in this study helped to explain how independent variable (success factors for integration of ICT in the management of secondary schools) influenced the integration of ICT in the management of government aided secondary schools in the context of Kanungu District, Uganda. Based on the above, the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) was adopted to provide a theoretical lens to guide the current study. It was assumed that this model with its variables/predictors of ICT adoption and use would

provide a suitable framework for analyzing and examining success factors for integrating ICT in the management of secondary school in Uganda's context. This theory was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain information systems usage behavior (Theory of Reasoned Action, Technological Acceptance Model, Motivational Model, and Model of Personal Computer Use, a combined theory of Planned Behavior/Technological Acceptance Model, Diffusion of Innovation Theory and Social Cognitive Theory). The Unified Theory of Acceptance and Use of Technology (UTAUT) offered a framework to explain the relationship between the current study variables and the mapping of these variables onto this theoretical framework created a holistic and clear understanding of the relationship between these factors and integration of ICT in the management of secondary schools. The theory identifies four independent variables that affect the adoption and use of new technology which include performance expectancy, effort expectancy, social influence and facilitating conditions. According to the theory, presence of these variables leads to the individuals' acceptance and use of the technology. Performance expectancy as per this theory refers to the degree to which an individual believes that using a system will help him or her to attain gains in job performance. Performance expectancy was mapped onto users' attitudes in this study. This is because school heads, teaching and non-teaching staff tend to have passion for and regard ICT as useful when they expect that using it would help them in the performance of academic and administrative tasks in school. Effort expectancy is the amount of effort required to use the said innovation. This was mapped onto users' competencies since school heads, teaching and non-teaching staff would tend to use the technology in administrative and academic tasks when they expected that the said technology required less effort to be used, therefore, they would find it easy to integrate

it in administrative and academic tasks in school if they possessed the required knowledge and skills (competencies), Social influence which is the degree to which an individual perceives that other important people believe he or she should use the new system and Facilitating conditions that refers to the degree to which an individual believes that an organization and technical infrastructure exists to support use of the system were mapped onto facilitating conditions factor. Head teachers, teaching and non-teaching staff in school would integrate ICT in administrative and academic tasks when they had sufficient and relevant support from other stakeholders like the government, school leadership and parents, plus availability of ICT infrastructure, technical support and administrative support. For this study in summary, ICT integration in the management of secondary schools would be influenced by users' attitudes (performance expectancy), users' competencies (effort expectancy) and facilitating conditions (social influence and facilitating conditions). The rationale for adopting this theory in the current study was that it (UTAUT) has made several contributions to the literature and also it provides empirical insight into technology acceptance by comparing prominent technology acceptance theories, which often offer competing or partial perspectives on the subject. UTAUT demonstrates that proposed factors account for 70 percent of the variance in use intention (Venkatesh et al., 2003) offering stronger predictive power compared to the rest of the models that examine technology acceptance for example (Davis, 1993; Sheppard et al., 1988). Accordingly, it also provides for both internal (intrinsic) and external (extrinsic) factors that predict technology acceptance and use hence becoming the suitable theory for this study. This theory is significant for education stakeholders (policy and decision makers) to realize the variables (factors) that must be present for school administrators to integrate ICT in the management of secondary schools). If all the above are addressed sufficiently, the

desired outcome which is integration of ICT in the management of secondary schools would be obtained.

1.14 Conceptual Framework

Using the Unified theory of Acceptance and use of Technology (UTAUT) and the literature reviewed, it was believed that the constructs of performance expectancy, effort expectancy, social influence and facilitation conditions would provide a suitable foundation for theoretical and practical analysis and explanation of the relationship between independent variable that is, users' attitudes, users' competencies and facilitating conditions and the dependent variable ICT integration in the management of secondary schools in both administrative and academic functions. In schools, administrative personnel use diverse tools to uphold links among stakeholders, record keeping, processing of documents and the collection of information. Such tasks in management are made to be accomplished efficiently and effectively using ICT (Shah, 2014). Cano and García (2013) studied ICT strategies and tools for the improvement of instructional supervision, the virtual supervision. They suggested that a supervision model that supplements the techniques and strategies of traditional supervision with new ways of addressing the educational processes based on web was needed. Equally, Mue (2014) after examining the application of ICT in school administration in selected public secondary schools in Lang'ata division, Nairobi County. He established that ICT has been only used in monitoring of classroom facilities, as well as monitoring laboratory facilities and stationery.

Therefore, the conceptual model below shows the connections between independent variable (success factors) and the dependent variable ICT integration in the management of government aided secondary schools in both administrative and academic functions. This means that ICT users seem to be influenced by some factors

which trigger how they act. Thus the structure of the framework for this study was conceptualized from the Unified Theory of Acceptance and Use of Technology which include performance expectancy (Users' attitudes), effort expectancy (users' competencies), social influence and facilitation condition (ICT resources and facilities) as the core factors of the independent variable and how such variables influence/predict ICT integration in the management of secondary schools in aspects of administrative and academic functions of information management as well as monitoring and supervision as the factors of the dependent variable as per the literature reviewed.

Independent variable   **Dependent variable**
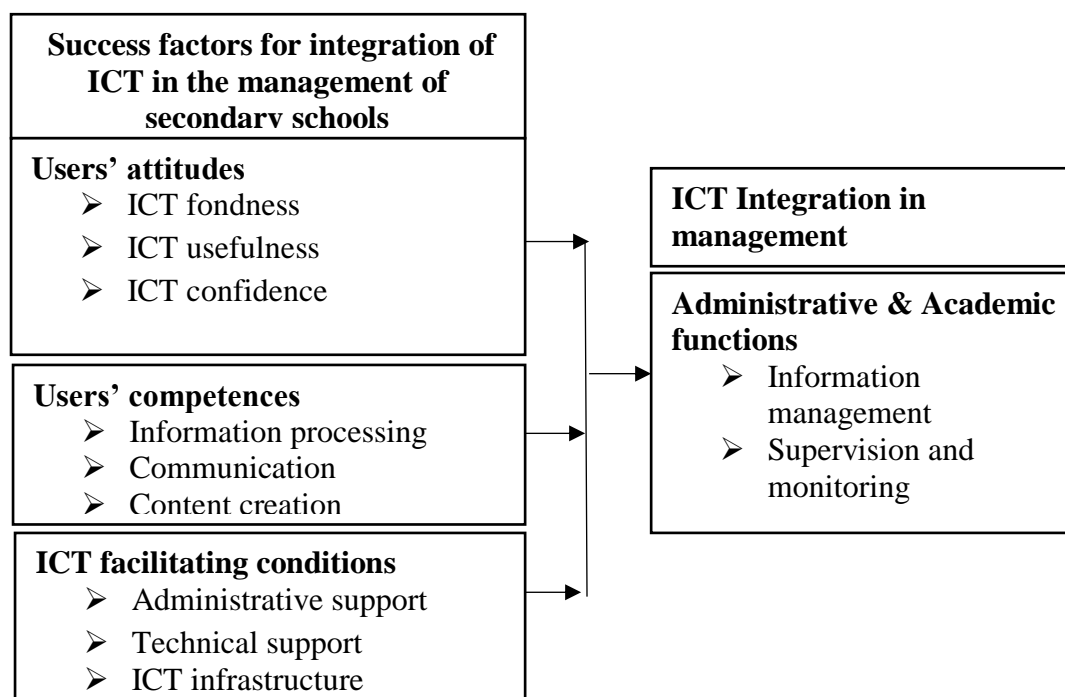
Figure 1.1: Conceptual Framework showing the relationship between independent and dependent Variable

Source: Adopted from Christensen and Knezek (2008) with some modification.

1.15 Operational Definitions of key terms and concepts

The following terms are defined to express the sense in which they were used in this study:

Facilitating conditions: In this study, facilitating conditions means the degree to which school head teachers, teaching and non-teaching staff believe that the available ICT infrastructure, administrative and technical support exist for successful ICT integration in the administrative and academic functions of government aided secondary schools.

Integration of ICT: This is the embedding of Information and Communication Technology into the management of secondary schools as a set of tools to create more effective and efficient administration and management. ICT integration in this study refers to the use of technology in communication, data processing, and content creation to achieve the administrative and academic goals of educational programs for several reasons in government aided secondary schools in Kanungu District, Uganda.

Management: In this study, Management refers to planning, controlling, organizing and coordinating government aided secondary schools administrative and academic activities in aspects of information management as well as monitoring and evaluation to achieve educational goals of secondary schools in Kanungu District, Uganda.

Success factor: In this case, success factors are those key variables or conditions (users' attitudes, users' competencies and facilitating conditions) that must be present for successful ICT integration in the administrative and academic functions of government aided secondary schools in Kanungu District, Uganda.

User's attitude: In this study the term user's attitudes means head teachers', teaching and non-teaching staffs' beliefs and reactions towards ICT integration in administrative and academic functions of government aided secondary schools in Kanungu District, Uganda. It was measured in terms of users' fondness/passion towards ICT and their beliefs on its usefulness.

User's Competency: This means the ability to do something successfully or efficiently. In this study, user's competencies mean the ability of school heads, teaching and non-teaching staff to process information, communicate and create content using ICT in carrying out administrative and academic tasks in government aided secondary schools in Kanungu District, Uganda.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of related literature about success factors for ICT integration in the management of secondary schools. This section deals with general literature about users' attitudes, users' competencies, and facilitating conditions in relation to ICT integration in the management of secondary schools in terms of information management as well as monitoring and supervision. A number of publications such as articles, seminar papers, government policy papers, conference proceedings, training manuals, research reports, business journals, text books and theses were reviewed. The section concludes with a summary analysis of the commonly mentioned empirical and theoretical issues, and unanswered questions in the literature on the success factors for ICT integration in the management of secondary schools. From the review, some theoretical, knowledge, and methodological gaps were identified and the focus of which this study sought to fill.

2.2 ICT Integration in the Management of Secondary Schools

In Uganda, secondary school education is the third level of education in which the students are enrolled after successful completion of primary seven education. Students spend six years of studies in secondary education that is from senior one to senior six. Secondary education in Uganda is provided by both the public and private sector. Globally, educational management in the 21st Century is expected to focus on the achievement of the Sustainable Development Goals (SDGs) which were identified by 193 countries that came together in 2015, Uganda being one of them (United Nations Development Programme report, 2015). The report explains that these countries agreed on the year 2030 agenda on SDGs which each of these countries committed themselves

to fight poverty and attain sustainable development within 15 years. Some of the modular building-blocks of SDGs achievement goals were education, gender inequality and digital revolution for sustainable development (Sachs et al., 2019). With the emerging technologies, it becomes necessary to introduce efficient and effective information technology systems in secondary schools.

Darling-Hammond and Adamson (2014) recognized that ICT deployment has had a substantial influence on the transformation happening in societies, organizations and the economy at large. Institutions are social entities that dwell for excellence and better working conditions to yield the results (Nilsen et al., 2015). In schools, ICT should be used as a mediation tool in various school activities in order for it to be effectively integrated and utilized. Developments in ICT have led to rapid changes in contemporary management of many institutions including public and private schools. The development of technology has given fresh impulse to ICT usage in management of schools. This necessitates interrogation of the existing range of applications in enhancing management of resources at school level.

ICT plays a key role in the planning and management of complex information flow and integration of such information towards effective policy formulation and planning towards the utmost maximization of human capital and potential in the school environment. In the context of this study, the phrase Information and Communication Technologies (ICTs) refers to the software, hardware, media and networks for gathering, storing, handling, communicating and producing facts and those linked facilities (Muchai & Kimuyu, 2016). According to Chileshe (2019), ICT encompasses computer and telecommunication. It deals with the technology used in handling, acquiring, processing, storing, retrieving and disseminating information. ICT is any innovative tool that can be used to execute such functions as receiving, processing,

storing, analyzing, retrieving and transmitting information presented to it and enabling communication among individuals or groups of humans. In this case, ICT integration is understood as ICT working as an integral or mediating tool/means to complete specific activities to meet specified objectives of any organization. ICT integration in education refers to the use of technology in communication, data processing as well as data storage to achieve the goals of educational programs for numerous reasons. ICT has generally enabled schools to establish systems for efficient control and effective accountability of assets, finances and other school property.

ICT Integration in administrative management has made it possible and easy for secondary schools to be efficient and effective in managing records and communication. Usage of ICT in administrative management involves specifically harnessing ICTs for better planning, setting standards, effecting change and monitoring results of the essential functions of secondary schools. Good performance and position of any organization is as a result of forecasting, monitoring and controlling activities towards the set target. One may wonder how one can check performance using inaccurate records or where no records are kept. Both the Schools and Ministry of Education and Sports generate information on a daily basis which is used for the smooth running of the schools, as well as for projecting and planning purposes. For the information to be used effectively, it must be accurate and reliable. This calls for efficient information management and herein lies the role of ICT in records keeping. The administrative personnel use diverse tools to uphold links among stakeholders, record keeping, processing of documents and the collection of information. Such tasks are made to be accomplished efficiently and effectively using ICT (Shah, 2014).

In South Africa, Kamalizen (2017), carried out a study titled evaluation of the adoption of Information and Communication Technology in secondary school management.

Findings showed that ICT for management tends to improve managerial duties of leaders in schools and school leaders were able to monitor financial records and stores quite effectively using ICTs. In Botswana, Moatlhodi and Kalusopa (2016) conducted a study to assess the use of ICT systems in the management of records in labor organizations. They found out that ICT had not been properly administered in the integration of records management. It also conclusively proved that the records management practices in the Corporate Service Division were not well established thus weakening the delivery of services. The inexistence of the records management policy, procedural manual, excessive missing file cases, the problem of accessing and using records, were some of the shortfalls identified by the corporate service division. The above findings implied that failure to use ICT in managing records and information management, leads to a number of shortfalls in service delivery in secondary schools. This reflects the case in Kanungu District of Uganda where the researcher intends to conduct the current study.

In a study carried out in Ghana by (Bentil, 2018) about the use of information and communication technology (ICT) in students' records management at university of professional studies, Accra, with the help of interviews, results from the study revealed that the University experienced effective and efficient records management, quick decision making. It is from this experience that the current study aims at examining success factors for ICT integration in the management of government aided secondary schools in Uganda so as for schools to enjoy the same benefits of ICT integration in the administrative and academic functions.

Ngugi (2012) conducted a study to investigate the extent of the use of ICT in education management in public secondary schools in Naivasha District. The study found out that 72% of the respondents used computers to carry out administrative duties including

information dissemination. The study concluded that even though some of the secondary schools in Naivasha District were prepared, others were not prepared as they did not have ICT resources required for the management of the schools. However, the study revealed the extent of ICT use in education management but did not bring out the necessary conditions or strategies for successful use or integration of ICT hence the current study aims at examining success factors for ICT integration in the administrative and academic functions of secondary schools in order to present empirical evidence for what is necessary for successful ICT integration in the management of secondary schools in Kanungu District, Uganda. Mutisya and Mwania (2017) also determined the extent to which Information and Communication Technology was integrated in the management of public secondary schools in Kitui County, Kenya. Interviews results indicated that some principals were indeed using ICT in management of schools and especially in communication with teachers, parents and suppliers.

In a study carried out by Karanja (2018) about Role of ICT in dissemination of information in secondary schools in Kenya, it was established that ICT plays a critical role in the dissemination of information in schools. It was found that ICT was relevant in facilitating effective and quick decision making, aiding analyzing data quickly and accurately, facilitating information gathering & dissemination, facilitating adequate data storage, enhancing effective communication and knowledge sharing as well as enhancing data processing, improving coordination of tasks and activities, facilitating fast educational planning process, enhancing monitoring of educational facilities & resources. In order for secondary schools in Kanungu District, Uganda to benefit from the above, the current study sought to examine success factors for integration of ICT in the administrative and academic functions in the management of government aided

secondary schools specifically in information management as well as monitoring and supervision.

Regarding ICT integration in supervision and monitoring of secondary schools' administrative and academic functions, it should be noted that supervision is not about an inquisition or fault finding, but rather means guidance, assistance, and sharing of ideas with all those involved in the process of management of secondary schools. Meanwhile, Cano et al., (2013) studied ICT strategies and tools for the improvement of instructional supervision, the virtual supervision. The findings of the study led the authors to suggest that a supervision model that supplements the techniques and strategies of traditional supervision with new ways of addressing the educational processes based on Web was needed. Equally, Mue, (2014) examined the application of ICT in school administration in selected public secondary schools in Lang'ata division, Nairobi County. Findings established that ICT has been limited only to the monitoring of classroom facilities, as well as monitoring laboratory facilities and stationery.

The above study indicated that ICT was only limited to monitoring of classroom and laboratory facilities. Therefore, this study aims at examining success factors for ICT integration in both management aspects of administrative and academic functions specifically in information management as well as monitoring and supervising. Brar and Relhan, (n.d.) explored the role played by ICT in informing the Uganda post primary education and training project (UPPET). They contended that ICT was helpful in monitoring progress of construction as well as monitoring the number and frequency of visits by supervision firms as well as Ministry officials. Makewa et al., (2013) carried out a study on ICT effectiveness in secondary school administration and management in rural southern Kenya. The study found out that both teachers and administrators use

ICT mainly for student administration and supervision of instructions. ICT is essential in management of secondary schools because it reduces the administrative costs and improves decision making (Al Harbi, 2014). Thus, it can therefore, be argued that supervision must integrate ICT from different perspectives for the development of different subsystems in which it operates. The activities of supervisors involve among others, inspecting, checking, telling, rating, and monitoring. For the development of these activities, supervisors behave as coordinators, consultants, group leaders, and evaluators. ICT can be a valuable resource that serves to enhance these functions and processes of supervision of school contexts mediated by ICT.

Based on this literature, the current study seeks to examine success factors for ICT integration in the management of secondary schools in Kanungu District, Uganda since it is proven through research that ICT enhances the quality of management of administrative and academic functions in secondary schools.

Edoru and Adebayo (2020) carried out a study about information and communication Technology in Uganda Higher Education where Makerere University was used as a case study, specifically the study focused on the use of ICT as a strategy for delivering effective management of educational services in a cross-section of educational institutions, universities inclusive. The study discussed the nature of ICT tools installed in Makerere University, perceptions and experiences of stakeholders in the effectiveness of ICT adoption and strategies for effective ICT use in educational services management. It was found out that there was quite effective ICT implementation at Makerere University because the University had embraced ICT policy due to its importance. However, the study was only confined to Makerere University which is in the center of Uganda's capital city and highly funded. The case might be different as far as other institutions especially in upcountry regions of the

country are concerned and the study was carried out in a higher institution of learning which may not be a reflection of secondary schools. This gave the basis for this current study that was conducted in secondary schools specifically in Kanungu District in the Kigezi region of South Western Uganda.

In a related study carried out by Kayiwa et al. (2016) on the role of ICT in higher educational administration in Uganda, findings revealed that ICT enhanced the performance of educational administrator through improving cross communication at the managerial level, rapid access to needed information, analyzing data effectively and efficiently, a networked platform for collaborative work, motivates administrators through access to new information, enhances research skills of administrators, evaluation of staff and students is made easier, helps administrators in result processing, greatly reduces on workload, provides good and secure storage of information, and improves coordination of tasks and activities. Despite the fact that ICT provides all the above mentioned benefits in management, Aheisibwe (2020) in his study about utilization of ICT in effective administration of secondary schools in Mitooma District of Uganda, revealed that lack of knowledge and skills of ICT, limited electricity supply, poor quality computers and limited computer accessories were reasons for non-utilization of ICT. Given this situation in Uganda, the current study aimed at examining success factors for ICT utilization in the management of secondary schools in Uganda.

In the same vein, Newby et al. (2013) carried out a study about Technology and education: ICT in Ugandan secondary schools. The study examined ICT infrastructure and use in eleven secondary schools in Mukono, Uganda. Findings indicated that despite limited resources, schools are investing heavily into ICT. However, the study targeted schools with high levels of ICT, the schools that were used in the study were selected from Mukono District which is one of the developed Districts in Uganda and

not from Kanungu where the current study was carried out. Additionally, the findings of the study cannot be generalized to all schools in Uganda hence the current study was carried out in Kanungu District which has a different context.

From the study that was carried out by Markon (2013) about perspectives on ICT adoption in Ugandan schools where steps for the integration and adoption of information and ICT were discussed, the study concluded that promotion of utilization of ICT does not only rely on overcoming the major barriers of ICT integration, but also developing a positive attitude of ICT. Sustainability is an issue that relies on all three groups of the school community; administration, staff and users. Therefore, this study targeted not only head teachers but also both teaching and non-teaching staff members in selected government aided secondary schools in Kanungu District.

According to the MOES (2012), all learning/educational institutions in Uganda provide custody of the administrative records that most government agencies rely on to source the education data which is collected annually. The records among others include; learners' attendance registers, records concerning examination performance, transfer forms, teachers' records, income and expenditure statements. Records management at institutions is not well-run and this creates data gaps when submitting the reports. The question would be, could there be a difference if ICT was perceived as a useful tool in the performance of such administrative tasks? The current study is aimed at identifying success factors for ICT integration in the management of secondary schools considering users' attitudes as one of the key variables for ICT integration.

Success factors is a management term used to mean elements that are necessary for an organization, institution or project to achieve its mission. They are things that must go well to ensure successful operation of an organization. They are a limited number of

key variables or conditions that have tremendous impact on how successful an organization meets the set strategic goals or objectives of the program. In this case, success factors are those key variables or conditions that must be present for successful ICT integration in the management of secondary schools. Currently, understanding the reason for users' accepting or rejecting any new technology has become a fundamental task in any information system's life cycle (Sivathanu & Pillai, 2019).

A number of technology acceptance theories and models have been put across as a framework to study the method of understanding and accepting new technologies by users, how they could use it, and what could be the effect of continuing using it. Some factors such as usefulness, ease of use, complexity, and social influence can affect the users' decision about any technology and the method of using it. These factors have been adopted and used in different theories and studies in several research works (Ajzen, 1985; Bandura, 1986; Davis, 1986; Deci & Ryan, 1985; Maddux & Rogers, 1983; Venkatesh & Davis, 2000), in addition to a lot of works that have been done up to date. For example the research study that was carried out by Venkatesh et al. (2003) aimed at defining a unified form of technology acceptance theories.

The Unified Theory of Acceptance and Use of Technology (UTAUT) is one of the most integrated and developed technology acceptance theories that was developed by adopting the most beneficial constructs from other older theories and models. This theory was established by adopting the most important characteristics of already existing eight old theories over the past years so as to be a unified form to all of them. Thus, the theory hypothesized four variables as the most important and significant, and are hypothesized to have direct effect on behavioral intention and usage behavior, and hence user acceptance. These constructs include performance expectancy, effort expectancy, social influence, and facilitating conditions. From the Technological

Acceptance Model that was developed by Davis (1989), two factors perceived usefulness and perceived ease of use are relevant in computer use behaviors. Davis defined perceived usefulness as the prospective user's belief that using a specific system application would enhance their job or life performance. According to him, perceived ease of use can be defined as the degree to which the prospective user expects the intended system to be free of effort. According to TAM, ease of use and perceived usefulness are the most important variables that determine actual system use. He further indicated that the two factors are influenced by external variables. The main external factors that are usually manifested are social factors, cultural factors and political factors. Social factors include language, skills and facilitating conditions. In line with the above theories, Akbar (2013) applied the UTAUT model to investigate the effective factors for technology acceptance and use by students at a higher-education institution in Qatar, the results indicated that all the constructs and moderating variables of the model have significant influences, except the level of experience. Furthermore, the researcher reported that the UTAUT model could be used to test technologies in the educational setting, with a probable need to be modified so as to fit the context. In line with this, the current study indicated that all the study variables had significant influence on ICT integration except users' competencies.

Albugami and Ahmed (2015) carried out a study about success factors for ICT implementation in Saudi secondary schools, from the literature, it was revealed that a successful implementation of ICT in education requires paying attention to some factors such as providing adequate infrastructure, adequate management support, adequate teacher training on ICT and pedagogy, a clear educational policy and evaluation on an ongoing basis. Also Rodrigues et al. (2016) applied the UTAUT model over a group of expected and current users of e-government services in the United Arab Emirates.

By using the ANOVA test, the study found out that confidentiality and users' trust, and attitudes toward using technology were key determinants of overall satisfaction of e-government services. In line with this, the current study studied ICT integration in the management of government aided secondary schools in Kanungu District, Uganda by examining users' attitudes, users' competencies and facilitating conditions as the success factors for ICT acceptance and usage. These are hypothesized to have significant effect on ICT integration in the administrative and academic functions as in the management of government aided secondary schools in Kanungu District, specifically in information management as well as monitoring and supervision.

2.3 Users' Attitudes and ICT Integration in the Management of Secondary Schools

This section covers literature about users' attitudes towards ICT integration in the management of secondary schools. In this study, the term users' attitudes mean head teachers', teaching and non-teaching staffs' beliefs and reactions towards ICT integration in the administrative and academic functions of government aided secondary schools in aspects of information management as well monitoring and supervision.

According to Ajzen, (1985) in the theory of Reasoned Action, the individual behavior is motivated by behavioral objectives and these are a function of an individual's attitude towards the behavior and subjective norms surrounding the performance of the behavior. According to Davis (1989), the perceived usefulness factor and perceived ease of use factors are major factors in computer use behaviors based on Technology Acceptance Model. TAM has been widely used to scrutinize individual technology acceptance behavior in various types of information systems. For example, Mulugeta et al. (2020) used the TAM constructs to determine whether it can be applied to assess health professional's behavioral intention to adopt e-health systems in resource-limited

settings, results showed that attitude towards e-health was the strongest determinant factor for the intention to use e-health. Perceived usefulness and perceived ease of use were also found important determinants for attitude towards e-health. Understanding administrator's perceptions and attitudes towards ICT integration in schools and the factors that influence these perceptions is important for designing ICT integration and management policies that are sensitive to their needs. School leaders' perceptions towards ICT integration for effective and efficient management has been a topic of considerable interest and concern. The significant relationship between principals' technology leadership and technology integration is paramount (Thannimalai & Raman, 2018).

Positive perceptions and attitudes of school leaders towards ICT integration in school management is an essential prerequisite for active integration of ICT in school activities Kerubo (2016). It is believed that if implementers perceived technology programs as neither fulfilling their needs nor organizations' needs, it is likely that they will not integrate the technology into their operations. According to Mayamin (2020), there is a widespread positive perception of ICT, researching about school teachers' perceptions and views about the use of technology in relation to government education, participants identified a number of encouraging factors linked to the promising outcomes that ICT could bring to the future (ibid).

In South Africa Tigere (2020) studied Perceptions of school management teams on information and communication technology integration in township and rural secondary schools in KwaZulu-Natal, results revealed that the principals had persevered to implement ICT integration in their schools. This implies that they had positive perceptions and attitudes towards ICT integration. Similarly, in Kenya, Kerubo (2016) in his study about factors influencing ICT integration in resource Planning in

secondary schools, results revealed that the respondents had moderate positive perception towards the ICT integration in resource planning in schools. The study concluded that influence of teachers' perception on ICT integration in resource planning and principals' age greatly influenced the integration of ICT in resource planning in secondary schools. However, the study only explored administrators' perceptions about ICT integration in resource planning in secondary schools in Kenya, therefore, the current study looked at users' attitudes in form of ICT fondness, ICT usefulness, and confidence as its indices to evaluate users' attitudes towards ICT integration in the management aspects of administrative and academic functions in government aided secondary schools in Kanungu District, Uganda.

A number of attitudinal scales have been developed by various researchers to evaluate teachers' attitudes and these scales range from computer avoidance, anxiety, self-efficacy, enthusiasm, confidence, liking/fondness, and usefulness of computers in personal life (Manduku et al., 2012; Ogundile et al., 2019). The current study focused on users' attitudes as one of the success factors for ICT integration in the management of government aided secondary schools in Kanungu District, Uganda by using ICT fondness, ICT usefulness and confidences as the sub factors to evaluate users' attitudes. An investigation on teachers' attitudes provides insights into their perception of ICT implementation in their administrative and academic functions in schools where they work.

A study by Onwuagboke and Singh, (2016) which was carried out in Kenya revealed gender attitudinal disparity where it was found out that males teachers had positive attitude towards ICT compared to their female counterparts. Thus, the study revealed that ICT integration had been greatly influenced by teachers' perceptions. In the same vein, Bariu and Chun, (2022) established that male teachers had a slightly higher

positive attitude towards using ICT tools such as computers, unlike their female counterparts. However, other researchers such as Mingaine, (2013) reiterated that positive attitude did not necessarily mean integrating or adopting the technology. Therefore, according to them, teachers' positive attitude towards ICT technology did not significantly influence ICT implementation. Similarly, a study by Salele and Khan, (2022) showed that positive teachers' attitudes towards ICT technology did not significantly influence the perceived intentions to adopt ICT in pedagogical practices. Contrary to this, Buabeng-Andoh, (2019), asserted that personal characteristics such as level of education, age, gender, education experience, and attitude greatly influenced ICT implementation in institutions.

Due to the controversies in the findings by different researchers about the influence of attitudes on ICT acceptance and usage, The current study focused on examining success factors for ICT integration in the management of government aided secondary schools in Kanungu District, Uganda by considering users' attitudes as one of the critical success factors that predict ICT integration in administrative and academic functions. Attitude was measured in terms of ICT fondness, ICT usefulness and confidences as per the literature (Manduku et al., 2012; Ogundile et al., 2019).

Nchunge et al. (2012) carried out a study about user perceptions on ICT adoption in Kenya's Thika District, a sample of 92 respondents was assessed for their attitudes. The population of the study was the school management and teachers involved in ICT implementation in secondary schools in the District. Results revealed that there was technology acceptance setback. However, the findings from the study cannot give an overview of the perceptions of other teachers involved in the administration of secondary schools. It is possible that teachers from the District that was studied have different perceptions regarding the use of ICT in administration compared to teachers

from other places. Furthermore, every country and District has its own uniqueness in context, which is why the current study is intended to be conducted in Kanungu District of Uganda which is believed to have a different context other than Kenya.

Literature reviewed in this section points out that it is important to understand that for school leaders to adopt and integrate ICT in carrying out management and administrative tasks in schools, they have to perceive technology as a better practice which is in line with existing needs and ease of use. If they have negative perceptions towards technology, then they are likely to become hesitant to technological changes and applications Kerubo (2016). Therefore, providing them with excellent ICT facilities may not necessarily influence how and when they will use it in performing school management and administrative tasks unless their attitudes and perceptions are carefully understood. This study therefore sought to examine users' attitudes as one of the success factors for ICT integration in enhancing the management of government–aided secondary schools in Kanungu District, Uganda.

2.4 Users' Competences and ICT Integration in the Management of Secondary Schools

Competency refers to the ability to do something successfully or efficiently. In this study, User's competencies refers to the ability of school based ICT users that is, head teachers, teaching and non-teaching staff to integrate/use ICT in carrying out administrative and academic functions. Marcial and Rama (2015) assert that the ICT competency level of the respondents is interpreted as 'knowledge deepening level. Therefore, for ICT integration programs to be effective and sustainable, school administrators themselves must be competent and knowledgeable in the use of the technology, and they must have a broad understanding of the technical, curricular,

administrative, financial, and social dimensions of ICT use in education (Chepkonga, 2012).

ICT plays a key role in the planning and management of complex information flow and integration of such information towards effective policy formulation and planning towards the utmost maximization of human capital and potential in the school environment. ICT competency envisions sufficient skills and knowledge in the use of computers and associated devices and applications, therefore school administrators are expected to demonstrate the ability to apply knowledge and abilities needed in ICT-related complexities.

The Technological Acceptance Model that was developed by Davis (1989), explains perceived usefulness and perceived ease of use as relevant factors in computer use behaviors. Davis defined perceived usefulness as the prospective user's belief that using a specific system application will enhance their job or life performance, according to Davis, perceived ease of use is defined as the degree to which the prospective user expects that the target system is free of effort. The perceived usefulness of technology relates to the belief among users such as school heads, teaching and non-teaching staff that it would make their work easier thus enhance/improve their job performance (Muinde & Mbataru, 2019). This means that if school heads, teaching and non-teaching staff think that the use of ICT would make their day-to-day activities such as preparation of schemes of work, lesson plans, lesson materials, or analyzing student's results be carried out more accurately and in an organized way, then they would probably use it. The perceived ease of use of new or existing technology would mean that the users view technology as one that does not necessitate a lot of effort to learn how to use (Venkatesh et al., 2003). This suggests that as school heads, teaching and non-teaching staff would possibly adopt and use technology which they consider easy

to learn and use with minimal need for expert consultation. Based on this, the researcher decided to examine users' attitudes and competences as some of the critical success factors for ICT integration in the management of government aided secondary schools in Kanungu District, Uganda.

Accordingly, for one to perceive any information system to be free of effort, one has to possess some skills or competencies in dealing with the system. Being digitally competent today implies the ability to understand media (as most media have been/are being digitalized), to search for information and be critical about what is retrieved (given the wide uptake of the internet) and to be able to communicate with others using a variety of digital tools and applications (mobile, internet) (Ferrari, 2012). Therefore, the current study focused on examining critical success factors for integration of ICT in the management of government aided secondary schools in Kanungu District, Uganda and the researcher considered users' competencies as one of the major success factors for its integration and it was measured in terms of users' ability to process information, communicate and create content using ICT. This is because digital competence refers to the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks, solve problems, communicate, manage information, collaborate, create and share content, and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work (ibid).

Digital Competence is at the convergence of multiple fields, the concept of digital competence is a multi-faceted moving target, covering many areas and literacies and rapidly evolving as new technologies appear. Given these circumstances, education managers are required to have increased managerial and communication skills. It is vital for those in management positions to recognize the imperative of continuing

professional development and ensure that staff are proactive in maintaining up-to-date levels of expertise. The significance of continued professional development in this climate has been acknowledged by both the United Kingdom's Chartered Institute of Library and Information Professionals (CILIP) and the United States' American Library Association (ALA). Fort (2017) discussed the ICT skills educators must possess in order to collaborate and communicate with others and to create meaningful outputs relative to the needs of their work. He found out that mastery of Microsoft Office/productivity tools (word processing, spreadsheet, electronic presentation skills, database management), internet navigation skills (searching the web efficiently, web resources, search skills, internet and flexibility), e-mail management skills (communicating using email), networking skills, troubleshooting are skills educators have to master. There are still other skills that the educators need to be capable of doing. These are, being willing to learn new technology, connecting with social media, sharing and collaborating via YouTube and blogging, unlocking the potential of mobile devices, goggling it, getting ahead in the cloud and technical assistance. Because of this, the current study sought to examine users' competencies as one of the critical success factors for the integration of ICT in the management of secondary schools in Kanungu District, Uganda and it was measured in terms of users' competencies in information processing, communication and content creation in as far as executing both administrative and academic functions are concerned in secondary schools.

The results of Amuche & Iyekekpolor (2014) study in Philippines revealed that most of the teachers had low level of ICT competency. However, some studies showed positive point of view in terms of ICT use and competency for example Catanaoan, (2017) showed that the respondents were very literate in using Microsoft Word except for some word processing tasks. Gatpandan (2012) mentioned that the selected public

secondary school teachers in the 7th congressional District of Cavite were aware of the hardware, software, and internet operations. However, the texts above lacked empirical evidence of studies done in Uganda relating to users' competencies and ICT integration in the management of secondary schools. Therefore, the present study sought to assess users' competencies in ICT integration in the management of secondary schools in a Ugandan setting in Kanungu District while measuring users' competencies in terms of users' ability to process information, communicate and create content using ICT as the sub factors/indices of user competencies.

Aslan and Zhu (2018) in their study about starting teachers' integration of ICT into their teaching practices in the lower secondary schools in Turkey, The study showed that perceived competence in ICT integration and pedagogical knowledge was significant predictor for starting teachers' integration of ICT into their teaching practices. However, the study considered teachers' competencies in ICT integration in teaching and learning, therefore the current study considered ICT competencies in terms of information processing, communication and content creation specifically in integrating ICT in the administrative and academic functions in the management of government aided secondary schools in Kanungu District, Uganda.

2.5 Facilitating Conditions and ICT Integration in the Management of Secondary Schools

Facilitating conditions refers to the degree to which individuals believe that the present organizational and technical infrastructure can support the use of technology (Chan et al, 2010). Teo et al. (2008) defined facilitating conditions as factors that are present in the environment that exert an influence over a person's desire to perform a task. According to Vanderlinde and van Braak (2010), ICT infrastructure measures the perceived availability and suitability of the ICT tools such as hardware, software and

peripheral equipment provided in the school. It can be argued that administrators can provide the conditions that are needed, such as putting in place an ICT policy, incentives and resources. Facilitating conditions in general may include ICT infrastructure, technical and administrator support. Kular et al. (2008) defines administrative support as an act of giving out or applying something in an organization. In this study, administrative support refers to the help and guidelines given out by administrators in education institutions to aid in computer training and integration of ICT into the school management in both administrative and academic functions for the smooth running of the school.

Several past studies have tried to relate facilitating conditions and ICT implementation, for example in Yemen, a study that was carried out by Al-Mamary, (2022), findings showed that easy access to ICT infrastructure, availability of support from technical support teams, training for technology use were important factors that impacted on teachers use of technology in schools. According to Kenechukwu (n.d.), before any ICT-based programme is launched in schools, school managers and other policy planners must carefully consider the following: appropriate rooms or buildings available to house the technology, availability of electricity and telephony, availability of adequate and trained human resource as well as adequate information technologies like computers or enough resource to purchase them.

Based on the above literature, the current study sought to examine the critical success factors for integration of ICT in the management of government aided secondary schools in Kanungu District, Uganda and considered facilitating conditions as one of ICT integration success factors. The current study sought to examine the relationship between facilitating conditions and ICT integration in administrative and academic

functions. Facilitating conditions were measured in terms of administrative support, technical support and ICT infrastructure.

Basic infrastructures are critical for successful implementation of ICT resource planning in schools (World Bank, 2014). Technical and basic infrastructures, coupled with sustaining plans, make up structures that can empower or constrain the application of ICT in secondary education. Literature by Bryderup and Kowalski (2002) has it that the development of ICT school plan with clear goals and defined means to realize the goals is a crucial step towards actual ICT integration and a visionary leader is a major requirement as well. In addition to this, findings from one of the studies from Kenya indicated that the availability of technical support specialists was one of the important infrastructure that enhanced the integration of ICT in schools. The general technical support required was in the installation, operation and maintenance of ICT. Without on-site technical support, much time and money may be lost due to technical breakdowns and can delay the operations. Aheisibwe (2020) in his study about utilization of Information Communication Technologies in effective administration of secondary schools in Mitooma District of Uganda, he found out that lack of knowledge and skills of ICT, limited electricity supply, poor quality computers and limited computer accessories were some of the reasons for non-utilization of ICT.

Wanjala (2015) conducted a study on teachers' perceptions on the use of information communication technology in the administration of public secondary schools in Kimilili Sub County, Bungoma County, Kenya. The study sought to answer research questions on the perceptions of teachers regarding the level of availability of ICT facilities, the extent of use of ICT, effects of using ICT in administration and strategies that could be used to improve the use of ICT in the administration of public secondary schools. The findings of the study revealed that basic ICT hardware and software were

available in most schools but they were entirely not adequate for use in performing administrative tasks. They could use the computer to store and retrieve past examination papers, print results, and make copies of official documents. Most teachers in the study indicated that use of ICT had influenced their performance of administrative tasks since they were able to cut down on costs.

However, the highlighted text in this section shows that there is lack of empirical evidence of studies done in Uganda relating to success factors and ICT integration in the management of secondary schools. Therefore, the current study sought to examine success factors for ICT integration in the management of government aided secondary schools in Kanungu District context. It examined users' competencies in terms of administrative support, technical support and ICT infrastructure as the sub factors/indices to evaluate head teachers', teaching and non-teaching staffs' competencies in integrating ICT in the administrative and academic functions in schools where they work.

2.6 Summary

From the preceding literature, ICT integration and success factors for its integration in the management of secondary schools has been reviewed and highlighted. In all the studies reviewed above, aspects of success factors for ICT integration in the management of secondary schools are not adequately covered specifically considering Kanungu District hence illustrating a gap in the literature. The reviewed literature shows that ICT usage in the management of secondary schools has the potential to improve the quality of education if it is well integrated. Nonetheless, a number of studies have revealed that there are challenges that have slowed down the adoption and use of ICT in secondary schools. Furthermore, there is limited empirical literature on success factors for ICT integration in managing secondary schools in the context of

Kanungu District and the methodological approaches used in the previous researches adopted either qualitative or quantitative approaches. There was a need to address the issue for a more complete understanding through triangulating and synthesizing both quantitative and qualitative data, hence the current study aimed at examining success factors for ICT integration in the management of government–aided secondary schools in Kanungu District, Uganda using a mixed methods approach.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The study examined success factors for ICT integration in the management of government –aided secondary schools in Kanungu District, Uganda. This chapter explains how the study was carried out under the following headings: research paradigm, research design, study area, target population, sample size and sampling techniques, research instruments, validity and reliability of the instruments, data collection procedures, data analysis techniques and ethical consideration.

3.2 Research Paradigm

According to Willis et al. (2007), a paradigm is a wide-range or comprehensive belief system, a worldview or a framework that guides research and practice in a field of study. Paradigms provide different ways of looking at human social life, make own assumptions about the nature of social reality and can open up new understandings and unique ways of generating knowledge (Luitel & Taylor, 2019). This research study used a pragmatic philosophical worldview. Pragmatic approach involves using the method which appears best suited to the research problem. The method that best bring solutions to the problem without being caught up in philosophical wars of either quantitative or qualitative approach of conducting research. Pragmatic researchers therefore give themselves the freedom to use any of the methods, techniques and procedures associated with quantitative or qualitative research. They recognize that every method has its limitations and that the different approaches can be complementary. Pragmatism world view is used by mixed method researchers who collect both quantitative and qualitative data and mix them at the same time or one after the other or emphasizes on both equally or unequally.

3.3 Research Design

Research design can be thought of as the logic or master plan of a research that throws light on how the study is to be conducted. It constitutes the blueprint for the collection, measurement and analysis of data (Kothari, 2004). Pragmatic philosophical assumptions influenced this study to apply mixed method research approach using concurrent triangulation mixed research design currently known as the convergent design (Creswell et al., 2003). This is a one phase design in which the researcher implemented the qualitative and quantitative methods for generating data at the same timeframe and with equal weight applied to them. It involved concurrent, but separate, collection and analysis of qualitative and quantitative data and the results integrated during the interpretation time in order for the researcher to understand the research problem best (Creswell & Creswell, 2017). This design was employed because it enabled the researcher to support data obtained from one method with another hence complementing the weaknesses of one method with the other's strength. The challenge of using this design was that much expertise and effort was required now that data was being generated concurrently and that both qualitative and quantitative approaches carried equal weight. The study applied mixed methods design in generating, analyzing and then converging data during interpretation and discussion. This involved the collection and analysis of both quantitative and qualitative data in a single study in which the data was collected and generated parallel respectively (Creswell, 2003). Concurrent triangulation mixed methods provided the researcher with room to integrate different methods for generating both qualitative and quantitative data hence complimenting each other to produce quality results Figure 3.1 below shows a visual model for the mixed methods research design.
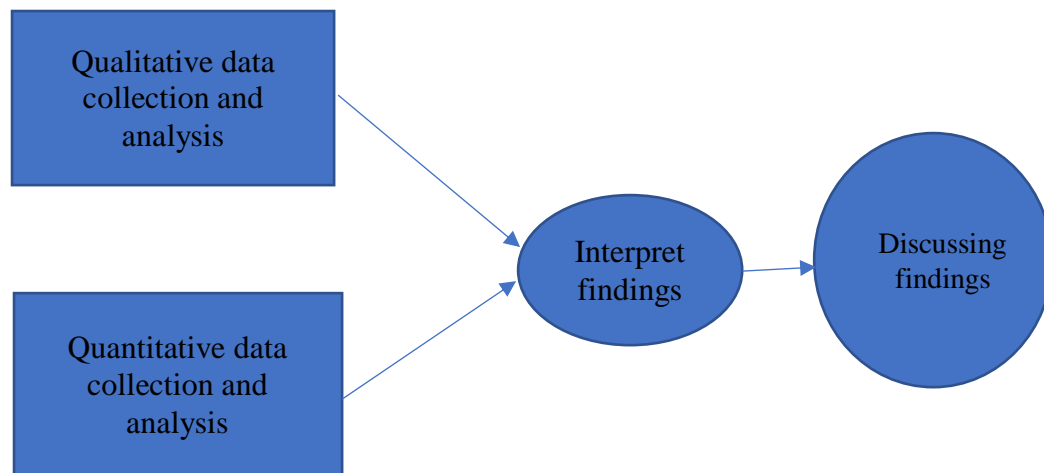
Figure 3.1: Visual Model for the Convergent Research Design

Source: *Adapted from Creswell and Creswell (2018)*

The data from the two datasets were analyzed separately. Quantitative data was analyzed first (see chapter 4, sub-section 4.4) and there after qualitative data analysis followed (see chapter 4, sub-section 4.4) as per the objectives of the study. Findings from the two datasets were followed by a discussion section in chapter four sub section 4.5 presenting the key findings of the study in which the findings were compared for supportive and non-supportive outcomes.

3.4 The Area of Study

The study was carried out in Kanungu District, Western Uganda. Kanungu District is one of the Districts in the South Western region and found in the Kigezi Sub-Region. The District has 17 sub counties, 72 parishes and 503 villages. It is located between 29050'E and 0045'S of the Equator, bordering Rukungiri District in the North and East, Kabale District in South East, Kisoro District in the South and the Democratic Republic of Congo in the West. The District administrative headquarters are located in Kanungu town, about 450km from Kampala, the capital city of Uganda. Kanungu District has a total area of 1,228.28sq km, comprising 60% small scale farmland, 15% high tropical forest, 11% woodland, 9% grass land, 2% bush land, 1% open water and 2%

miscellaneous mosaics. The District has a total population of 257,300 people representing less than one percent of the total population in the whole country and it has a diversity of ethnic groups.   Kanungu has 48 out of the 56 legally recognized ethnic groups in the whole country with the majority being the Bakiga who account for more than 88 percent of its population. Other categories of communities that make up Kanungu District include the minority groups (Batwa and Banyarutunde), civil servants, business community and vulnerable groups. The major economic activity carried out in Kanungu is farming with some people engaging in both large scale and small scale business. Kanungu District is well known for tea growing with three tea factories that is, Kayonza growers' tea factory, Kinkiizi Development Company tea factory and Rugyeyo tea factory. Kanungu people also indulge in tourism activities as Kanungu shares the biggest part of Bwindi Impenetrable National park and part of Queen Elizabeth National Park. Religiously Anglicans are predominant and accounts for 56 percent.

Kanungu District has been selected as the area of study because according to Rural Communications Development Fund (RCDF) report (2014/15), Kanungu is one of the Districts in Uganda with high number of secondary schools that received computers from the Ministry of Education and Sports in collaboration with Uganda Communications Commission (UCC), therefore, head teachers, teaching and non-teaching staff in Kanungu government aided secondary schools would provide relevant and accurate information regarding ICT integration in the management of secondary schools in Uganda. Moreover, Kanungu District has a contextual composition of both urban and rural setting, this is because some schools are located in urban areas while others are located in rural areas, hence would give a clear indication of ICT integration in the management of secondary schools in Uganda. It is against this backdrop that

Kanungu District was deemed ideal for this study. The study targeted public schools from Kanungu District with an aim of exploring ICT integration in the management of these secondary schools.

3.5 Target Population

Target population is a group of people that is identified as the intended participants for research. It refers to a group of people or study subjects who are similar in one or more ways and which forms the subjects of the study in a particular study (Kombo & Tromp, 2006). Rather than meaning everyone who lives in the study area, it refers to all the items in the category of things that are being researched (Denscombe, 2017). Only school based ICT users who directly involved in the implementation of ICT integration in the management of secondary schools were selected as study participants. The school based ICT users' categories from which the researcher selected participants included the following:

Head teachers from selected secondary schools in Kanungu District. These were critical to the study since they are the strategic decision-makers, and the school administrators. In their position, they influence knowledge and skills, training, information, and any activity concerning ICT integration in school. They therefore provided relevant information about ICT integration in the management of secondary schools.

Non-teaching staff. These are also directly involved in the use of ICT in the management of secondary schools and therefore, have knowledge and provide required information about the integration of ICT in the management of secondary schools where they work. For example, school bursars are so much involved in the use of ICT in schools in matters concerning financial management.

Teaching staff. These are also school based ICT users in school setting. They execute academic functions within the arena of managing secondary schools and at times they also involve in the administrative functions. They provided data about ICT integration in the management of secondary schools where they work. Teachers were chosen because they command first-hand knowledge regarding ICT integration in school systems and how it obtains in administrative information management as well as supervision and monitoring. Moreover, they were expected to be objective compared to head teachers who are directly responsible for ICT integration in the management of secondary schools. The target population of teachers was 334 based on the available sampling frame of the academic staff of the respective schools.

Directors of studies. These are part of the teaching staff, however they engage much in the administrative tasks than their colleagues who are just teachers. Therefore, directors of studies were selected for interviews as heads of department.

3.6 Sampling Design and Sample Size

3.6.1 Sampling design

The quality of a piece of research stands or falls not only by the appropriateness of methodology and instrumentation but also by the suitability of the sampling strategy that has been adopted. Sampling is the process of selecting a number of individuals for a study in such a way that the selected individuals represent the large group from which they were selected. The study applied both probability and non-probability sampling techniques. The 12 government-aided secondary schools in Kanungu District which received computers from the government were divided into subgroups called strata based on their location on the basis of rural or urban. Simple random sampling was used to select 10 schools to represent the sub-groups in the study.

From each selected school, purposive sampling technique was used to select head teachers because of their typicality to the current study situation. This technique was used to enable the researcher to get the information from the study participants that would answer the research question. Secondly, ICT integration in the management of secondary schools to ensure quality management is directed by the head teachers who are also managers of the schools. The non-teaching staff in this case school bursars were also purposively selected because they constitute the school based ICT users that work hand in hand with the sitting head teacher of the respective school to manage the affairs of the school. According to Burke & Christensen (2008), purposive sampling is a non-random sampling technique which the researcher uses to solicit persons with specific characteristics to participate in a research study. Simple random sampling was used to select teachers to participate in the study. This approach gave every teacher an equal and a non-zero chance of being included in the sample.

3.6.2 Sample size determination

The researcher used the formula by Kothari (2004) to calculate the sample size for the finite population for quantitative data as shown below:

$$n = \frac{z^2.p.q.N}{e^2(N-1) + z^2.p.q}$$

Where

(N) = Target population.

(z) = Z-score at confidence level 95% is 1.96.

(e) = Margin of error 5% (0.05).

(p)= Population portion assumed to be 50% (0.5)

(q) = 1 − p is (0.5)

The formula yielded a sample size of 179 from a total population of 334 teachers based on the schools' staffing. This sample size was also confirmed by the use of the online sample size calculator at confidence level of 95% and the confidence interval of 0.05 which yielded the same sample size.

Table 3.1: Table Showing Study Participants' sample size, sampling method and data collection methods

NO	Description	Target population	Sample	Sampling method	Data collection method
1.	Head teachers	10	05	Purposive	Interview
2.	Non-teaching Staff (Bursars)	10	05	Purposive	Interview
3	DOS	10	05	Purposive	Interview
4.	Teachers	334	194	Proportionate Simple random	Questionnaire
	Total	**354**	**187**		**100%**

Source: Field notes (2022)

Table 3.2: Table Showing Sampling Frame and Sample Selected for academic staff/teachers

NO	SCHOOL	Teachers	%	SAMPLE
1.	School A	42	13%	23
2.	School B	25	7%	13
3.	School C	39	12%	21
4.	School D	44	13%	23
5.	School E	24	7%	13
6.	School F	43	13%	23
7.	School G	45	13%	23
8.	School H	26	8%	14
9.	School I	24	7%	13
10.	School J	22	7%	13
	Total	**334**	**100**	**179**

Source: *Survey data* (2022)

3.7 Data Collection Methods

Data generation is the exercise of the collection and measurement of evidence on study variables of intent in a conventional systematic mode that allows answering the

specified research questions, testing of the study hypothesis, and, appraise the outcomes (Kabir, 2017). To meet the objectives of the study, the researcher collected data using semi-structured interviews, and survey questionnaire.

3.7.1 Survey questionnaire method

A survey questionnaire is an effective way of assessing the behavior, attitudes, preferences, opinions, and intentions of a relatively huge number of subjects more cheaply and quickly than other methods (Creswell, 2014). In this method, a questionnaire was given out to the teachers with a request to them to answer the questions. (Refer to appendix VI). The questionnaire was structured with definite, concrete, and pre-determined questions (O'Leary, 2014). The questions had predetermined and limited responses from which to choose the most appropriate specified responses. Questionnaire was used because of being simple to administer to respondents and relatively cheap to analyze. Secondly, the provision of alternative responses helped to understand the meaning of the questions clearly. The first part of the questionnaire was about respondents' profile, where basic demographic questions such as the participants' sex, educational qualification, age, among others were included, the second part of the questionnaire incorporated questions about the research topic covering all the objectives. As for the scale used, questionnaires adopted a five-point Likert scale format to assess respondents' responses for each related section. (1 = Strongly Disagree, 2 = Disagree, 3 = Not sure, 4=Agree, 5 = Strongly Agree).

3.7.1.1 Questionnaire

A questionnaire is an assortment of pre-determined questions for all respondents that serve as a primary data collection instrument in research (Takeshi & Billinge, 2012). For this study, a large sample was needed, therefore, it was natural to use a questionnaire to obtain as many respondents as possible (Creswell, 2014). A

questionnaire is an instrument for gathering primary data (Cohen et al., 2020). The researcher developed and organized the questionnaire in relation to the study objectives and the participants were expected to answer the questions as per the guidelines that were given (refer to appendix vi).

The questionnaires for the teachers comprised of two sections, the demographic information and the section about the study variables covering all the objectives. The questionnaire was structured, with pre-determined responses. It was used to gather quantitative data meant establishing relationships between the two study variables and also testing hypotheses. This technique was appropriate because large numbers of teachers were involved in the study thus making it less costly and less time-consuming. Furthermore, the respondents who were teachers were literates and capable of responding to the questionnaire items easily.

3.7.2 Interviews

Interviews are recommended for gathering qualitative data on respondents' lived experiences to better understand the meanings attached to them (Yin, 2011). Besides, semi-structured interviews were used to gather qualitative data. This was because of its power of language to light up and reveal meanings as well as its flexibility and appropriateness in constructing new knowledge. This is as a results of probes and interactions between the interviewee and the interviewer on grounds that knowledge is not given but created and negotiated (Yin, 2011; Owen, 2014). Based on such views, the researcher used semi-structured questions as a method of gathering data from participants (refer to appendix: xii, xiii and ix). The interviews were conducted with purposively selected school head teachers, director of studies and bursars who were audio-recorded with their consent. The interviews focused on understanding users' perceptions about the success factors for ICT integration in the management of

government-aided secondary schools and the meanings subjectively or socially attached to them (Creswell, 2014). The interviews lasted between 15-30 minutes.

3.7.2.1 Interview guide

A semi-structured interviews guide was used to understand the participants' perceptions about success factors for ICT integration in the management of government-aided secondary schools and interpret their meanings, to construct knowledge that contributes to general understanding (Clarke & Braun, 2013). An interview guide is a list of questions that have been prepared and organized, to help as a guide for the interviewer and interviewee in gathering data about a specific topic (Kallio et al., 2016). There were three (3) sets of interview guides (refer to appendix xii, xiii and ix). The interview guides were used to obtain qualitative data from the head teachers, director of studies and, non-teaching staff members about their perceptions and views concerning success factors for ICT integration in the management of secondary schools. The interview guides were used for collecting data from key informants that could not be got using the questionnaires and for supporting and supplementing questionnaire collected data.

3.8 Data Collection Procedure

The process of data collection started off with seeking clearance to conduct the research from relevant institutions and authorities. The researcher then went through interview guides and questionnaire to ensure a deep understanding of the instruments and also be aware of the researcher's role in personally collecting data. Letters requesting the respondents to participate in the study were dispatched during the pre-visit to the schools. Data collection started with the pilot study which was conducted in the neighboring schools that were not included in the study in order to enhance validity and reliability of the data to be collected and increase the response rate. A schedule of administering the research instruments was drawn by the researcher. The researcher

proceeded to collect data from the selected respondents. The interviews were conducted by the researcher in person while the questionnaires were self-administered by the respondents.

3.9 Validity and Reliability of Research Instruments

This section is important in ensuring that the tools for data collection and the data generated are valid and reliable.

3.9.1 Validity

Validity is a measure of the degree to which a research instrument measures what it is meant to measure. Amin (2005) defines validity as the appropriateness of a tool in measuring whatever it intends to measure. The researcher used face, construct and content validity as they are relevant to the nature and purpose of the interview schedule and questionnaire that were used. Face validity refers to the extent to which a test seems to cover the relevant content it intends to cover (Onen, 2016). The content validity refers to connections between the test items and the subject related tasks in a manner sufficiently representative, relevant and comprehensible (Creswell, 2012), while construct validity is about how well a test measures the concept it was designed to measure. It's crucial to establishing the overall validity of a method. For construct and face validity, the clarity of the items, completeness and level of language was checked through consultations with the researchers' course supervisors and ICT specialists which helped to assess the significance of each item on the Likert scale in the questionnaire. The advice of these experts helped to design the questions that captured all objectives of the research study. This is reinforced by Kothari (2004), who contends that validity, should not depend on the subjective judgments of only one specialist rather several specialists can give test items. Their feedback was then used to revise the contents of the instruments accordingly.

For content validity, the Content Validity Index (CVI) based on the results was gotten for the questionnaires. (Yusoff, 2019) defines the Content Validity Index as, the degree to which elements of an assessment instrument are appropriate to and representative of the target attributes for a particular assessment. Amin (2005) argues that content validity is determined by expert judgment where experts in the field being studied are asked to assess its validity. Therefore, he gives the formula of content validity index CVI as:

$$C.V.I = \frac{\text{No. of items declared valid by judges}}{\text{Total number of items}}$$

Polit and Beck, (2006) contended that there were two forms of CVI, that is, CVI for the item (I-CVI) and CVI for scale (S-CVI). One method necessitates universal agreement among the experts (S-CVI/UA) but a less conservative method averages the item-level CVI (S-CVI/Ave). This study used S-CVI/Ave. Before calculating CVI, the relevance rating was recorded as 1 (relevance scale of 3 or 4) or 0 (relevance scale of 1 or 2). Based on the responses from expert judgment, and using the above formula, the researcher calculated the number of items that were rated relevant against the total number of items to obtain I-CVI. 0.90 value for two experts was attained. This is regarded as evidence of good content Validity of an instrument (Yusoff, 2019). According to Amin (2005), the research instrument is considered valid when the C.V.I output is 0.5 and above.

3.9.2 Reliability of Research Instruments

The reliability of the questionnaire means the ability of the questionnaire to gather the same data consistently under similar conditions (Burke & Christensen, 2008). Creswell et al. (2018) defines reliability as the degree to which the instrument produces the same results or data after several trials. Correspondingly Kothari (2004) describes reliability

as the central criterion that reveals the degree to which an instrument quantifies what it is supposed to quantify.

The researcher used data gathered from the pilot study to establish the reliability of the instrument's items for quantitative data. The data collected from the pilot study was used to calculate both the internal and external reliability of the instrument's items. Reliability coefficient is used to evaluate the consistency of the data with Cronbach Alpha being the most commonly used measure (Hair et al., 2010). The reliability coefficient was calculated to test the internal consistency among the variables and to select how the variables correlated among themselves. The rationale for determining internal consistency was that the individual items of the scale should all be measuring the same construct and thus be highly inter-correlated. The reliability test was done for the three constructs of users' attitudes, users' competencies, and facilitating conditions using Cronbach alpha. For the dependent variable ICT integration, the Cronbach alpha was also used to calculate reliability. Kothari (2004) level of 0.7 was used as a benchmark level to indicate acceptance levels of internal consistency of the instruments. Table 3.3 presents the results of the reliability test.

Table 3.3: Cronbach alpha coefficients

Variables	Cronbach alpha	Number of items
Users' attitudes	.723	12
Users' Competences	.822	16
Facilitating conditions	.799	15
ICT integration	.881	15

Source: Primary data

Alpha coefficients for all the variables were in the range of .723–881 for final test after the field. The alpha coefficients were all above the benchmark level as suggested by Kothari (2004) and therefore entire questionnaire was reliable.

The test-retest reliability method was used to establish external reliability of the instrument, the same instrument was administered to participants on two different well-spaced occasions of three weeks in a pilot study in Kabale District with 10 teachers who were not going to be included in the actual study. With the help of SPSS version 21.0, the researcher correlated the test results from the two occasions to get the correlation coefficient. Pearson Product Moment was used to determine the association coefficient for ascertaining the extent to which the content of the questionnaires was consistent in producing the same response whenever the tool was administered. The computation generated a correlation coefficient of 0.87. This coefficient revealed that the instrument had a high degree of reliability. Besides, Amin (2005); Kothari (2004) articulates that a high notch of reliability is indicated by a constant of 0.7 and above.

3.10 Ensuring Trustworthiness

For purposes of ensuring the trustworthiness of the interview guide for collecting the qualitative data, the key issues were; credibility, transferability, dependability, and conformability as discussed in detail below. The strength of any research study is producing credible outputs in form of findings (Anney, 2014). This is always influenced by the philosophical underpinnings, suitable methodological approaches, the nature and processes of data analysis, and the credibility of the inquirer (Lincoln & Guba, 1985). This corresponds with Anney's (2014) contention that each research approach uses distinct assessment criteria to ensure that there is rigor in the inquiry because of different philosophical and methodological assumptions that guided each approach. Given this, quantitative approaches observe tests of validity and reliability to evaluate the quality of their research findings. This is opposed to the qualitative approaches which adhere to trustworthiness of the research findings (Lincoln & Guba, 1985; Smith et al., 1994; Schwandt et al., 2007); Anney, 2014). Therefore, qualitative research is

trustworthy if its findings can be trusted by the readers to the extent that the readers are confident in them based on the criteria followed while investigating the phenomenon. The criterion that is used to determine trustworthiness in qualitative research to ensure the rigor of the findings is based on, credibility, transferability, dependability, and conformability (Lincoln & Guba, 1985; Schwandt et al., 2007); Creswell, 2014; Patton & McMahon, 2014).

To safeguard the above, the researcher employed several strategies which included; prolonged data collection till its saturation, member checking, and peer debriefing (Lincoln & Guba, 1985; Creswell, 2014).

3.10.1 Credibility

Credibility is the same as internal validity in quantitative research and it is about the aspect of truth validity. It determines whether the results represent reasonable information drawn from the participant's original data and whether it is the correct interpretation of the participants' original views (Lincoln & Guba, 1985; Korstjens & Moser, 2018).

To safeguard credibility of the results, the researcher purposively selected key informants (head teachers, teaching and non-teaching staff). This was followed by prolonged engagement with the respondents through semi-structured interviews based on the research protocol till data saturation. The findings were later triangulated from multiple respondents. Member checking on the interview scripts and their summaries was frequently done with the respondents for clarity. Besides, during the data collection and analysis, the researcher carried out peer debriefing to obtain a second opinion for deeper understanding and interpretation of some findings that were emerging from the

data. The findings from the respondents were also corroborated with other information gathered from related literature.

3.10.2 Transferability

Transferability about the findings of the study being applicable to other contexts with similar specificities (Lincoln & Guba, 1985; Cohen & Crabtree, 2006; Maree, 2012; Korstjens & Moser, 2018). Although this criterion is criticised by the positivists because of its inability to be generalized to a large population, the context in which it is applied is different from how it is statistically applied in qualitative research. Yin (2011) contends that the findings of qualitative study are generalizable to theoretical propositions and not statistically to the population. Miles and Huberman (1994) affirm that qualitative research aims at exploring the complex phenomenon experienced by the respondent to generate new ideas, interpretations, meanings, and insights that can be applied to other contexts for analytical purposes. Therefore transferability refer to the generalization of ideas or theoretical knowledge generated so that they can be applied in various contexts (Mahoney, 2018). Given this, a new idea or theoretical knowledge from the study of success factors for ICT integration in the management of government aided secondary schools may be broadly applied to their similar context.

In order to ensure transferability, the researcher used multiple data sources through interviews and questionnaires with the school based ICT users. The findings were corroborated with literature review and field notes to produce credible data in regards to ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. Member checking on some findings was also undertaken soon after completing some preliminary data analysis with some head teachers, teaching and non-teaching staff members. The researcher also spent a prolonged period

with some participants who had a lot to tell about their opinions and views after they had developed confidence in the researcher.

3.10.3 Dependability

Dependability refers to the stability of findings over time. It involves the respondents evaluating the findings, interpretations, and recommendations of the study such that all are supported by the data as received from respondents of the study (Lincoln & Guba, 1985; Gunawan, 2015; Korstjens & Moser, 2018). To safeguard dependability of the findings, the researcher used an audit trail. This involved a set of notes on decisions made during the research process, reflective thoughts, research materials adopted, emerging findings, and information about data management. This enabled the researcher to study the transparency of the research process.

3.10.4 Conformability

Conformability refers to the degree to which the findings of the research study can be confirmed by other researchers. It is deals with establishing that the data and interpretations of the narratives of the respondents are not different from the respondents' imaginations, but are resulting from the data (Lincoln & Guba, 1985). The researcher before carrying out the actual study began by piloting the interview protocol. This which helped the researcher to capture the correctness and accuracy of the tool for quality and richness before gathering and analyzing the actual data. Besides, accuracy in collecting data was done through interviews that were audiotaped using of a reliable, good-quality recorder. The interview recordings were then transcribed and studied through an iterative process of comparing and cross-checking the interview data in each transcript in search of respondents' similar responses. The back-and-forth data reduction process was aimed at generating research codes, categories, and themes for consistent analysis and integration with other gathered databases for further analysis.

This was done to ensure that the evidence provided analytical descriptions, inferences, and interpretations made as findings and conclusions were adequately grounded in the data to confirm their trustworthiness (Yin, 2011; Creswell, 2014). Further, the researcher employed an audit trail, whereby a detailed process of data collection, thoughts about coding, provision of the rationale for why the codes emerged, and explanations about the themes were made (Olfert et al., 2018; Korstjens & Moser, 2018).

3.11 Data Analysis Techniques

Data analysis forms the core of any research, whether quantitative or qualitative or mixed. Flick (2018) stresses that data analysis is the essential step in qualitative research. Whatever the data are, it is their analysis that in a significant way, forms the completion of the research. According to Creswell (2012) data analysis is the progression of rendering information meaningful in an organized way. The data collected using questionnaires were checked to ensure completeness and was coded before analysis. The data that was gathered from key informant interviews were sorted and arranged according to themes. The researcher analyzed quantitative and qualitative data separately in this study.

3.11.1 Descriptive Statistics

In this study, descriptive analysis was used to generate the frequencies, percentages, mean scores and standard deviations with the help of the computer Statistical Package for Social Science (SPSS) version 21.0. After data collection, responses from all questionnaires were cross-checked to facilitate coding and processing. The mean which is the most commonly used measure of central tendency helped the researcher to summarize the essential features of ordinal data (Kothari, 2004). The mean was used to summarize scores on users' attitudes, users' competencies and facilitating conditions

for the ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. The Standard Deviation as a measure of dispersion was used to determine the disparities within the respondents' responses as per the responses obtained from the questionnaire since it gives the distribution of scores around the mean. Standard Deviation was used in this study because the data was in the form of the ordinal scale. The findings are presented in the form of tables in chapter four.

3.11.2 Inferential Statistics

Inferential statistics, involving factor analysis, Pearson correlation coefficient and regression analysis was used to determine the relationship between the independent variable and the dependent variable. This is grounded on the assumption that there is a relationship between the independent and dependent variable. Multiple Linear regression using bootstrapping was used to determine the interacting effect of users' attitudes, users' competencies, and facilitating conditions on one hand and ICT integration in the management of secondary schools on the other hand. Bootstrapping was used because the data violated the assumptions for a normal distribution (Demiralp et al., 2008). Bootstrapping procedure is a method that is used to estimate the statistical accuracy from the data in a single sample with potential bias in the sample data (Wilcox, 2017).

For purposes of data analysis, the researcher adopted the following multiple regression model.

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$

Where:

Y represents ICT integration.

B_0 represents Constant.

X_1 represents users' attitudes.

X_2 represents users' competencies.

X_3 represents facilitating conditions,

e represents Error term

β_1, β_2, and β_3 denotes regression coefficients of independent variables.

Before running linear regression analysis, the underlying statistical assumptions including; normality, linearity, homoscedasticity, multivariate outliers, and independence of observations were tested.

3.11.3 Analysis of Qualitative Data

According to Cohen et al (2011), analysis of qualitative data involves making sense of data in terms of the participants' definitions of the experience stating, themes, and categories. This explanation explains the processes through which qualitative data is conducted. However, according to how Patton et al. (2015) noted, carrying out qualitative data analysis is quite challenging. This involves the reduction of the volume of raw data by examining the irrelevant from the important, identifying important patterns, and creating a framework for communicating the essence of what the data reveals (Patton et al.,2015)

The researcher in this study, started by transcribing the collected data by playing the audio recordings several times in order to derive textual transcripts, which were then re-read to correct errors. Braun and Clarke (2014) identified these errors as sentence structures, quotation marks, omissions, and mistaken words or phrases. Specifically, for this study, transcription of interviews was done close to five weeks. This was done to ensure that spoken words were captured properly. In this study, the researcher was both the interviewer and the transcriber and thus the quality of the results was enhanced by the researcher's positive attitude towards the research, his understanding of the research, and his proficiencies in transcription. The researcher did all transcriptions of

semi-structured interviews to get familiar with the data which is a requirement in data analysis (Cohen et al., 2011). The researcher also developed transcription notations, including participant identifiers that were used to ensure anonymity. The researcher used codes and numbers to ensure anonymity. These formed part of the transcription system for the study.

Numerous methods can be used in qualitative data analysis. However, thematic analysis is broadly used by many researchers in qualitative research. (Braun & Clarke, 2006; Javadi & Zarea, 2016). Thematic analysis is an iterative process that involves moving back and forth as needed throughout the phase (Braun & Clarke, 2006.). It involves organizing, reducing, and categorizing large amounts of qualitative data to find patterns or themes, which are then displayed and questioned to identify meanings as the findings (Braun & Clarke 2006, Clarke & Braun, 2013). According to Braun and Clarke (2006), thematic analysis offers a flawless approach to analyzing qualitative data thus, it can be used to answer the research questions in this study. It offered flexibility to the researcher to generate findings based on themes.

Qualitative and quantitative data sets were merged or combined by giving equal weight to both qualitative and quantitative data. This was to help the researcher to draw inferences and conclusions based on the merged quantitative and qualitative data. Triangulation of the two datasets was done at the interpretation and discussion stage.

Table 3.4 below shows a summary of data collection methods and analysis techniques for the respective objectives of the study.

Table 3.4: Data Collection Methods and Analysis Matrix

Task	Objective	I.V	D.V	Collection method	Analysis technique
Obj. 1	Examine the relationship between users' attitudes and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda	Attitudes	ICT integration in management	Survey, Interviews.	Mean, Frequencies, Percentages, Standard Deviation, Correlation, Linear regression using Bootstrapping Latent Thematic Analysis.
Obj. 2	Examine the relationship between users' competencies and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda	Competencies	ICT integration in management	Survey, Interviews.	Mean, Frequencies, Percentages, Standard Deviation, Correlation, Linear regression using Bootstrapping Latent Thematic Analysis.
Obj. 3	Examine the relationship between facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda	Facilitating conditions	ICT integration in management	Survey, Interviews.	Mean, Frequencies, Percentages, Standard Deviation, Correlation, Linear regression using Bootstrapping Latent Thematic Analysis.

3.12 Methodology Graphical Summary

```
┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│ Pragmatism  │  ▷   │ Mixed Methods│  ▷  │ Convergent  │
│  paradigm   │      │   Approach   │     │  pararell   │
│             │      │              │     │   design    │
└─────────────┘      └─────────────┘      └─────────────┘
                                                  │
                                                  ▽
┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│Descriptive  │      │ Data        │      │ Purposive,  │
│and inferent-│  ◁   │ generation  │  ◁  │ Stratified  │
│ial statistic│      │ tools(      │     │ random      │
│Thematic data│      │Questionnaire│     │ sampling    │
│analysis     │      │Interviews)  │     │ technique)  │
│technique    │      │             │     │             │
└─────────────┘      └─────────────┘      └─────────────┘
```
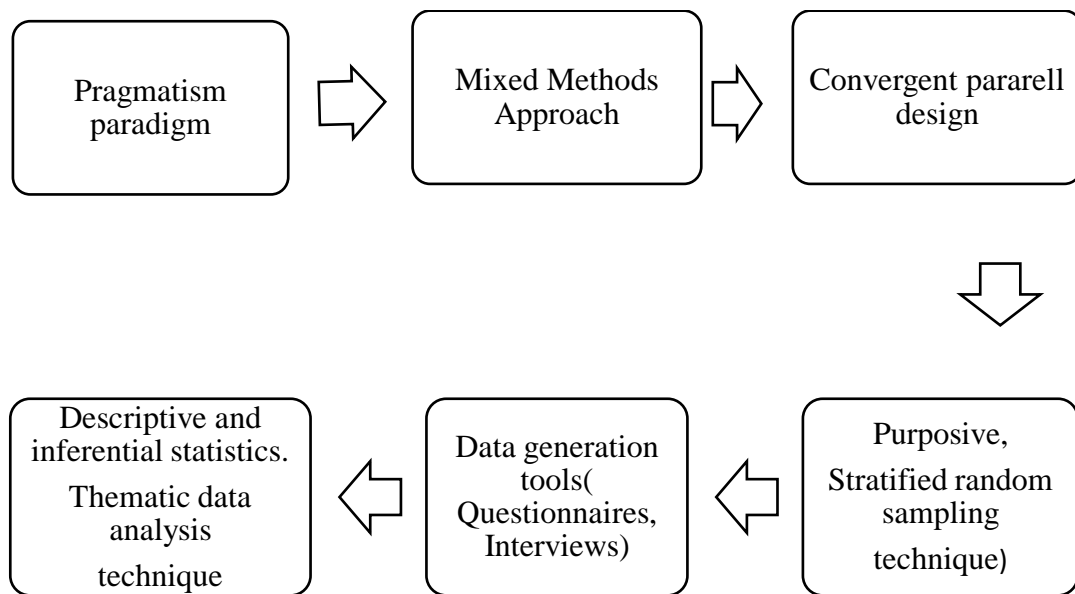
Figure 3.2: Methodology Summary

Source: The Researcher (2022)

3.13 Ethical Considerations

In conducting research, there are some ethical issues that the researcher should consider. In research where subjects are people or animals, researchers must consider the conduct of their research and give attention to ethical issues associated with carrying out their research Kombo & Tromp, 2006). The adherence to ethical issues helps the researcher to have smooth process in research. In order to coincide with research protocol, the following ethical issues were considered in this research; the researcher secured written permission (Research Introduction Letter) from the university which acted as an official prologue for the researcher in the field. The researcher also sought for authorization letter and research permit for data collection. The researcher solicited approval from the District Education Officer (DEO) of Kanungu District before carrying out the study and the researcher got the permission from head teachers in schools in order to collect data from participants. Informed consent was ensured in the study by the researcher getting permission from the participants to participate in the

study. Informed consent letter containing brief introduction of the research, the significance of the study and the respondents' cooperation in answering the questions was provided and signed. The respondents were informed about the study objectives before they responded to the items in the research instruments. The researcher ensured participants' confidentiality and privacy before, during and after the study. The researcher kept in mind that participants must agree voluntarily to participate in the study without physical or psychological compulsion and they would not be forced to mention their names during the interview process. To maintain confidentiality of the participants, numbers instead of names were used on the questionnaires. Information gathered from the respondents was treated with maximum confidentiality and respondents' anonymity was upheld. The necessary translation of the contents of the questionnaire was given to the respondents where necessary for proper understanding. Openness and honesty to the participants during the entire investigation was ensured in that all information important to them was availed. To safeguard against unauthorized access to the questionnaire after data collection, the researcher kept them under lock and key in the cabinet. The researcher also secured the laptop from unauthorized access by putting passwords. The researcher made sure that research participants were not unfairly disadvantaged as a result of the research activity and ensured impartiality, emphasis of objectivity and respect for evidence throughout the research process was upheld.

3.14 Dissemination Plan

The researcher, after writing the report for examination purposes, intends to share the findings with the school based ICT users especially school administrators through an executive summary, and publish the findings in international Journals, to be shared with the academia. The researcher also intends to share the report in CERMESA-

DIGIFACE platform and Moi University repository. The researcher also intends to go back to the study area to sensitize the community based on the study recommendations as well as offering a copy of the research report to the participants. All of these are hoped to facilitate the communication of the study findings to the potential audience for example school managers, school heads, policymakers/government of Uganda and NGOs so as to make informed decisions based on the published findings and recommendations.

3.15 Summary

This chapter presented the research paradigm, research design and the approach adopted by the study. It then presented the geographic location of the study, the target population, sampling technique, data generation, data collection procedures, and data analysis techniques. The chapter also presented the validity and trustworthiness of the data gathering instruments, data collection procedures, the ethical considerations of the study, research dissemination plan, and finally the methodology summary. The next chapter presents data presentation, analysis, interpretation and discussion.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND

DISCUSSION

4.1 Introduction

This chapter is dedicated to presentation, analysis of data, interpretation and discussion of the findings. Since both quantitative and qualitative data was gathered, this chapter contains descriptive and inferential statistics as well as the themes of the results obtained in relation to the study objectives. It is vital to note that both quantitative and qualitative data in this study were interrelated as both were aimed at fulfilling the main purpose of this research study. Therefore, the findings from the two data sets are interpreted and discussed together for triangulation and complementarity purposes.

4.2 Response Rate

Response rate is defined by Fincham (2008) as the percentage of questionnaires that are returned by research participants. It serves as a guide to the representativeness of the sample respondents that were included in the study. It is computed as the number of people who answered the questionnaire divided by the total number of people in the study sample that was accessible and given the questionnaire to fill. For quantitative data, one hundred and seventy-nine (179) questionnaires were distributed to the respondents; however, one hundred and seventy five (175) were returned. This represented a response rate of 97.76 % which was above 70% acceptable minimum set out by Draugalis et al. (2008). Also Mugenda and Mugenda (2003) assert that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and 70% and above is excellent. For qualitative data, all the five (5) targeted respondents from head teachers were accessed, giving a percentage response rate of 100, five (5) targeted respondents from teaching staff (DOS) participated in the study with a

response rate of 100%, and four (4) out of five (5) respondents from non-teaching staff (bursars) which gave a percentage response rate of 80. The overall response rate was 93.3%, which was above the recommended excellent rate of 70% (Mugenda & Mugenda, 2003). Therefore, this study was able to collect sufficient data to generate a comprehensive report.

4.3 Respondents' Demographic Description

The demographic characteristics of the respondents included; gender, age, highest academic qualification, and position held in school. The demographic characteristics of respondents are presented using cross-tabulation to show the patterns within the raw data. For qualitative data, interviews were done with five head teachers who were all males, five directors of studies who were all males and four bursars where one was a male and three were females. This information was not part of the research objectives or even the research questions of the current research problem. Nevertheless, it was included to permit a deeper understanding of the current research problem.

Table 4.1: Cross-tabulation showing gender and age of teachers

			Age of respondent					Total
			Below 25	25 - 30	31 - 35	36 - 40	Above 40	
Gender	**Male**	f	6	36	27	21	25	115
		%	5.2%	31.3%	23.5%	18.3%	21.7%	100.0%
	Female	f	2	22	14	15	7	60
		%	3.3%	36.7%	23.3%	25.0%	11.7%	100.0%
	Total	f	8	58	41	36	32	175
		%	4.6%	33.1%	23.4%	20.6%	18.3%	100.0%

Key: (f) frequency (%) percentage
Source: Primary Data (2022)

Results in Table 4.1 indicate that the majority of the male respondents 36 (31.3%) were between the age of 25 – 30 years compared to the female respondents in the same category 22 (36.7%). The findings further show that generally the majority 58 (33.1%)

of the respondents were aged between 25 to 30, 41 (23.4%) were aged between 31 to 35, 36 (20.6%) of the respondents were aged between 36 to 40, the least 8 (4.6%) of the respondents were below the age of 20 while 32 (18.3%) of the respondents indicated that they were aged 40 and above. This shows that various age groups were equitably engaged in this research and that the data collected was representative of the views of respondents of various age groups.

Table 4.2: Cross-tabulation showing gender and level of education of teachers

			Academic qualification of respondent				Total
			Diploma	**Bachelors**	**Post Graduate Diploma**	**Masters**	
Gender	**Male**	f	27	71	11	6	115
		%	23.5%	61.7%	9.6%	5.2%	100.0%
	Female	f	15	34	8	3	60
		%	25.0%	56.7%	13.3%	5.0%	100.0%
	Total	f	42	105	19	9	175
		%	24.0%	60.0%	10.9%	5.1%	100.0%

Source: Primary Data (2022)

Results in Table 4.2 indicate that the majority of male respondents 71 (61.7%) had attained a Bachelor's education qualification compared to the female respondents in the same category 34 (56.7%). Further, 6 (5.2%) of the males had improved their tertiary education by acquiring a Master's qualification as compared to the female respondents 3 (5.0%). This difference may be attributed to the gender disparity and gender gaps in education over the past five decades, especially in developing countries (Evans et al., 2019) Generally, 42 (24.0%) of the respondents had attained diploma level, the majority 105 (60.0%) had attained bachelors, 19 (10.9%) of the respondents had post graduate diploma and 9 (5.1%) of the respondents had attained masters. This high educational level was expected since the study was conducted in an academic environment. It indicates that the respondents could provide valid and relevant data regarding ICT integration in the management of government-aided secondary schools in Kanungu

District, Uganda. Also the data collected was representative of the views of respondents of various educational levels.

Table 4.3: Cross-tabulation showing gender and position held in school by teachers

			Position of respondent in school			Total
			Head of Department	Class teacher	Teacher	
Gender	Male	f	35	33	47	115
		%	30.4%	28.7%	40.9%	100.0%
	Female	f	12	26	22	60
		%	20.0%	43.3%	36.7%	100.0%
	Total	f	47	59	69	175
		%	26.9%	33.7%	39.4%	100.0%

Source: Primary Data (2022)

The results from Table 4.3 indicate that 35 (30.4%) of the male respondents were in the position of head of department compared to their female counterparts 12 (20.0%). The majority of females 26 (43.3%) respondents were class teachers. Generally, 47 (26.9%) of the respondents indicated that they were in the position of head of department, 59 (33.7%) of the respondents were class teachers and the majority of the respondents 69 (39.4%) were teachers. The position held in school by the respondents was investigated as it was an important variable in determining the ability of the respondents to understand the study concepts of ICT integration in the management of secondary schools. It also showed that the data collected was representative of the views of respondents holding various positions in the school.

4.4 Presentation and Analysis of Empirical Data

This section presents the empirical findings of the study objectives. Analysis of the findings involved descriptive statistics of frequencies, percentages, mean and standard deviations derived from responses of respondents for each item. Inferential statistics of correlation analysis were applied to get the nature of the relationship between the Independent and Dependent variables while regression analysis was used to establish

the extent to which the independent variable affects the dependent variable. A five-point Likert scale was used by the researcher to rate respondents' opinions. The interpretation was drawn from comparison of the five categories. This was done to enable the investigator measure attitudes or behaviors using opinions rated from (5) = Strongly Agree (4) = Agree, (3) = Not sure (2) = Disagree (1) = Strongly Disagree. In data analysis, reference was made to the five-point Likert scale. Thus, the mean score 1.0 – 2.0 = SD; 2.1 – 2.9 = D; 3.0 = NS; 3.1 – 4.0 = A, and 4.1 – 5.0 = SA. The standard deviation (S.D) below 1.0 implies high agreement of the respondents as well as reasonable validity of the reported mean values. The S.D which is high (above 1.0) shows high variations in responses about the items asked. Qualitative data was thematically analyzed and presented in terms of themes that emerged from the data.

4.4.1 Users' attitudes and ICT integration in the management of secondary schools in Kanungu District, Uganda

Objective one sought to examine the relationship between users' attitudes and ICT integration in the management of secondary schools using twelve (12) items on a five-point Likert scale, opinions and views on users' attitudes towards ICT integration in the management of secondary schools were sought from staff members and the results are presented in Table 4.4.

Table 4.4: Descriptive Statistics of users' attitudes (UA) towards ICT integration in the management of secondary schools

Tested items	SD	D	NS	A	SA	Mean	SD
I like working with ICT in carrying out my work/tasks in school	3 (1.7%)	2 (1.1%)	9 (5.1%)	102 (58.3%)	59 (53.7%)	4.2114	.73959
Using ICT in information management in school is enjoyable and stimulating	1 (.6%)	4 (2.3%)	9 (4.1%)	84 (48.6%)	76 (43.4%)	4.3200	.72746
When I start to work with the computer, I find it hard to leave it/stop	20 (11.4%)	44 (25.1%)	28 (16.0%)	57 (32.6%)	26 (14.9%)	3.1429	1.27177
I prefer doing as much of my duties related work /tasks using ICT as possible	6 (3.4%)	11 (6.3%)	17 (9.7%)	83 (47.4%)	58 (33.1%)	4.0057	.99711
It is important to me to integrate ICT in carrying out my daily school work	3 (1.7%)	9 (5.1%)	20 (11.4%)	71 (40.6%)	72 (41.1%)	4.1429	.93289
Using ICT in managing information in school is worthwhile	2 (1.1%)	3 (1.7%)	12 (6.9%)	96 (54.9%)	62 (35.4%)	4.2171	.74181
Using ICT in information management in school eliminates a lot of tedious work to improve job performance	0 (0%)	0 (0%)	17 (9.7%)	86 (49.1)	72 (41.1%)	4.3143	.64199
I believe ICT has much use in my day to day work/activities in school	0 (0%)	4 (2.3%)	3 (1.7%)	107 (61.1%)	61 (34.9%)	4.2857	.61455
Computers are a fast and efficient means of managing information in a school setting	3 (1.7%)	10 (5.7%)	8 (4.6%)	67 (38.3%)	87 (49.7%)	4.2857	.92138
I am good at using ICT in carrying out ICT related tasks in school as far as information management is concerned	3 (1.7%)	33 (18.9%)	27 (15.4%)	77 (44.0%)	35 (20.0%)	3.6171	1.05957
Generally, I feel ok about trying a new problem/task on a computer	6 (3.4%)	13 (7.4%)	20 (11.4%)	95 (54.3%)	41 (23.4%)	3.8686	.97077
Using ICT to manage information in my daily tasks like maintaining documents, class records is very easy for me	14 (8.0%)	20 (11.4%)	22 (12.6%)	81 (46.3%)	38 (21.7%)	3.6229	1.17715

Source: Primary Data (2022)

Results in Table 4.4 indicate that most respondents 102 (58.3%) agreed and 59 (53.7%) strongly agreed that they liked working with ICT in carrying out their work/tasks in school. On the other hand, only 2 (1.1%) disagreed and 3 (1.7%) strongly disagreed with the statement while 9 (5.1%) were not sure. The corresponding mean value obtained was 4.21 which shows that the majority of the respondents agreed with the statement. In addition, a standard deviation of .74 implies low variations in responses. The findings reflect a general view of strong agreement with the idea that the respondents like working with ICT in carrying out their work/tasks in school.

Regarding the statement whether using ICT in information management in school is enjoyable and stimulating, most respondents 84 (48.6%) agreed and 76 (43.4%) strongly agreed. On the other hand, only a few respondents 4 (2.3%) disagreed and 1 (.6%) strongly disagreed while 9 (4.1%) were not sure. The results were verified with a mean score of 4.32 which indicates that a good number of respondents consented with the statement while the standard deviation of .73 shows low variations in responses. The results reflect general agreement, which implies that several respondents enjoy using ICT in information management in school.

·Regarding the statement "when I start to work with the computer, I find it hard to leave it/stop, the majority 57 (32.6%) agreed and 26 (14.9%) strongly agreed. At the same time, 44 (25.1%) disagreed and 20 (11.4%) strongly disagreed while 28 (16.0%) were not sure with a corresponding mean value of 3.14. This implies that generally, respondents were in agreement with the statement while the standard deviation of 1.27 shows high variations in responses. This implies that much as the majority of the respondents held that they find it hard to leave/stop when they start to work with the computer, a good section of respondents had varied views about the same which was

indicated by a high standard deviation. This would mean that as some staff members would integrate ICT in their work, others would not.

On the statement "I prefer doing as much of my duties related work/tasks using ICT as possible", the majority 83 (47.4%) agreed and 58 (33.1%) strongly agreed. At the same time, 11 (6.3%) disagreed and 6 (3.4%) strongly disagreed while 17 (9.7%) were not sure. The corresponding mean value of 4.00, indicated that generally, respondents were in agreement with the statement while the standard deviation of .997 shows low variations in responses. This implies that the majority of respondents held that they prefer doing as much of their duties related work/tasks using ICT as possible. For example managing information which would improve the quality of school management.

When asked whether it is important to integrate ICT in carrying out daily school work, most respondents 72 (41.1%) strongly agreed and 71 (40.6%) agreed. On the other hand, only a few 9 (5.1%) disagreed and 3 (1.7%) strongly disagreed while 20 (11.4%) were not sure. The findings show that the majority of the respondents were in strong agreement with the statement. This is indicated by a corresponding mean score of 4.14 while a standard deviation of .932 means that there were low variations in responses. Thus, the findings reflect general agreement, which implies that it is important to integrate ICT in carrying out daily school work like information management as well as in monitoring and supervision of school activities.

Regarding whether Using ICT in managing information in school is worthwhile, the majority of the respondents 96 (54.9%) agreed and 62 (35.4%) strongly agreed with the statement. However, a few of them 3 (1.7%) disagreed and only the minority 2 (1.1%) strongly disagreed while 12 (6.9%) were not sure. The results show that respondents

generally agreed with the statement. The corresponding mean score of 4.21 reflects general agreement with the statement while a standard deviation of .742 indicates low variations in responses. This implies that overall, respondents consented that using ICT in managing information in school is worthwhile.

On whether using ICT in information management in school eliminates a lot of tedious work to improve job performance, the majority of the respondents 86 (49.1%) agreed and 72 (41.1%) strongly agreed with the statement. On the other hand, none of the respondents disagreed or strongly disagreed, only a few 17 (9.7%) were not sure. The findings were further supported with a mean response of 4.31 which is above average, implying that the majority respondents were in agreement with the statement, and a standard deviation of .641 reflects low variations in responses. This implies that generally, respondents concurred with the statement that using ICT in information management in school eliminates a lot of tedious work to improve job performance which in turn would improve the quality of management in terms of information management as well as monitoring and supervision of both the academic and administrative activities.

In relation to the above, findings also show that the majority respondents 107 (61.1%) agreed and 61 (34.9%) strongly agreed that they believe ICT has much use in their day to day work/activities in school. On the other hand, 4 (2.3%) disagreed and none of the respondents strongly disagreed with the statement while 3 (1.7%) were not sure. The findings show that generally, the majority of the respondents agreed with the statement which is reflected by the corresponding mean value of 4.28 and a standard deviation of .614 which implies that there were low variations in responses. This indicates that overall, respondents consented that ICT has much use in their day to day work/activities

in school such as managing administrative and academic information as well as monitoring and supervising school activities.

When asked whether computers are a fast and efficient means of managing information in a school setting, the majority of the respondents 87 (49.7%) strongly agreed and 67 (38.3%) agreed. On the other hand, the minority 3 (1.7%) strongly disagreed and only a few 10 (5.7%) disagreed while 8 (4.6%) were not sure. The findings show that on average, the majority of the respondents were in strong agreement with the statement. The corresponding mean score of 4.28 indicates that the majority of the respondents consented with the statement while a standard deviation of .921 means that there were low variations in responses. Thus, the findings imply that Computers are a fast and efficient means of managing information in a school setting which improves information management in secondary schools hence quality management.

Respondents were asked to rate themselves on whether they were good at using ICT in carrying out ICT related tasks in school as far as information management is concerned, the majority of the respondents 77 (44.0%) agreed and 35 (20.0%) strongly agreed with the statement. On the contrary, 33 (18.9%) disagreed and only 3 (1.7%) strongly disagreed while 27 (15.4%) were not sure. The results indicate that the majority of the respondents agreed with the statement. The corresponding mean score of 3.62 reflects general agreement of the respondents with the statement while standard deviation of 1.06 shows high variations in responses. This implies that most respondents were in agreement with the idea that they were good at using ICT in carrying out ICT related tasks in school as far as information management is concerned. This improves ICT integration in information management as well as monitoring and supervision in secondary schools leading to quality management.

Additionally, the study findings showed that the majority 95 (54.3%) agreed and 41 (23.4%) strongly agreed that generally, they feel ok about trying a new problem/task on a computer. On the other side, 13 (7.4%) disagreed and only the minority 6 (3.4%) strongly disagreed with the statement while 20 (11.4%) were not sure. This means that the majority of the respondents were in agreement with the statement. The corresponding mean value obtained was 3.86 which is above average indicating that respondents were in agreement with the statement, and a standard deviation of .972 which reflects low variations in responses. The results imply that overall, respondents generally agreed that they feel ok about trying a new problem/task on a computer.

To support the quantitative findings in this study, through an interview, participants were asked to share their views and perceptions regarding their attitudes as ICT users who participated in the integration of ICT in the management of government aided secondary schools in Kanungu District, Uganda. Thematic analysis of data revealed the code structure shown in Figure 4.1 which shows a summary of findings in terms of theme and the categories
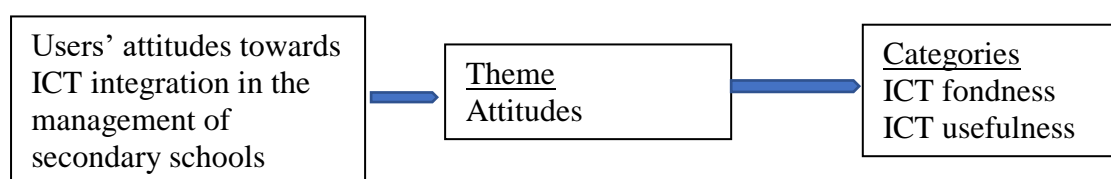
Figure 4.1: Diagrammatic Representation of Qualitative Findings on users' attitudes towards ICT integration in the management of secondary schools

Source: Primary Data (2022)

The findings above focus on one theme in response to what the participants perceived about their attitudes towards ICT integration in the management of secondary schools and which is discussed in this section.

Theme: Attitudes

Figure 4.1 above shows that the study participants reported that they perceived ICT integration as useful and important and that they liked using ICT in their administrative and academic tasks while at school. It was reported that the use of ICT aimed at improving service delivery in the management of their respective schools which, would influence the quality of management in secondary schools. The participants' attitudes were characterized by ICT fondness/liking, and perception that ICT was useful. Each of these categories is explored in details below:

a. **ICT fondness**

In this study, the participants revealed that they were passionate about ICT use and liked using ICT in their day to day school administrative and academic work which had a bearing on ICT integration in school management. According to them, most ICT users in schools had positive attitudes towards ICT integration in the management of their schools. One of them said

> *I want to in fact let you know that teachers are so much interested in the use of ICT, when, in fact they are even forgetting about these verbal communications, whatever, writing letters and whatever, everything, they communicate using computers, like they use phones, they use all sources of information especially on the side of ICT, when they want to inform me anything, they send me the message through ICT, they send information to other people, even giving tasks, whenever I want someone to do a certain task, I send to that particular teacher a message using ICT, so they are interested* (R1, line 39-47, p.2 {15/03/2022})

In the quotation above, the participant reports that ICT users within the school are so much interested in the use of ICT and that they like using it in most of their tasks like communicating and searching for information. This signifies the ICT users' fondness towards ICT integration in the management of the schools where they work. Another participant reported *"Some like ICT, naturally they want to use it, and they learn, they*

even go for courses without taking them there" (R2, line 183-184, p.9 {15/03/2022}).

The participant in the above quotation highlights the passion (IT fondness) exhibited by some teachers where some of them go for ICT training courses on their own without the school facilitating them. The passion possessed by the teachers shows positive attitudes and would enhance teachers' enthusiasm to integrate ICT in their day to day work in school. This is in line with the results from descriptive analysis of the quantitative data above.

b. ICT usefulness

Participants reported that one of the characteristics of their attitudes was the perception that ICT was useful in their work in school. They indicated that in many of their tasks, ICT was integrated because it was helpful and useful to them. Some of them said:

> *ICT is most important and I would recommend it to be used in my daily activities and also in other schools because, one, it is easy and it can keep more things like much information compared to other things that one may use, it is even quick, it is smart like when you are using these Microsoft excel, Microsoft office word.* (R8, line 731-736, p.35 {17/03/2022}).

> *I am very interested and the ICT system has helped us a lot in communications and carrying out administrative issues and even giving out assignments and tasks to the staff, so they like them very much, that's why I am saying that they have now forgotten these letter writing, communication through paper and whatever, we are all now using ICT.* (R1, line 45-49, p.2 {15/03/2022}).

As seen above, participants illustrate that ICT users have positive attitudes towards ICT integration because they consider it to be useful to them in their work. The participants highlighted the usefulness of ICT within the school ranging from ICT being quick, smart to storing huge amount of information and many other benefits the users enjoy from the integration of ICT in their administrative and academic functions in school.

4.4.2 Users' competences and ICT integration in the management of secondary schools in Kanungu District, Uganda

Objective two sought to examine the relationship between users' competencies and ICT integration in the management of secondary schools using 16 items on a five-point Likert scale, the results are illustrated in Table 4.5.

Table 4.5: Descriptive Statistics of users' competencies (UC) on ICT integration in the management of secondary schools

Tested items	SD	D	NS	A	SA	Mean	SD
I am competent in using a word processor to develop and produce text documents such as letters	11 (6.3%)	25 (14.3%)	12 (6.9%)	79 (45.1%)	48 (27.4%)	3.7	1.18994
I can easily use spreadsheet/excel to do my work where necessary	24 (13.7%)	30 (17.1%)	16 (9.1%)	79 (45.1%)	26 (14.9%)	3.3	1.29754
I am capable of using PowerPoint to organize work for presentation	24 (13.7%)	32 (18.3%)	17 (9.7%)	68 (38.9%)	34 (19.4%)	3.3	1.34352
I can easily look for information online using a search engine	16 (9.1%)	20 (11.4%)	20 (11.4%)	71 (40.6%)	48 (27.4%)	3.7	1.24897
I can organize computer files in folders and sub folders	17 (9.7%)	29 (16.6%)	19 (10.9%)	68 (38.9%)	42 (24.0%)	3.5	1.28595
I am aware that not all online information is reliable	10 (5.7%)	18 (10.3%)	10 (5.7%)	81 (46.3%)	56 (32.0%)	3.9	1.13895
I can save/store files or content and retrieve them once saved and stored	11 (6.3%)	19 (10.9%)	10 (5.7%)	72 (41.1%)	63 (36.0%)	3.9	1.18939
I can actively use a wide range of communication tools(email, SMS) for online communication	4 (2.3%)	22 (12.6%)	10 (5.7%)	81 (46.3%)	58 (33.1%)	3.9	1.04945
I can share files and content with colleagues at work using simple tools such as email, SMS	9 (5.1%)	7 (4.6%)	8 (4.0%)	100 (57.1%)	51 (29.1%)	4.0	.99133
I can use advanced features of communication tools (video conferencing, zoom) to attend meetings and communicate with colleagues	24 (13.7%)	37 (21.1%)	22 (12.6)	70 (40.0%)	22 (12.6%)	3.2	1.28250
I can use online services to meet school and my own needs e.g. e-banking	23 (13.1%)	26 (14.9%)	24 (13.7%)	75 (42.9%)	27 (15.4%)	3.3	1.27404
I can produce simple digital content (texts, tables) using digital tools	21 (12.0%)	23 (13.1%)	20 (11.4%)	73 (41.7%)	38 (21.7%)	3.5	1.29473
I can apply basic formatting (e.g. insert footnotes, charts) to the content that I or others have produced	19 (10.9%)	33 (18.9%)	18 (10.3%)	68 (38.9%)	37 (21.1%)	3.4	1.30471
I am aware that content can be covered by copyright	9 (5.1%)	17 (9.7%)	19 (10.9%)	101 (57.7%)	29 (16.6%)	3.7	1.02312
I can manipulate simple functions of software and applications such as changing default settings	21 (12.0%)	31 (17.7%)	21 (12.0%)	71 (40.6%)	31 (17.7%)	3.3	1.28972
I can create different passwords to access equipment and digital services	20 (11.4%)	24 (13.7%)	25 (14.3%)	74 (42.3%)	32 (18.3%)	3.4	1.25650

Source: Primary Data (2022)

The results in Table 4.5 indicate that the majority of the respondents 79 (45.1%) agreed and 48 (27.4%) strongly agreed that they were competent in using a word processor to develop and produce text documents such as letters, while 25 (14.3%) disagreed and the minority 11 (6.3%) strongly disagreed with the statement, 12 (6.9%) were not sure. The results indicate that on average, the majority of the respondents agreed with the statement. The corresponding mean value obtained was 3.7 which reflects general agreement with the statement while the standard deviation of 1.18 shows that there were high variations in responses. This means that respondents generally agreed that they were competent in using a word processor to develop and produce text documents such as letters.

Additionally, when asked whether they could easily use spreadsheet/excel to do their work where necessary, the majority of them 79 (45.1%) agreed and 26 (14.9%) strongly agreed. At the same time 30 (17.1%) disagreed and 24 (13.7%) strongly disagreed with the statement while only 16 (9.1%) were not sure. The results show that overall, the majority of the respondents were in agreement with the statement. The findings were justified with a corresponding mean score of 3.3 which is above average and a standard deviation of 1.29 which reflects high variations in responses. This implies that generally, respondents consented that they could easily use spreadsheet/excel to do their work where necessary. However, high variation in responses indicated by a high standard deviation implies that whereas the majority of the respondents agreed with the statement, some percentage of respondents did not agree with the statement meaning that they are not competent in that aspect.

On whether respondents were capable of using PowerPoint to organize work for presentation, most respondents 68 (38.9%) agreed and 34 (19.4%) strongly agreed with

the statement. On the other hand, a reasonable number of respondents 32 (18.3%) disagreed and 24 (13.7%) strongly disagreed with 17 (9.7%) holding that they were not sure. The findings were further supported with a mean response of 3.3 which is slightly above average, implying that the majority respondents were in agreement with the statement, and a standard deviation of 1.34 which reflects high variation in responses. Whereas the mean score implies that generally, respondents concurred with the statement that they were capable of using PowerPoint to organize work for presentation, the high standard deviation implies high variations in responses meaning that some good number disagreed with the statement.

When the respondents were asked whether they could easily look for information online using a search engine, the majority of them 71 (40.6%) agreed and 48 (27.4%) strongly agreed. On the other hand, (11.4%) disagreed and only 16 (9.1%) strongly disagreed while a big number of 20 (11.4%) were not sure. The findings show that on average, the majority of the respondents were in agreement with the statement. The corresponding mean score of 3.7 indicates that majority of the respondents consented with the statement while a standard deviation of 1.25 means that there were high variations in responses. This high variation could mean that respondents were most varied on the statement which implies that much as the majority agreed with the statement, others disagreed meaning that they could not easily look for information online using a search engine.

On the statement "I can organize computer files in folders and sub folders", study findings revealed that the majority of the respondents 68 (38.9%) agreed and 42 (24.0%) strongly agreed with the statement. Contrary 29 (16.6%) disagreed and 17 (9.7%) strongly disagreed and 19 (10.9%) were not sure. The findings show that

generally, respondents were in agreement with the statement. The findings were verified with a mean score of 3.5 indicating that the majority of the respondents agreed with the statement. The corresponding standard deviation of 1.28 reflects high variations in responses in the obtained results. This implies that respondents generally agreed with the idea that they can organize computer files in folders and sub folders.

On whether respondents were aware that not all online information is reliable, the majority 81 (46.3%) agreed and 56 (32.0%) strongly agreed. At the same time, 18 (10.3%) disagreed and 10 (5.7%) strongly disagreed while 10 (5.7%) were not sure with a corresponding mean value of 3.9, which indicates that generally, respondents were in agreement with the statement while the standard deviation of 1.14 shows high variations in responses. This implies that the majority of the respondents held that they were aware that not all online information is reliable.

When asked whether they could save/store files or content and retrieve them once saved and stored, the majority of the respondents 72 (41.1%) agreed and 63 (36.0%) strongly agreed. On the other hand, 19 (10.9%) disagreed and the minority 11 (6.3%) strongly disagreed while 10 (5.7%) were not sure. The findings show that on average, the majority of the respondents were in agreement with the statement. The corresponding mean score of 3.9 indicates that majority of the respondents consented with the statement while a standard deviation of 1.19 means that there were high variations in responses. Thus, the findings reflect general agreement, which implies that the majority of the respondents could save/store files or content and retrieve them once saved and stored. This improves on the information management in school hence improved and quality management.

Regarding whether respondents could actively use a wide range of communication tools (email, SMS) for online communication, the majority of the respondents 81 (46.3%) agreed and 58 (33.1%) strongly agreed. However, 22 (12.6%) disagreed and the minority 4 (2.3%) strongly disagreed while 10 (5.7%) were not sure. The results show that on average, respondents generally agreed with the statement. The corresponding mean score of 3.9 reflects general agreement with the statement while a standard deviation of 1.05 indicates high variations in responses. This implies that overall, respondents consented that they could actively use a wide range of communication tools (email, SMS) for online communication. This is good for information management in school which improves the quality of school management.

When respondents were asked whether they could share files and content with colleagues at work using simple tools such as email, SMS, the majority 100 (57.1%) agreed and 51 (29.1%) strongly agreed. At the same time 7 (4.6%) disagreed and 9 (5.1%) strongly disagreed with the statement while 8 (4.0%) were not sure. The results show that overall, the majority of respondents were in agreement with the statement. The findings were justified with a corresponding mean score of 4.0 which is above average and a standard deviation of .99 which reflects low variations in responses. This implies that generally, respondents indicated that they could share files and content with colleagues at work using simple tools such as email, SMS as part of information management in school.

On whether respondents could use online services to meet school and their own needs e.g. e-banking, the majority of the respondents 75 (42.9%) agreed and 27 (15.4%) strongly agreed with the statement. On the other hand, 26 (14.9%) disagreed and 23 (13.1%) strongly disagreed while 24 (13.7%) were not sure. The results show that on

average, the majority of the respondents agreed with the statement. The obtained mean value of 3.3 was corresponding to respondents agreeing with the statement and a standard deviation of 1.27 shows high variations in the responses obtained. The results therefore indicate that much as the majority of the respondents agreed with the statement, others were also in disagreement which was indicated by a high standard deviation.

In addition, study findings revealed that majority 73 (41.7%) agreed and 38 (21.7%) strongly agreed with the statement that "I can produce simple digital content (texts, tables) using digital tools". on the other hand, 23 (13.1%) disagreed and 21 (12.0%) strongly disagreed while 20 (11.4%) were not sure. The findings were verified with a mean score of 3.5 which is above average, reflecting general agreement with the statement and the standard deviation of 1.29 implying that that there were high variations in responses. The results imply that generally, respondents agreed that they can produce simple digital content (texts, tables) using digital tools which leads to proper information management as well as using ICT in monitoring and supervision in school management.

On whether respondents were able to apply basic formatting (e.g. insert footnotes, charts) to the content that they or others have produced, the majority 68 (38.9%) agreed and 37 (21.1%) strongly agreed with the statement. On the other hand, 33 (18.9%) disagreed and 19 (10.9%) strongly disagreed while 18 (10.3%) were not sure. The results indicate that respondents generally agreed with the statement. The corresponding mean obtained was 3.4 which reflects agreement with the statement and a standard deviation of 1.30 indicating high variations in responses. This indicates that though most respondents agreed with the idea that they were able to apply basic

formatting (e.g. insert footnotes, charts) to the content that they or others have produced, a good number was in disagreement with the statement which implies that they were incompetent on that particular aspect.

On the issue regarding whether respondents were aware that content can be covered by copyright, the majority of the respondents 101 (57.7%) agreed and 29 (16.6%) strongly agreed. On the other hand, 17 (9.7%) disagreed and only a few 9 (5.1%) strongly disagreed with the statement while 19 (10.9%) were not sure. This indicates that generally, respondents were in agreement with the statement. The corresponding mean score of 3.7 was above average, which reflects general agreement with the statement while a standard deviation of 1.02 shows high variations in the responses. This means that the majority of the respondents were aware that content can be covered by copyright.

When asked whether they can manipulate simple functions of software and applications such as changing default settings, the majority of the respondents 71 (40.6%) agreed and 31 (17.7%) strongly agreed. On the other hand, 31 (17.7%) disagreed and 21 (12.0%) strongly disagreed with the statement while 21 (12.0%) were not sure. This indicates that generally, respondents were in agreement with the statement. The corresponding mean score of 3.3 was above average, which reflects general agreement with the statement while a standard deviation of 1.28 shows high variations in the responses. With high variations in responses, it means that respondents were varied on that aspect, while some staff members were able to manipulate simple functions of software and applications such as changing default settings, others indicated that they were unable. This affects ICT integration in information management.

About whether respondents can create different passwords to access equipment and digital services, the majority 74 (42.3%) agreed and 32 (18.3%) strongly agreed. Besides, 24 (13.7%) disagreed and 20 (11.4%) strongly disagreed with the statement while 25 (14.3%) were not sure. This indicates that generally, respondents were in agreement with the statement. This is supported by the corresponding mean score of 3.4 which is above average, a standard deviation of 1.26 shows high variations in the responses. With high variations in responses, it means that respondents were varied on that aspect, while some were able to create different passwords to access equipment and digital services, others indicated that they were unable. This would affect ICT integration in information management and generally affecting the quality of the management of secondary school.

From all the above findings about users' competences, it is evident that whereas the majority of the respondents revealed that they are competent in various aspects of ICT integration in the management of secondary schools, others were not competent which was reflected by high standard deviations on almost every statement that was rated on a likert scale and the qualitative findings from key informants during interviews.

The above quantitative findings were supported by qualitative findings from interview data where participants were asked to share their views and perspectives regarding their competencies in ICT integration. Thematic analysis of data revealed the code structure in Figure 4.2 below.
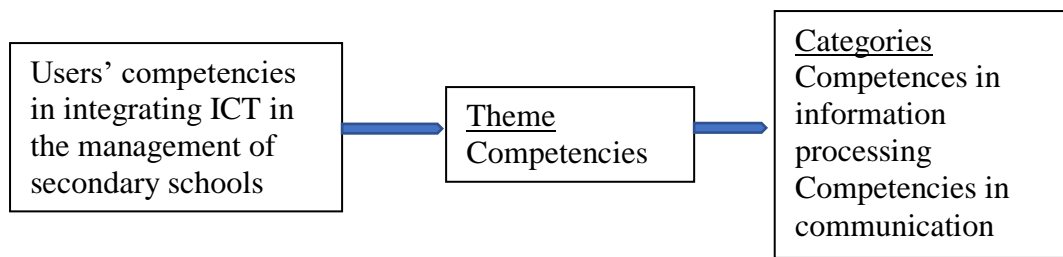
Figure 4.2: Diagrammatic Representation of the Findings on users' competences in integrating ICT in the management of secondary schools

Source: Primary Data (2022)

Theme: Competences

As illustrated in Figure 4.2 above, the users. Competencies were characterized by competences in information processing, and competencies in communication. Each of these is explored in detail below.

a. **Competences in information processing**

Participants in the study had variant perceptions about users' competencies in integrating ICT in the management of secondary school. Some study participants reported that users' competencies in using ICT were to a limited extent while others revealed that to some extent some ICT users were competent in ICT integration in the management of secondary schools in Kanungu District, Uganda. This is depicted in the quotations below.

> *Of course, as far as their competences in using ICT, that category I have told you, there competence is not so, actually they are not competent, you find that they do not even bother to press on the button of the keyboard, they are not interested, and therefore, they are not competent and that hinders information processing* (R3, line 321-324, p.15 {25/03/2022}).

Another respondent said that *"the competence, not all, but the competence is average, when I can grade all the teachers, there are some teachers who cannot even operate a computer" (R4, line 431-432, p.20 {25/03/2022}).*

> *As I have told you that it is average, it is still a challenge because when you want like a computer presentable work by the teacher, to*

process it and present it, the teacher is supposed to enter his marks for example in the computer, but he says my duty is to present the marks on the sheet of a paper, if you don't put them in the computer, I will not, and we end up over using some teachers, someone enters for the other, and the other one enters for the other, that is why you see that some teachers have gone but there is a heap of marks that they are entering in the computer, so that means that there is some computer illiteracy among the teachers (R4, line 435-441, p.20 {25/03/2022}).

To a smaller extent, given the total number of teachers, because if the staff is made up of 25, around only six, I don't know what percentage is that but it is very less, so out of 25 only six have the knowledge and at times most of the work they give to the teachers of computer to do it for them, that makes them not bother to go for training to do it for themselves and they normally say that they have no time (R5, line 506-510, p.24 {26/03/2022}).

In all these excerpts above, there is a clear indication of limited competencies among the ICT users in schools. Most of the participants revealed that most teachers and other school administrators had limited if not zero competencies as far as ICT usage is concerned. However, on the other hand, school administrators had a deviant perception. Some of them said:

I have said they are now skilled, they know how to use computers, they can get information on internet, they can use information through these smart phones, and therefore whenever they want to send any information, they can sent it through ICT, and they have skills now which they can use to disseminate information to the learners, to the administration, to wherever they want to send and therefore, they are now competent enough, I believe they have a lot of competences in terms of using ICT (R1, line 71-76, p.4 {15/03/2022}).

Yes, in information processing, some of the teachers access the school laboratory, computer laboratory they make their own notes, they use the internet in the computer to make communication and information processing is so far ok and even communication, they communicate with other colleagues in other schools (R7, line 671-674, p.32 {26/03/2022}).

As quoted above, some participants reported that some of the staff members in their schools were competent as far as processing information is concerned in the management of secondary schools.

b. Competencies in communication

Just like users' competences in information processing, Participants in the study also had variant perceptions about users' competencies in communication using ICT. Some study participants reported that users' competencies in using ICT were to a limited extent while others revealed that to some extent some ICT users were competent in using ICT for sharing administrative and academic information. This is depicted in the quotations below.

> *I have been able to send the information to the District like the day to day information about students, you know we have been affected by covid 19, so the District headquarters always require us to send the information, I have been using the computer, phone to send messages* (R8, line 749-751, p.35 {02/04/2022}).

> *Almost three quarters of all members of staff are using smart phones, they have knowledge on computer, they can go to internet, they can search, they can get information, there can deliver it to whoever they want send it to, so it is now being used by almost three quarters of the members of staff. So they are sure and confident when they are using these gadgets especially smart phones* (R1, line 60-64, p.3 {15/03/2022}).

According to the above quotations, participants revealed that some members of staff were competent in using ICT for communication, they can use smartphones, send information from the internet and that they have general knowledge about use of computers in their day to day work in school. However, on the other hand some other participants revealed that some staff members had no competences in using ICT for communication in management. Some had to say as below:

> *It has affected them because of lack of competences, the integration has remained behind and even low, it is not yet at the point it would be needed really, not yet at the desired standard, so teachers really need to improve on competences otherwise even the computers we are having here may not be helpful to us to the desired standard* (R5, line 513-516, p.24 {26/03/2022}).

> *As far as communication purposes is concerned, definitely such teachers who have lost competence cannot communicate using gadgets in form of whatsApp, you find it difficult even finding a*

teacher connected on whatsApp or Facebook and when you talk of whatsApp you find that he doesn't know the information even on social media, so that applies to those who don't have the interest, that category I told you (R3, line 326-330, p.16 {25/03/2022}).

To a smaller extent, given the total number of teachers, because if the staff is made up of 25, around only six, I don't know what percentage is that but it is very less, so out of 25 only six have the knowledge and at times most of the work they give to the teachers of computer to do it for them, that makes them not bother to go for training to do it for themselves and they normally say that they have no time (R5, line 506-510, p.24 {25/03/2022}).

From the above quotations, participants illustrated that some staff members are not competent in using ICT for communication in the management of secondary schools and further indicated that age had something to do with competencies showing that older staff members exhibited less competencies in ICT usage compared to their younger counterparts.

4.4.3 Facilitating conditions and ICT integration in the management of secondary schools in Kanungu District, Uganda

Objective three sought to examine the relationship between facilitating conditions and ICT integration in the management of secondary schools using fifteen (15) items on a five-point Likert scale, the results are illustrated in Table 4.6 below.

Table 4.6: Descriptive Statistics of facilitating conditions (FC) for ICT integration in the management of secondary schools

Tested items	SD	D	NS	A	SA	Mean	SD
The school has clearly articulated the vision and mission of ICT integration in ICT related school activities	3 (1.7%)	16 (9.1%)	44 (25.1%)	69 (39.4%)	43 (24.6%)	3.8	.98
Important decisions about ICT integration are made at all levels of management	9 (5.1%)	36 (20.6%)	37 (21.1%)	76 (43.4%)	17 (9.7%)	3.3	1.06
The school encourages autonomy to enhance ICT use among the staff	7 (4.0%)	36 (20.6%)	24 (13.7%)	73 (41.7%)	35 (20.0%)	3.5	1.14
The school gives flexibility for staff to adapt ICT integration in exciting their tasks	0 (0%)	12 (6.9%)	35 (20.0%)	96 (54.9%)	32 (18.3%)	3.8	.79
The school supports the staff to attend workshops or training programs in order to integrate ICT effectively in managing their work in school	9 (5.1%)	35 (20.0%)	32 (918.3%)	73 (41.7%)	26 (14.9%)	3.4	1.12
The school provides internet connectivity for staff to use while at school	49 (28.0%)	65 (37.1%)	10 (5.7%)	32 (18.3%)	19 (10.9%)	2.5	1.35
The school has employed an ICT coordinator who can provide technical support	27 (15.4%)	20 (11.4%)	16 (9.1%)	70 (40.0%)	42 (24.0%)	3.5	1.37
The school provides consistent hardware and software update	18 (10.3%)	28 (16.0%)	35 (20.0%)	66 (37.7%)	28 (16.0%)	3.3	1.21
Training programs are provided to staff to increase their awareness about the value of ICT	30 (17.1%)	22 (12.6%)	28 (16.0%)	64 (36.6%)	31 (17.7%)	3.3	1.35
The school employs an ICT technician who ensures proper functioning of software and hardware	11 (6.3%)	29 (16.6%)	21 (12.0%)	83 (47.4%)	31 (17.7%)	3.5	1.14
The school employs a computer laboratory attendant who ensures proper access to the computers	7 (4.0%)	13 (7.4%)	10 (5.7%)	97 (55.4%)	48 (27.4%)	3.9	.99
ICT facilities like desktop computers, printers are available	4 (2.3%)	9 (5.1%)	6 (3.4%)	97 (55.4%)	59 (33.7%)	4.1	.87
ICT infrastructure available is quite enough to allow I CT integration in managing the school	13 (7.4%)	23 (13.1%)	26 (14.9%)	75 (42.9%)	38 (21.7%)	3.6	1.18
The school has reliable internet connectivity	67 (38.3%)	49 (28.0%)	14 (8.0%)	31 (17.7%)	14 (8.0%)	2.3	1.34
The available ICT facilities can be accessed by the users when needed for use	9 (5.1%)	28 (16.0%)	19 (10.9%)	86 (49.1%)	33 (18.9%)	3.6	1.11

Source: Primary Data (2022)

Results in Table 4.6 indicate that the majority of the respondents 69 (39.4%) agreed and 43 (24.6%) strongly agreed that the school has clearly articulated the vision and mission of ICT integration in ICT related school activities. On the other hand, 16 (9.1%) disagreed and only a few 3 (1.7%) strongly disagreed with the statement while 44 (25.1%) were not sure. The corresponding mean value obtained was 3.8 which shows that majority respondents agreed with the statement. In addition, a standard deviation of .98 implies low variations in responses. The findings reflected a general view of strong agreement with the idea that the school has clearly articulated the vision and mission of ICT integration in ICT related school activities which is ideal for ICT integration in information management as well as monitoring and supervision of academic and administrative activities in school.

On whether important decisions about ICT integration are made at all levels of management, the majority 76 (43.4%) agreed and 17 (9.7%) strongly agreed. At the same time, 36 (20.6%) disagreed and only 9 (5.1%) strongly disagreed while 37 (21.1%) were not sure with a corresponding mean value of 3.3, this mean indicates that generally, respondents were in agreement with the statement however, the standard deviation of 1.06 shows high variations in responses. This implies that the majority of the respondents held that important decisions about ICT integration are made at all levels of management. This would encourage ICT integration in information processing as well as monitoring and supervision to improve the quality of secondary schools management.

Regarding the issue whether the school encourages autonomy to enhance ICT use among the staff, the majority of the respondents 73 (41.7%) agreed and 55 (20.0%) strongly agreed with the statement. On the other hand, 36 (20.6%) disagreed and only 7 (4.0%) strongly disagreed while 24 (13.7%) were not sure. The results were verified

with a mean score of 3.5 which indicates that many respondents agreed with the statement while the standard deviation of 1.14 shows high variations in responses. The results reflect general agreement, which implies that several schools encourage autonomy to enhance ICT use among the staff. This would improve the quality of school management in terms of information management as well as monitoring and supervision.

On whether the school gives flexibility for staff to adapt ICT integration in executing their tasks, the findings revealed that the majority of the respondents 96 (54.9%) agreed and 32 (18.3%) strongly agreed with the statement. On the contrary, the minority 12 (6.9%) disagreed and none of the respondents strongly disagreed with the statement while 35 (20.0%) were not sure. The corresponding mean score of 3.8 shows that respondents generally agreed with the statement while a standard deviation of .79 shows low variations in responses. The findings imply that schools give flexibility for staff to adapt ICT integration in executing their tasks.

On whether the school supports the staff to attend workshops or training programs in order to integrate ICT effectively in managing their work in school, the majority of the respondents 73 (41.7%) agreed and 26 (14.9%) strongly agreed. On the other side, 35 (20.0%) disagreed and the minority 9 (5.1%) strongly disagreed while 32 (18.3%) were not sure. The corresponding mean score of 3.4 shows that most of the respondents were in agreement with the statement while standard deviation of 1.12 shows high variations in responses. The findings mean that respondents generally agreed that schools supports the staff to attend workshops or training programs in order to integrate ICT effectively in managing their work in school.

When asked whether the school provides internet connectivity for staff to use while at school, the majority of the respondents 65 (37.1%) disagreed and 49 (28.0%) strongly disagreed. On the other hand, 32 (18.3%) agreed and only 19 (10.9%) strongly disagreed while 10 (5.7%) were not sure. The findings show that on average, the majority of the respondents were in agreement with the statement. The corresponding mean score of 2.5 indicates that the majority of the respondents disagreed with the statement while a standard deviation of 1.35 means that there were high variations in responses. Thus, the findings reflect general disagreement, which implies that schools do not provide internet connectivity for staff to use while at school. This would hinder ICT integration in academic and administrative activities that require internet for example sharing information using internet.

Regarding whether Training programs are provided to staff to increase their awareness about the value of ICT, the majority 64 (36.6%) agreed and 31 (17.7%) strongly agreed. However, 22 (12.6%) disagreed and 30 (17.1%) strongly disagreed while a 28 (16.0%) were not sure. The results show that on average, respondents generally agreed with the statement. The corresponding mean score of 3.3 reflects general agreement with the statement while a standard deviation of 1.35 indicates high variations in responses. This implies that overall, respondents consented that training programs are provided to staff to increase their awareness about the value of ICT.

When asked whether the school employs an ICT technician who ensures proper functioning of software and hardware, the majority of the respondents 83 (47.4%) agreed and 31 (17.7%) strongly agreed with the statement. On the contrary, 29 (16.6%) disagreed and 11 (6.3%) strongly disagreed while 21 (12.0%) were not sure. The results indicate that the majority of the respondents agreed with the statement. The

corresponding mean score of 3.5 reflects general agreement of the respondents with the statement while standard deviation of 1.14 shows high variations in responses. This implies that most respondents were in agreement with the idea that the school employs an ICT technician who ensures proper functioning of software and hardware.

Additionally, when respondents were asked whether the school employs a computer laboratory attendant who ensures proper access to the computers, the majority 97 (55.4%) agreed and 48 (27.4%) strongly agreed. At the same time 13 (7.4%) disagreed and the minority 7 (4.0%) strongly disagreed with the statement while 10 (5.7%) were not sure. The results show that overall, most respondents were in agreement with the statement. The findings were justified with a corresponding mean score of 3.9 which is above average and a standard deviation of .99 which reflects low variations in responses. This implies that generally, respondents agreed that the school employs a computer laboratory attendant who ensures proper access to the computers

The study findings also show that 97 (55.4%) agreed and 59 (33.7%) strongly agreed that ICT facilities like desktop computers, printers are available. On the other side, 9 (5.1%) disagreed and only 4 (2.3%) strongly disagreed with the statement while 6 (3.4%) were not sure. This means that the majority respondents were in agreement with the statement. The corresponding mean value obtained was 4.1 which is above average, and a standard deviation of .87 which reflects low variations in responses. The results imply that overall, respondents generally agreed that ICT facilities like desktop computers, printers are available.

When asked whether ICT infrastructure available is quite enough to allow ICT integration in managing the school, the majority of the respondents 75 (42.9%) agreed and 38 (21.7%) strongly agreed. On the contrary, 23 (13.1%) disagreed and 13 (7.4%)

strongly disagreed while 26 (14.9%) were not sure. This shows that generally, most respondents agreed with the statement. The obtained mean response was 3.6 which reflects general agreement with the statement and a standard deviation of 1.18 which reflects high variations in responses. The findings implies that most respondents agreed with the idea that ICT infrastructure available is quite enough to allow ICT integration in managing the school.

On whether the school has reliable internet connectivity, the majority of the respondents 67 (38.3%) strongly disagreed and 49 (28.0%) disagreed with the statement. On the other hand, 31 (17.7%) agreed and the minority 14 (8.3%) strongly agreed while 14 (8.0%) were not sure. The results show that on average, the majority of the respondents strongly disagreed with the statement. The obtained mean value of 2.3 was corresponding to respondents strongly disagreeing with the statement and a standard deviation of 1.34 which shows high variations in the responses was obtained. The results therefore indicate that most school have no reliable internet connectivity. This eventually would hamper ICT integration in the management of secondary schools in the areas of information management as well as monitoring and supervision hence leading to poor quality management in schools.

On whether the available ICT facilities can be accessed by the users when needed for use, the majority of the respondents 86 (49.1%) agreed and 33 (18.9%) strongly agreed with the statement. On the other hand, 28 (16.0%) disagreed and only 9 (35.1%) strongly disagreed while 19 (10.9%) were not sure. The results indicate that respondents generally agreed with the statement. The corresponding mean obtained was 3.6 which reflects agreement and a standard deviation of 1.11 indicating high variations in responses. This indicates that most respondents agreed with the idea that available ICT

facilities can be accessed by the users when needed for use, which contribute to increase in ICT usage and hence ICT integration in the management of secondary schools.

The above findings were supported by the qualitative findings that were obtained from the analysis gathered using interviews. Participants were asked to share their views and comments on the facilitating conditions for ICT integration in the management of their schools. Thematic analysis of data revealed the code structure in Figure 4.3 below

| Facilitating conditions for ICT integration in the management of secondary schools | → | Theme Facilitating conditions | → | Categories Administrative support Technical support |
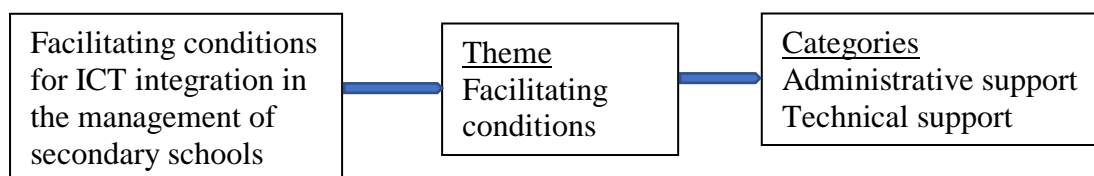
Figure 4.3: Diagrammatic Representation of Facilitating conditions for ICT integration in the management of secondary schools

Source: Primary data (2022)

Theme: Facilitating conditions

Findings in Figure 4.3 above show that facilitating conditions were in form of administrative support and technical support. Facilitating conditions play a crucial role in the ICT integration in the management of secondary schools. Administrative support and technical support provided within schools would enhance the attainment of quality management through ICT integration. Each of the above categories is explored in detail as follows.

a. Administrative support

In this study, participants revealed that there was administrative support for ICT integration in the management of government aided secondary schools in Kanungu District, ICT integration for quality secondary schools management requires the necessary administrative support to be availed within the school setting. The existence

of administrative support was one of the major success factors for effective ICT integration in the management of secondary schools. Some of the participants said:

> *ICT integration has been actually supported, we have the trainings for those ones who are very much interested in this ICT, Then we have the router, meaning that there is connectivity, internet, there is internet connectivity and in most cases, we encourage our staff members to go for workshops for ICT, when there is a workshop, where they have invited us, we can facilitate them and they go there* (R2, line 208-212, p.10 {15/03/2022}).

> *Basically in our school, we have some computers around like 40, the administration has encouraged the teachers especially those who do not have skills in ICT to use such facilities in trying to awaken their skills in ICT, in the same way, administration has tried to provide support in terms of maintaining computers and where need be, the school has tried to create a room where we have put up the computers, computer laboratory* (R6, line 607-611, p.29 {26/03/2022}).

> *Given the fact that these facilities for example the computer laboratory is functional, these days we normally see teachers trying to process their own work like notes, giving simple exercises, trying to show learners some kind of examples which are downloaded from the internet, so the system of integrating ICT in learning and administration is very possible and it is moving forward* (R6, line 617-620, p.29 {26/03/2022}).

In the excerpts above, it is evident that there was availability of facilitating conditions for ICT integration in terms of administrative support. Participants further illustrated that the presence of facilitating conditions in schools has a great impact to staff members using the available ICT tools. Availability of administrative support towards ICT integration in the management of secondary schools has a great contribution to the enhancement of the service delivery thus improve the quality of management in schools.

b. Technical support

Participants revealed that there was technical support for ICT integration in the management of government aided secondary schools in Kanungu District, technical

support was necessary for effective ICT integration in the management of secondary schools. Some of the participants said:

> *first of all we make sure that the machines are stand by, they are repaired, for instance, as I speak now all our computers are repaired, we have been able to repair a vibrant computer lab with almost everything and we have been able to give them some of these other gadgets to use like CDs, flash discs* (R3, line 351-353, p.17 {25/03/2022}).

> *Generally the school has supported it very much because of purchase of computers, in fact we have two computer rooms, one they are 35 then another one they are 20, so the school did the best, it purchased and solicited from the government, the first one were from the government, even 20 that have been given to us by Uganda Communication Commission was also because of the school soliciting seriously, lobbying seriously, so the school has supported and it has employed a computer laboratory attendant and also recruited two teachers specifically for ICT, so generally it is supporting it. And then when there is need for repair, it does, repairing is done, they hire then and then someone to come and visit and check on them, so generally I can say they're doing it well* (R5, line 521-528, p.24-25 {25/03/2022}).

In the excerpts above, it is shown that technical support was being provided in schools. Availability of technical support towards ICT integration in the management of secondary schools has a great contribution to the enhancement of the service delivery thus improve the quality of management in schools.

4.4.4 Description of the Dependent Variable: ICT integration in the management of secondary schools.

On this perspective of ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. Respondents were asked the extent to which ICT had been integrated in the management of secondary schools in terms of managing both academic and administrative information as well as monitoring and supervision. Using 16 items, respondents were asked to perform a self-rating on level of ICT integration in school as per section A of the questionnaire. Items measuring the

variable were scaled using the five-point Likert scale ranging from 1=Never, 2=Seldom, 3=Sometimes, 4=Often, 5=Always. In data analysis, reference was made to the five-point Likert scale. Thus, the mean score, $1.0 – 2.0 = N$; $2.1 – 2.9 = S$; $3.0 – 3.9 = ST$; $3.1 – 4.0 = O$, and $4.1 – 5.0 = A$. Table 4.7 illustrates pertinent descriptive statistics showing the frequencies, percentages, mean, and standard deviation of the responses.

Table 4.7: Descriptive Statistics of ICT integration in the management of secondary schools

ICT integration levels	N	S	ST	O	A	Mean	SD
Create and produce documents such as departmental reports, class lists	10 (5.7%)	12 (6.9%)	25 (14.3%)	58 (33.1%)	70 (40.0%)	3.9	1.15604
Look for information online using search engines like getting information from school website and UNEB portal	12 (6.9%)	24 (13.7%)	53 (30.3%)	56 (32.0%)	30 (17.1%)	3.4	1.12846
Security surveillance (CCTV)	103 (58.9%)	38 (21.7%)	16 (9.1%)	14 (8.0%)	4 (2.3%)	1.7	1.06775
Retrieving information at any time when needed for decision making	9 (5.1%)	38 (21.7%)	59 (33.7%)	46 (21.7%)	23 (13.1%)	3.2	1.08436
Share files and content with colleagues at work using simple tools such as email, SMS	11 (6.3%)	25 (14.3%)	47 (26.9%)	52 (29.7%)	40 (22.9%)	3.5	1.17374
Attend meetings using advanced features of communication tools e.g. zoom and video conferencing	74 (42.3%)	45 (25.7%)	23 (13.3%)	29 (16.6%)	4 (2.3%)	2.1	1.19129
Making presentations during meetings e.g. staff meeting	46 (26.3%)	36 (20.6%)	39 (22.3%)	37 (21.1%)	17 (22.3%)	2.7	1.32707
Disseminate information to staff members and other school stakeholders (mails, social networks)	14 (8.0%)	35 (20.0%)	44 (25.1%)	60 (34.3%)	22 (12.6%)	3.2	1.14820
Prepare teaching timetables and assign work to staff in order to utilize time properly and avoid collision	23 (13.1%)	12 (6.9%)	29 (16.6%)	49 (28.0%)	62 (35.4%)	3.7	1.36758
Preparation of assessment timetables and materials	18 (10.3%)	25 (14.3%)	26 (14.9%)	57 (32.6%)	49 (28.0%)	3.5	1.31199
Monitor class attendance (CCTV)	111 (63.4%)	44 (25.1%)	18 (10.3%)	1 (.6%)	1 (.6%)	1.5	.74952
Preparation of teaching materials and content	25 (14.3%)	17 (9.7%)	38 (21.7%)	56 (32.0%)	39 (22.3%)	3.4	1.32037
Preparation of annual schedule of academic activities	33 (18.9%)	21 (12.0%)	25 (14.3%)	63 (36.0%)	33 (18.9%)	3.2	1.39358
Online teaching of students during school holidays	98 (56.0%)	63 (36.0%)	10 (5.7%)	2 (1.1%)	2 (1.1%)	1.6	.75519
Processing of examination results and reports	4 (2.3%)	4 (2.3%)	8 (4.6%)	78 (44.6%)	81 (46.3%)	4.3	.84741

Source: Primary Data (2022)

The results in Table 4.7 indicate that the majority of the respondents 70 (40.0%) indicated that they always create and produce documents such as departmental reports, class lists using ICT, 58 (33.1%) indicated often, 12 (6.9%) indicated seldom, while 25 (14.3%) indicated sometimes and only 10 (5.7%) indicated that they never used ICT to create and produce documents such as departmental reports, class lists. The results indicated that on average, the majority of respondents indicated that they always create and produce documents such as departmental reports, class lists using ICT. The corresponding mean value obtained was 3.9 which reflects that schools often create and produce documents such as departmental reports, class lists using ICT while the standard deviation of 1.16 shows that there were high variations in responses.

On whether schools look for information online using search engines like getting information from school website and UNEB portal, the majority of the respondents 56 (32.1%) indicated often, 30 (17.1%) indicated always, 24 (13.7%) indicated seldom, 12 (6.9%) indicated never while 53 (30.3%) indicated that their schools often search for information online using search engines like getting information from school website and UNEB portal with a corresponding mean value of 3.4, which indicates that generally, most schools search for information online using search engines while the standard deviation of 1.13 shows high variations in responses. The above highlight is evident from the following quotation by one of the key informants:

When asked about security surveillance (CCTV), the majority of the respondents 103 (58.9%) responded that they never had security surveillance using CCTVs and 38 (21.7%) indicated seldom. At the same time, 14 (8.0%) indicated often, 4 (2.3%) indicated always while 16 (9.1%) indicated sometimes. A corresponding mean value of 1.7 was obtained which indicates that generally, respondents held that they never used

CCTVs for security surveillance in their schools while the standard deviation of 1.07 shows quite high variations in responses. This affects monitoring and supervision in school management which leads to mismanagement of resources.

Regarding the issue of retrieving information at any time when needed for decision making, the majority of the respondents 59 (33.7%) responded that they often do it, 46 (21.7%) indicated sometimes and 23 (13.1%) indicated always. On the other hand 38 (21.7%) indicated seldom and 9 (5.1%) indicated that they never used ICT to retrieve information at any time when needed for decision making. The results were verified with a mean score of 3.2 which indicates that on average, the majority of the respondents responded that they often use ICT to retrieve information at any time when needed for decision making while the standard deviation of 1.121 shows high variations in responses.

On whether staff share files and content with colleagues at work using simple tools such as email, SMS, the majority of the respondents 52 (29.7%) indicated often, 40 (22.9%) indicated always, 47 (26.9%) indicated sometimes, 25 (14.3%) indicated seldom while the minority 11 (6.3%) indicated that they never share files and content with colleagues at work using simple tools such as email, SMS. The corresponding mean obtained was 3. 5 which reflects that staff often share files and content with colleagues at work using simple tools such as email, SMS while the standard deviation of 1.17 implies that that there were high variations in responses.

Regarding whether staff attend meetings using advanced features of communication tools e.g. zoom and video conferencing, the majority of the respondents 74 (42.3%) indicated that they never did so, 45 (25.7%) indicated seldom, 23 (13.3%) indicated sometimes, 29 (16.6%) indicated often while the minority 4 (2.3%) indicated that they

always attend meetings using advanced features of communication tools e.g. zoom and video conferencing. The corresponding mean obtained 2.1 reflect that generally staff members seldom attend meetings using advanced features of communication tools e.g. zoom and video conferencing while the standard deviation of 1.19 implies that there were high variations in responses.

Additionally, on whether staff members make presentations during meetings e.g. staff meeting, the majority of the respondents 46 (26.3%) indicated that they never did so, 36 (20.6%) indicated seldom, 39 (22.3%) indicated sometimes, 37 (21.1%) indicated often while 17 (22.3%) indicated that they always make presentations during meetings e.g. staff meeting. The corresponding mean 2.7 reflects that on average, staff members seldom make presentations during meetings such as staff meeting while the standard deviation of 1.33 implies that that there were high variations in responses. This implies that there is limited use of ICT in making presentations during meetings. This impacts the quality of management especially when it comes to quality and fruitful meetings and proper information management.

Respondents were also asked whether they disseminate information to staff members and other school stakeholders (mails, social networks), the majority of the respondents 60 (34.3%) indicated that they often did so, 44 (25.1%) indicated sometimes, 35 (20.0%) indicated seldom, 14 (8.0%) indicated never while 22 (12.6%) indicated that they always disseminate information to staff members and other school stakeholders. The corresponding mean of 3.2 reflects that generally staff members often disseminate information to staff members and other school stakeholders while the standard deviation of 1.15 implies that that there were high variations in responses.

On whether ICT is used to prepare teaching timetables and assign work to staff in order to utilize time properly and avoid collision, the majority of the respondents 62 (35.4%) indicated that it was always done, 49 (28.0%) indicated often, 29 (16.6%) indicated sometimes, 12 (6.9%) indicated seldom while 23 (13.1%) indicated that ICT was never used to prepare teaching timetables and assign work to staff in order to utilize time properly and avoid collision. The corresponding mean of 3.7 reflects that generally ICT was often used to prepare teaching timetables and assign work to staff while the standard deviation of 1.37 implies that there were high variations in responses.

Regarding whether ICT is used in preparation of assessment timetables and materials, the majority of the respondents 57 (32.6%) indicated that ICT was often used to do so, 49 (28.0%) indicated always, 26 (14.9%) indicated sometimes, 25 (14.3%) indicated seldom while the minority 18 (10.3%) indicated that ICT was never used in preparation of assessment timetables and materials. The corresponding mean of 3.5 reflects that generally ICT was often used in preparation of assessment timetables and materials while the standard deviation of 1.31 implies that that there were high variations in responses.

On whether ICT is used to monitor class attendance (CCTV), the majority of the respondents 111 (63.4%) indicated that ICT was never used to monitor class attendance (CCTV), 44 (25.1%) indicated seldom, 18 (10.3%) indicated sometimes, 1 (.6%) indicated often while only 1 (.6%) indicated that ICT was always used to monitor class attendance (CCTV). The corresponding mean of 1.5 reflects that generally ICT was never used to monitor class attendance (CCTV) while the standard deviation of .75 implies low variations in responses. This means that the respondents were in agreement that ICT was never used to monitor class attendance which affects monitoring and

supervision of both academic and administrative activities in school hence mismanagement.

Asked whether ICT is used in preparation of teaching materials and content, the majority of the respondents 56 (32.0%) indicated that ICT was often used, 39 (22.3%) indicated always, 38 (21.7%) indicated sometimes, 17 (9.7%) indicated seldom while 25 (14.3%) indicated that ICT was never used in preparation of teaching materials and content. The corresponding mean of 3.4 reflects that generally ICT was often used while the standard deviation of 1.32 implies high variations in responses.

On the issue of whether ICT is used in preparation of annual schedule of academic activities, the majority of the respondents 63 (36.0%) indicated that ICT was often used, 33 (18.9%) indicated always, 25 (14.3%) indicated sometimes, 21 (12.0%) indicated seldom while 33 (18.9%) indicated that ICT was never used in preparation of annual schedule of academic activities. The corresponding mean of 3.2 reflects that on average ICT was often used in preparation of annual schedule of academic activities while the standard deviation of 1.39 implies high variations in responses.

On the issue of whether ICT is used for online teaching of students during school holidays, the majority of the respondents 98 (56.0%) indicated that ICT was never used for online teaching of students during school holidays, 63 (36.0%) indicated seldom, 10 (5.7%) indicated sometimes, 2 (1.1%) indicated often and while only 2 (1.1%) indicated that ICT was always used for online teaching of students during school holidays. The corresponding mean of 1.6 reflects that generally ICT was never used for online teaching of students during school holidays while the standard deviation of .76 implies low variations in responses.

On the issue of whether ICT is used in processing of examination results and reports, the majority of the respondents 81 (46.3%) indicated that ICT was always used, 78 (44.6%) indicated often, 8 (4.6%) indicated sometimes, 4 (2.3%) indicated seldom while the minority 4 (2.3%) indicated that ICT was never used in processing of examination results and reports. The corresponding mean of 4.3 reflects that generally ICT was always used in processing of examination results and reports while the standard deviation of .85 implies low variations in responses.

The above findings were supported by the qualitative findings from interviews with participants who were asked to share their views and comments on ICT integration in the management of their schools. Thematic analysis of data revealed the code structure in Figure 4.4 below
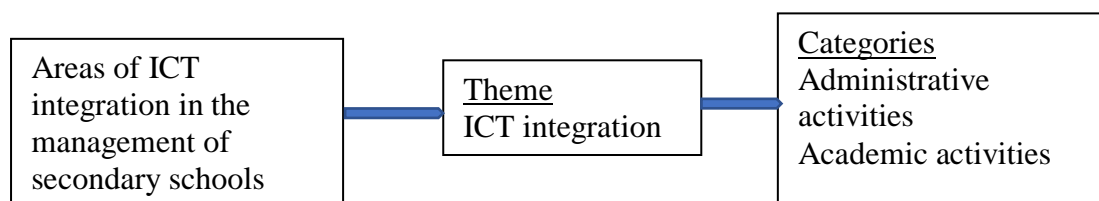
Figure 4.4: Diagrammatic Representation of Facilitating conditions for ICT integration in the management of secondary schools

Source: Primary data (2022)

Theme: ICT integration

Findings in Figure 4.4 above show that ICT integration was in administrative and academic activities. Each of the above categories is explored in detail as follows.

c. **Administrative activities**

In this study, participants revealed that ICT was being used in some of the administrative activities in government aided secondary schools in Kanungu District. Some of the participants said:

> *At times we find ourselves searching from the internet the required circulars of the school, we no longer go to the ministry to get these*

> *circulars, we just get them directly from the internet, and there is direct communication with stakeholders, the ministry, and the foundation body through the ICT.* (R2, line 158-161, p.8 {15/03/2022}).

The above findings show that staff members in schools often search for information online using search engines like getting information from school website and UNEB portal. This helps the school to easily access and manage information which improves its quality of management.

> *sometimes the information we keep it in our computers especially the minutes for purposes of references and the computers help us in processing most of the information, particularly documents for students, then information pertaining minutes of the meetings of the board, of PTA, staff meetings and whatever and therefore ICT has helped us in administrative functions, and I thank even those who started this system of ICT* (R1, line 22-26, p.1-2 {15/03/2022}).

The above findings indicate that ICT is often used to retrieve information at any time when needed for decision making in schools which eventually improves information management hence improving school management.

In line with the quantitative findings, one of the key informants asserted:

> *I have been able to send the information to the District like the day to day information about students, you know we have been affected by Covid 19, so the District headquarters always require us to send the information, I have been using the computer, phone to send messages* (R8, line 749-751, p.35 {02/04/2022}).

The above findings show that staff members share files and content with colleagues at work using simple tools such as email, SMS. This improves information sharing within the school hence improving its management.

d. Academic activities

Participants revealed that ICT was being used in some of the academic activities in the management of government aided secondary schools in Kanungu District. Some of the participants said:

> *ICT has helped me a lot in executing my duties as an administrator more especially when I am inviting these teachers for a staff meeting we use our gadgets especially the phones and we send messages inviting people for the meeting and when we have the meeting* (R1, line 45-49, p.2 {15/03/2022}).

Another interviewee during interviews had this to say *"We use it for connecting us to other stakeholders like parents, like the head office of the ministry, we use it to inform other people that actually deal with the school"* (R2, line 153-155, p.8 {15/03/2022}).

The above findings showed that schools use ICT to disseminate information to staff members and other school stakeholders using mails, and other social networks. This helps schools to disseminate information easily and quickly which improves the quality of school management.

About using ICT in time tabling and scheduling school activities, the qualitative findings were in line with the quantitative findings where one key informant from the interview asserted:

> *for example when actually the director of studies is making the time table, it is done manually and it is even done in hard copy but part of it is maintained in the computers and the students records in terms of age, in terms of sex, in terms of performance, all those things are always kept in the computers and therefore, administratively we have had records very well maintained in the computers with the help of ICT* (R1, line 30-34, p.2 {02/04/2022}).

This shows that ICT was being used in preparing teaching timetables and assign work to staff in order to utilize time properly and avoid collision, which increases schools capacity to monitor and supervise its employees hence improving the quality of management.

Another interviewee had this to say about record keeping in school:

> *When it comes to record keeping, these report cards we are using, the systems of report cards which contains the records of marks of the students, it helps very much for us to have these report cards processed.* (R2, line 171-173, p.8 {15/03/2022}).

From the above findings, it can be noted that several schools use ICT in processing of examination results and reports which improves the quality of management especially information management in the school.

Participants were also asked to share any other views or comments about ICT integration in their schools that the researcher might not have asked about if they had any. Thematic analysis of data about the same revealed the code structure in Figure 4.5.

| Participants' any other views about ICT integration in the management of secondary schools | → | Theme Participant's views | → | Categories Challenges Recommendations |
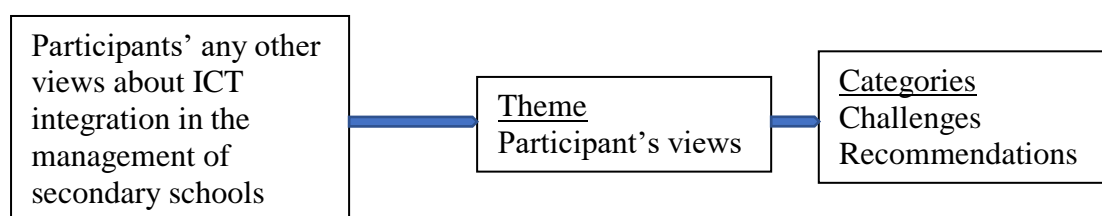
Figure 4.5: Diagrammatic Representation of the Findings on participants' any other views about the study concerning ICT integration in the management of secondary schools

Source: Primacy Data (2022)

Theme: Participants' other views

Results in Figure 7.4 above show that participants had a wide range of views about ICT integration in the management of schools where they work. Views were categorized into two that is, challenges and recommendations. Each of the above categories is explored in detail as follows.

a. **Challenges**

Participants revealed that there were quite a number of challenges affecting the integration of ICT in the management of many secondary schools in Kanungu District, Uganda. Some of the participants said:

> *I would be happy if you carried out some research and give some challenges, then if it can reach the ministry of education, then I would be happy because we have some challenges where we do not have*

adequate facilities, first of all the room is small and we have very many students, we have very many teachers who use the same room and remember we have over 900 students and many of them are very much interested in ICT and that place is too small and when we talk of the facilities in terms of the quantity of these computers and whatever, then they t cannot be enough for our learners and teachers (R1, line 115-121, p.6 {15/03/2022}).

*we have a very big population compared to the gadgets we have, the computers, when you look at the ratio of the students we have and even these staff members, even staff members alone, if they were to go on these computers at one particular time, like now when they are to enter there marks, these computers would not be enough (*R2, line 239-243, p.11-12 {15/03/2022}).

In my work, well, like you see in my office, because the materials concerning ICT are so much limited, like the photocopier, we are using one, these five offices that are combined at the head teacher's office, we only use one (R4, line 773-776, p.25 {25/03/2022}).

According to the above quotations, participants revealed that a number of challenges affected ICT integration in the management of secondary schools where they work. Limited resources like inadequate computers, poor network connectivity, limited space to accommodate the computers, ICT tools like computers breakdown among others are some of the challenges reflected by the participants through the interviews.

b. **Recommendations**

Participants also gave their views in form of recommendations about the challenges being faced in schools in the process of integrating ICT in the management of secondary schools in Kanungu District, Uganda. Some respondents put the recommendations as follows:

Through the ministry of education if the government can give more computers to schools, then we would be most grateful. So in short we have inadequate number of computers and therefore this affects performance in schools on the side of ICT and if they can also organize workshops so that the students can also be facilitated, I would be so grateful (R1, line 121-125, p.6 {25/03/2022}).

I was asking if there could be a possible way of inducing these other people who are not influenced or interested to learn ICT so that we can have at least a hundred percent of all these members of staff,

> *moving together or supporting ICT because it is very necessary in as one of the sources of integration in the education system, so we need actually to have these people either trained or facilitated or encouraged so that they can also come up to the usage of ICT* (R2, line 233-238, p.11 {25/03/2022}).

In the above quotations, participants made some recommendations about what should be done to ensure effective ICT integration in the management of secondary schools in Kanungu District, Uganda which would in turn enhance the quality of management in schools.

4.4.5 Data Reduction using Factor Analysis

Factor analysis is a multivariate statistical technique that is used to examine the structure of the interrelationships among large number of items in a variable and reduce them into smaller set of factors that are highly interrelated and are presumed to represent the dimensions within the data (Hair et al., 2010). To execute data reduction using factor analysis, there are three important decisions applied. These are elaborated below.

4.4.6 Assumptions for Factor Analysis

The crucial assumptions for conducting factor analysis are more conceptual than statistical. In factor analysis, the superseding concern focuses on the character and configuration of the variables. The conceptual issue assumption states that there should be some underlying structure existing in the set of the selected variables. Secondly, the sample is supposed to be homogeneous to the original factor structure.

4.4.6.1 Overall Measure of Inter-Correlation

In order to ensure that the data had adequate correlation to justify the use of factor analysis, testing Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (KMO) and Bartlett's test of sphericity was calculated to offer statistical significance that the correlation matrix had significant correlations among at least some of the variables

(Yong & Pearce, 2013). The significance < .05 shows that sufficient correlation exists among the variables. Thereafter, the researcher is at liberty to proceed to the next step. The KMO and Bartlett tests are shown in Table 4.8.

Table 4.8: KMO and Bartlett's Test Result

Variables	Kaiser-Meyer-Olkin of sampling adequacy	Barlett's test of Sphericity approx Chi-square	Df	Sig.
Users' attitudes	.652	270.611	66	.000
Users' competences	.872	1778.864	120	.000
Facilitating conditions	.841	988.129	105	.000
ICT integration	.824	1161.753	105	.000

As shown in Table 4.8 above, the test on KMO of sampling adequacy and Bartlett's test of sphericity tests were appropriate and viable for all the variables since KMO measures of sampling had reached the values of above 0.6 and Bartlett's Test of Sphericity was significant at $p < 0.05$ meaning that the correlation matrix was not an identity matrix and therefore was able to constitute factors. This test, therefore, concludes that the Kaiser-Meyer-Olkin measure of Sampling Adequacy (KMO) and Bartlett's measure were suitable for the factor analysis of variables to be performed.

4.4.7 Factor Analysis for users' attitudes and ICT integration

Based on Hair et al. (2010), the sample size of 179 respondents, and a threshold factor loading of .50 and above was considered significant for interpretation purposes. The attitudes dimension had twelve (12) items originally from the questionnaire, these items were subjected to extraction and only three (3) items were dropped as they did not meet the recommended threshold of 0.5 and above (Hair et al., 2010). The items deleted are indicated with (*) and were not considered for further analysis. As shown in Table 4.9

factor loading scores ranged from .525 to .782 (absolute values). This indicates a good correlation between the items and the factor they belong to.

Table 4.9: Rotated Factor Analysis for users' attitudes

Component matrix	Component
Generally, I feel ok about trying a new problem/task on a computer	.782
I am good at using ICT in carrying out ICT related tasks in school as far as information management is concerned	.732
Using ICT to manage information in my daily tasks like maintaining documents, class records is very easy for me	.588
I like working with ICT in carrying out my work/tasks in school	.573
When I start to work with the computer, I find it hard to leave it/stop	*
Using ICT in information management in school is enjoyable and stimulating	*
Using ICT in managing information in school is worthwhile	*
Computers are a fast and efficient means of managing information in a school setting	.676
I believe ICT has much use in my day to day work/activities in school	.604
Using I CT in information management is school eliminates a lot of tedious work to improve job performance	.542
I prefer doing as much of my duties related work /tasks using ICT as possible	.542
It is important to me to integrate ICT in carrying out my daily school work	.525

*** Item deleted**

Source: Primary Data (2022)

Two (2) predictor factors or dimensions were extracted from the users' attitudes dimension. The labels were instinctively developed by the researcher based on their suitability for demonstrating the underlying dimensions of a specific factor. This procedure was followed for each extracted factor. The final results were the label that represented each of the derived factors as precisely as possible. One factor was labeled ICT fondness with four items loading onto it with a score ranging between .573 and .782. The second factor or dimension was labeled ICT usefulness with five items with factor loading scores ranging between .525 and .676. It is recommended that for a factor to be identified at least four items must load on a factor (Hair et al., 2010). Factor loadings are indicated in Table 4.10.

Table 4.10: *Rotated Component Matrix*

Users' attitudes	Factor loading	
ICT fondness predictor	**1**	**2**
Generally, I feel ok about trying a new problem/task on a computer	.782	
I am good at using ICT in carrying out ICT related tasks in school as far as information management is concerned	.732	
Using ICT to manage information in my daily tasks like maintaining documents, class records is very easy for me	.588	
I like working with ICT in carrying out my work/tasks in school	.573	
ICT usefulness predictor		
Computers are a fast and efficient means of managing information in a school setting		.676
I believe ICT has much use in my day to day work/activities in school		.604
Using I CT in information management is school eliminates a lot of tedious work to improve job performance		.542
I prefer doing as much of my duties related work /tasks using ICT as possible		.542
It is important to me to integrate ICT in carrying out my daily school work		.525

Extraction Method: Principal Component Analysis.
Rotational Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.
Source: *Field Data (2022)*

4.4.8 Factor Analysis for users' competencies and ICT integration

The dimension had sixteen (16) items initially from the original questionnaire, these items were subjected to extraction and all the items met the recommended threshold of 0.5 and above (Hair et al., 2010), However, one item that was cross-loading was deleted and further orthogonal rotation using the VARIMAX approach to improve the structure and distinct groups of variables was executed for further analysis. The item deleted is indicated with (*) and was not considered for further analysis.

The fifteen items that were retained had a loading ranging between scores of .517 to .837 as indicated in Table 4.11.

Table 4.11: Rotated Factor Analysis for users' competences

Component matrix	Component
I am capable of using PowerPoint to organise work for presentation	.837
I can easily use spreadsheet/excel to do my work where necessary	.811
I can organise computer files in folders and sub folders	.804
I am competent using a word processor to develop and produce text documents such as letters	.775
I can apply basic formatting (e.g. insert footnotes, charts) to the content that I or others have produced	.733
I can use advanced features of communication tools (video conferencing, zoom) to attend meetings and communicate with colleagues	.713
I can use online services to meet school and my own needs e.g. e-banking	.584
I can easily look for information online using a search engine	.546
I can create different passwords to access equipment and digital services	.527
I can share files and content with colleagues at work using simple tools such as email, SMS	.743
I am aware that content can be covered by copyright	.741
I am aware that not all online information is reliable	.684
I can produce simple digital content (texts, tables) using digital tools	.683
I can manipulate simple functions of software and applications such as changing default settings	.621
I can save/store files or content and retrieve them once saved and stored	*
I can actively use a wide range of communication tools(email, SMS) for online communication	.517

* Item deleted

Source: Primary Data (2022)

Out of the sixteen (16) items, two (2) factors were extracted resulting in two factor solutions. Factor one (1) was labeled competence in information processing with nine (9) items loading onto it with a score ranging between .527 and .837. The second factor or dimension was labeled competence in communication with six (6) items with factor loading scores ranging between .517 and .743. Factor loadings are indicated in Table 4.12.

Table 4.12: Rotated Component Matrix

Users' competences	Factor loading	
Competence in Information processing	1	2
I am capable of using PowerPoint to organise work for presentation	.837	
I can easily use spreadsheet/excel to do my work where necessary	.811	
I can organise computer files in folders and sub folders	.804	
I am competent using a word processor to develop and produce text documents such as letters	.775	
I can apply basic formatting (e.g. insert footnotes, charts) to the content that I or others have produced	.733	
I can use advanced features of communication tools (video conferencing, zoom) to attend meetings and communicate with colleagues	.713	
I can use online services to meet school and my own needs e.g. e-banking	.584	
I can easily look for information online using a search engine	.546	
I can create different passwords to access equipment and digital services	.527	
Competences in Communication		
I can share files and content with colleagues at work using simple tools such as email, SMS		.743
I am aware that content can be covered by copyright		.741
I am aware that not all online information is reliable		.684
I can produce simple digital content (texts, tables) using digital tools		.683
I can manipulate simple functions of software and applications such as changing default settings		.621
I can actively use a wide range of communication tools(email, SMS) for online communication		.517

Extraction Method: Principal Component Analysis.
Rotational Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.
Source: *Primary Data (2022)*

4.4.9 Factor Analysis for facilitating conditions and ICT integration

The dimension had fifteen (15) items initially from the original questionnaire, these items were subjected to extraction and only four (4) items were dropped as they did not meet the recommended threshold of 0.5 and above (Hair et al., 2010). The items deleted are indicated with (*) and were not considered for further analysis. As shown in Table 4.13, factor loading scores ranged from .502 to .790 (absolute values).

Table 4.13: Rotated Factor Analysis for facilitating conditions

Component matrix	Component
Important decisions about ICT integration are made at all levels of management	.790
The school has clearly articulated the vision and mission of ICT integration in ICT related school activities	.694
The school has reliable internet connectivity	.648
The available ICT facilities can be accessed by the users when needed for use	.572
ICT facilities like desktop computers, printers are available	.519
The school gives flexibility for staff to adapt ICT integration in executing their tasks	.502
The school provides internet connectivity for staff to use while at school	*
The school encourages autonomy to enhance ICT use among the staff	*
ICT infrastructure available is quite enough to allow ICT integration in managing the school	*
The school employs an ICT technician who ensures proper functioning of software and hardware	.874
The school employs a computer laboratory attendant who ensures proper access to the computers	.767
The school has employed an ICT coordinator who can provide technical support	.688
The school provides consistent hardware and software update	.617
Training programs are provided to staff to increase their awareness about the value of ICT	*
The school supports the staff to attend workshops or training programs in order to integrate ICT effectively in managing their work in school	*

*** Item deleted**

Source: Primary Data (2022)

Out of the fifteen (15) items, two (2) factors were extracted resulting in two factor solutions. Factor one (1) was labeled administrative support using the highest loading item .790 and the low loading item of .502. The second factor was labeled technical support with high loading item .874 and low loading item .617 whose findings are indicated in Table 4.14.

Table 4.14: Rotated Component Matrix

Facilitating conditions	Factor loading	
Administrative support	**1**	**2**
Important decisions about ICT integration are made at all levels of management	.790	
The school has clearly articulated the vision and mission of ICT integration in ICT related school activities	.694	
The school has reliable internet connectivity	.648	
The available ICT facilities can be accessed by the users when needed for use	.572	
ICT facilities like desktop computers, printers are available	.519	
The school gives flexibility for staff to adapt ICT integration in executing their tasks	.502	
Technical support		
The school employs an ICT technician who ensures proper functioning of software and hardware		.874
The school employs a computer laboratory attendant who ensures proper access to the computers		.767
The school has employed an ICT coordinator who can provide technical support		.688
The school provides consistent hardware and software update		.617

Extraction Method: Principal Component Analysis.
Rotational Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.
Source: *Primary Data (2022)*

4.4.10 Factor Analysis for ICT integration

The dependent variable had fifteen (15) items from the original questionnaire, these items were subjected to extraction, and four (4) items were dropped and deleted as they did not meet the recommended threshold of 0.5 and above (Hair et al., 2010). The items that were therefore deleted are indicated by (*). The items were not considered for further analysis as indicated in Table 4.15.

Table 4.15: Factor Analysis for level of ICT integration

Component matrix	Component
Preparation of annual schedule of academic activities	.765
Making presentations during meetings e.g. staff meeting	.759
Preparation of teaching materials and content	.756
Retrieving information at any time when needed for decision making	.721
Attend meetings using advanced features of communication tools e.g. zoom and video conferencing	.687
Preparation of assessment timetables and materials	.685
Create and produce documents such as departmental reports, class lists	.643
Disseminate information to staff members and other school stakeholders (mails, social networks)	.630
Prepare teaching timetables and assign work to staff in order to utilize time properly and avoid collision	.595
Look for information online using search engines like getting information from school website and UNEB portal	.584
Share files and content with colleagues at work using simple tools such as email, SMS	.507
Processing of examination results and reports	*
Security surveillance (CCTV)	*
Online teaching of students during school holidays	*
Monitor class attendance (CCTV)	*

*** Item deleted**

Source: primary Data (2022)

One-dimensional factor was derived comprising thirteen (13) items with loading ranging between .507 and .765 as indicated in Table 4.16**.**

Table 4.16: Component Matrix

ICT integration	Factor loading
Preparation of annual schedule of academic activities	.765
Making presentations during meetings e.g. staff meeting	.759
Preparation of teaching materials and content	.756
Retrieving information at any time when needed for decision making	.721
Attend meetings using advanced features of communication tools e.g. zoom and video conferencing	.687
Preparation of assessment timetables and materials	.685
Create and produce documents such as departmental reports, class lists	.643
Disseminate information to staff members and other school stakeholders (mails, social networks)	.630
Prepare teaching timetables and assign work to staff in order to utilize time properly and avoid collision	.595
Look for information online using search engines like getting information from school website and UNEB portal	.584
Share files and content with colleagues at work using simple tools such as email, SMS	.507

Extraction Method: Principal Component Analysis. 1 component extracted.
Source: *Primary Data (2022)*

4.4.11 Construct Validity using Cronbach Alpha

Construct validity is an evaluation of the degree of consistency between several measurements of a construct (Cronbach, 1951). Reliability coefficient can be used to assess the consistency of the data with Cronbach Alpha being the most widely used measure (Hair et al., 2010). The reliability coefficient was computed to test the internal consistency among the variables in a summated scale and to select how the variables correlated among themselves. The rationale for internal consistency is that the individual items or indicators of the scale should all be measuring the same construct and thus be highly inter-correlated (ibid). The general acceptable lower limit for Cronbach's alpha is .70 and above; although in exploratory studies it may decrease to .60. Results of Cronbach Alpha for the extracted variables are indicated in Table 4.17.

Table 4.17: The Reliability Coefficient for the Extracted Variables

	Variables	Cronbach alpha	Number of items after elimination
UA	ICT fondness	.623	4
	ICT usefulness	.546	5
UC	Competences Inform. processing	.912	9
	Competences Communication	.822	6
FC	Administrative support	.752	6
	Technical support	.799	4
	ICT integration	.881	11

Source: Primary Data (2022)

4.4.11.1 Test for Statistical Assumption

The underlying assumptions for analyzing and hypotheses testing are; participants are randomly selected, the dependent variable is assessed using a scale measure and the distribution of the population must be approximately normal (Emmert-Streib & Dehmer, 2019). In this study, after generating a sampling frame for teachers from the target population of the respective schools where the research took place, the researcher drew a sample of the teachers for the study using the simple random technique as every participant had an equal opportunity to participate in the study. This ensured that bias in selection did not occur. Secondly, the dependent variable was measured using the Likert scale. The next step was to test for the normality of the population distribution.

4.4.11.2 Tests of Normality

To ensure that data on objectives one, two, and three was normally distributed, normality tests were conducted. Shapiro-Wilk test which is normally used to satisfy the assumption of parametric statistics was used to detect departures from normality for small sample sizes less than 300 with the help of the SPSS 21.0 version (King et al., 2016). If the significant value of the Shapiro-Wilk is greater than 0.05 then the data is normal. The results for the tests of Shapiro-Wilk are indicated in Table 4.18.

The hypotheses under consideration were:

H0: Data is normally distributed

H1: Data is not normally distributed

Table 4.18: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ICT integration	.054	175	.200[*]	.979	175	.011
Attitudes	.117	175	.000	.967	175	.000
Competencies	.133	175	.000	.918	175	.000
Administrative support	.077	175	.013	.979	175	.008

Source: Primary Data (2022)

The findings in Table 4.18 above indicate that all dimensions, users' attitudes, users' competencies, facilitating conditions and ICT integration were statistically significant, $p<0.05$. There was a statistically significant difference between the dimensions and the normal distribution so we rejected the null hypothesis. The data was not normally distributed therefore hypothesis testing could not be performed since the data was not normal. According to King et al. (2016) the normal distribution is the underpinning of many statistical analysis techniques of parametric statistics.

Data were checked for the causes of non-normality and remedial actions were taken as follows;

1. Extreme values were checked for what caused the non-normality distribution. Using Mahalanobis D2 with a cut-off of 0.001 any items that had a $p<0.001$ were considered outliers and therefore deleted from the data file (Hair, et al, 2010). The analysis for normal distribution was re-run but still violated the normality.

2. Next, non-normal distribution data was transformed using transformation techniques such as, "Lg10", square root. However, the data still violated the

assumption of normality. It was difficult to proceed with the analysis of hypothesis testing. Consequently, an inferential statistical technique "bootstrap" that does not require normality was adopted for analysis in this study (Wilcox, 2017).

4.4.11.3 Multi-collinearity Diagnostics

Collinearity means that two or more of the independent variables in a regression have a linear relationship. This causes a problem in the interpretation of the regression results. First, an examination of the correlation matrix of the independent variables was done. The presence of high correlations in the region of r=0.9 and above is an indication of substantial collinearity (Field, 2009).

Secondly, collinearity could be due to the combination of two or more other independent variables. Multi-collinearity was measured using Variance Inflation Factors (VIF) and tolerance. This was done through running a linear regression analysis in SPSS at a confidence level of 95% to determine collinearity diagnostics. A threshold of Variance inflation factor of not more than 10 and a tolerance value of between 0.2 and 10 is suggested by (Field, 2009). The variance inflation factor values for users' attitudes, users' competencies, and facilitating conditions are in the range of 1.055-1.028. The results are presented in Table 4.19 below

Table 4.19: Collinearity Statistic for variables

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Attitudes	.973	1.028
	Competencies	.974	1.027
	Facilitating conditions	.948	1.055

Source: Primary Data (2022)

4.4.12 Correlation Analysis of Study Variables

Pearson correlation analysis was used to examine the relationship between the variables (Wong & Hiew, 2005). Coefficient measures the strength of the linear relationship between variables. The coefficient ranges from -1 to +1 where by r=1 means a perfect positive correlation, 0.5>1 means strong positive correlation, 0>0.5 means weak positive correlation, 0 means no correlation, 0>-0.5 means weak negative correlation, -0.5>-1 means strong negative correlation while -1 means a perfect correlation. Facilitating conditions and ICT integration had a strong positive relationship (r=.577, p< .01). There was a weak positive relationship between users' attitudes and ICT integration (r=.444, p < 0.01). While Users' competencies and ICT integration indicated a very weak positive correlation (r=.098, p>.01). Correlation coefficients are presented in table 4.20 below

Table 4.20: Correlation Coefficients

	Correlations			
	ICT integration	Attitudes	Competences	Facilitating conditions
ICT integration	1			
Attitudes	.444**	1		
	.000			
Competences	.098	-.004	1	
	.195	.953		
Facilitating conditions	.577**	.163*	.159*	1
	.000	.031	.035	

***Source:** Primary Data (2022)*

4.4.13 Multiple Regression using Bootstrap Technique

The research in this study used the multiple regression bootstrapping method to make inferences about the study population, because the data from participants violated the assumptions for normally distributed data (Demiralp et al., 2008). Bootstrapping procedure is a method that is used to estimate the statistical accuracy from the data in a single sample with potential bias in the sample data (Wilcox, 2017). The sample data may have outliers that skew the data. This creates problems in case one wants to apply

a parametric test such as the Pearson Correlation Coefficient which obeys the assumptions of the linear model (Efron, 1979; Wilcox, 2017). Bootstrapping is a technique that violates the assumptions of linearity. Bootstrapping works by resampling with the replacement of the original sample data, via the drawing of a large number of smaller samples, each of which is the sample size (Wilcox, 2017).

The important feature of this method is that a large number of bootstrap samples of the observation are considered with the property that each bootstrap is equally alike under the hypothesis to be tested. Bootstrap methods are applied because the distribution of the observation under the null hypotheses need not be known to obtain a p-value. Sideridis and Simos (2010) stress that the bootstrap method is as powerful as the best parametric test when based on the same statistics. In this study, bootstrap procedures were used to measure the linear association between the independent and the dependent variables.

4.4.13.1 Multiple regression analysis of study variables

A multiple regression was performed at BCA 95% confidence level. To determine how well users' attitudes, users' competences and facilitating conditions combined together can predict ICT integration in the management of government aided secondary schools in Kanungu District, Uganda, a regression equation was established as follows:

$Y= \acute{\alpha} +\beta_1X_1+ \beta_2X_2 + \beta_3X_3 + \varepsilon$

Where Y is ICT integration, X_1 is attitudes, X_2 is competence X_3 is facilitating conditions, β_1, β_2 and β_3 are the coefficients of correlation and ε is the residual. Table 4.21 indicates the best fit of indicators users' attitudes, users' competences and facilitating conditions.

Table 4.21: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.678[a]	.459	.450	.62153

a. *Predictors: (Constant), facilitating conditions, competences, attitudes*

Results in Table 4.21 R square indicates the coefficient determination: meaning it explains how much ICT integration can be explained by users' attitudes, users' competences and facilitating conditions combined together. In this case, 67.8% of the total variation in ICT integration can be explained by the linear relationship between users' attitudes, users' competences and facilitating conditions indicators and ICT integration. However, Hair et al. (2010) recommended the use of Adjusted R Square given that R square exaggerate, in this case, 45.9% explains the relationship between the three independent variables (users' attitudes, users competences, facilitating conditions) and ICT integration while the remaining therefore implies that 54.1% of the variance in ICT integration can be explained by other variables not in the model, but outside the model.

To test the hypotheses that there is no statistically significant relationship between users' attitudes and ICT integration, there is no statistically significant relationship between users' competences and ICT integration, there is no statistically significant relationship between facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda, an F-test was done as shown in Table 4.22.

Table 4.22: Analysis of variance

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	56.082	3	18.694	48.393	.000[b]
1	Residual	66.056	171	.386		
	Total	122.138	174			

a. Dependent Variable: ICT integration
b. Predictors: (Constant), facilitating conditions, competences, attitudes

Table 4.22 indicates the test of significance of the model in predicting the dependent variable. The regression model was significant at an $F(3,171) = 48.393$, $p < 0.05$ to predict the criterion variable. The hypotheses tested, users' attitudes, users' competences and facilitating conditions combined together in the regression model are statistically fit to predict the criterion variable of ICT integration. Considering the findings, the F-test is statistically significant at $p < 0.05$. This, therefore, indicates that users' attitudes, users' competences and facilitating conditions combined together predict ICT integration.

To determine the regression equation, the bootstrap coefficient was performed as shown in Table 4.23 below.

Table 4.23: Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
	(Constant)	-1.729	-.061	.583	.004	-3.035	-.665
	Attitudes	.677	.015	.133	.001	.449	.981
1	Competences	.020	.002	.069	.778	-.118	.152
	Facilitating conditions	.619	-.002	.072	.001	.477	.760

Interpreting the confidence interval for the intercept using Bias Corrected Accelerated (BCA), the researcher is 95% confident that the users' attitudes and facilitating

conditions are statistically significant because their lower bound and upper bound are not intercepted by zero (.449 and .981) and (.477 and .760) respectively. For every 1 unit increase in users' attitudes, we expect ICT integration to increase by .677 and for every 1 unit increase in facilitating conditions, we expect ICT integration to increase by .619. We conclude that there is a statistically significant correlation between users' attitudes, facilitating conditions and ICT integration. However, the researcher is 95% confident that the users' competences data is not statistically significant because the lower bound and upper bound are intercepted by zero (-.118 and .152). The summary of the results of hypotheses testing using bootstrapping technique are indicated in Table 4.24.

Table 4.24: Summary of the results of hypothesis testing

Null hypothesis	Confidence interval		conclusion
	Upper	**Lower**	
H_{o1} = There is no statistically significant relationship between users' attitudes and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda	.449	.981	Rejected
H_{o2} = There is no statistically significant relationship between users' competences and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda	-.118	.152	Not rejected
H_{o1} = There is no statistically significant relationship between facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda	.477	.760	Rejected

Source: Primary data (2022)

4.5 Discussion of Research Findings

This section provides a discussion of the findings of the study presented in sections 4.4 above. As part of the discussion process, the researcher corroborates the major findings of the study with those of similar researches from the literature reviewed in chapter two using the Unified Theory of Acceptance and Use of Technology. This was to establish and describe their point of convergence and divergence. Sections are arranged in a

logical sequence concerning the study objectives. The discussion in this section is about users' attitudes, users' competencies, and facilitating conditions for ICT integration in the management of government aided secondary schools in Kanungu District, Uganda.

According to the regression analysis carried out in section 4.4 above, ICT integration in the management of secondary schools is not only determined by the constructs measured above (users' attitudes, users' competences, facilitating conditions), there are also other factors that play a role in the integration process, but the most important determinants according to the study are the ones measured above since they explain a very high percentage of variation in ICT integration in the management of secondary schools in Uganda.

4.5.1 Users' attitudes and ICT integration in the management of government-aided secondary schools in Kanungu District, Uganda

The findings showed a positive significant relationship between users' attitudes and ICT integration in the management of secondary schools in Kanungu District, Uganda ($\beta = .677$, $p = <0.05$). It was found that the users' attitudes were proven positive in terms of ICT fondness (passion) and ICT usefulness. From descriptive analysis, this was indicated by the high mean scores of the scale items that were used to measure users' attitudes. This was also reflected in the results from the model summary, ANOVA, and Correlation coefficient. These results are consistent with those of Rodrigues et al. (2016) who studied the utilization of the UTAUT model on e-government services. They applied the model over a group of expected and current users of e-government services in the United Arab Emirates. Using ANOVA test, they found out that users' trust, and attitudes toward using technology were key determinants of overall satisfaction of e-government services. These findings were corroborated with the

thematic analysis and the qualitative results indicated positive users' attitude towards ICT integration in the management of secondary schools which has significant impact on the overall quality of school management. This is in line with findings of Papaioannou and Charalambous (2011) who asserted that Cyprus primary school principals, generally, held positive attitudes towards ICT after exploring their attitudes towards Information and Communication Technologies (ICT) as well as their perceptions about the factors that facilitate or inhibit ICT integration in primary schools in Cyprus.

The above findings are similar with findings from the study that was carried out by Kerubo (2016) who studied factors influencing ICT integration in resource planning in Secondary Schools in Mashuuru District, Kajiado County, Kenya whereby results revealed that the respondents had moderate positive perception towards the ICT integration in resource planning in schools. Contrary to the above, Nchunge et al. (2012) researched about users' perceptions on ICT adoption in Kenya's Thika District, and the results revealed that there was technology acceptance setback.

Based on the results from the descriptive analysis and the qualitative results from thematic analysis, the majority of the respondents like working with ICT in carrying out their work/tasks in school such as managing information and in monitoring and supervising school academic and administrative activities. This was revealed by the quantitative data that was supported by the qualitative data from the interviews where some respondents said that teachers are so much interested in the use of ICT and that they are even forgetting about the verbal and written communication. This means that staff members in schools have passion for ICT and this passion towards ICT enhances ICT integration in information management in schools which improves the quality of

management in schools. The participants showed that most teachers in their schools like ICT and that they had positive attitudes towards its integration in their administrative and academic tasks in school. These findings are in line with findings of Mayamin (2020) who in his study about school teachers' perceptions and views about the use of technology in relation to government education found out that there was a widespread positive perception of ICT.

Study findings further revealed that the majority of the respondents enjoy using ICT in information management in school and that they prefer doing as much of their duties related work/tasks using ICT; much as the majority of the respondents showed that they like using ICT majorly in information management such as storing information in computers, creating documents, in communication which would improve the quality of school management, a few staff members indicated that they do not prefer using ICT in their work in school.

Results also showed that it is important to integrate ICT in carrying out daily school work. This is because it is highly believed that ICT eases information management and facilitates monitoring and supervision in school which brings about efficiency in school management. This was further confirmed by the majority of the respondents who indicated that using ICT in managing information in school is worthwhile

As seen above, findings showed that ICT users have positive attitudes towards ICT integration because they consider it to be useful to them in their work. The participants highlighted the usefulness of ICT within the school ranging from ICT being quick, smart to storing huge amount of information. To confirm this, results also revealed that using ICT in information management in school eliminates a lot of tedious work to improve job performance. All this reflects the usefulness of ICT and by the respondents

illustrating all this indicates positive attitude by the staff members which would increase their interest to integrate ICT in managing information as well as monitoring and supervising academic and administrative activities in school hence increasing the quality of management.

In addition, results indicated strong belief by respondents that ICT eliminates a lot of tedious work to improve job performance, results also revealed that computers are a fast and efficient means of managing information in a school setting. These results are supported by the assertion by Sang et al. (2011) who held that some of the factors for ICT integration include understanding ICT use, beliefs and attitudes toward technology integration. The majority of the respondents revealing that generally, they feel ok about trying a new problem/task on a computer and that they like using ICT to manage information in daily tasks like maintaining documents such as class lists, class registers which in turn help in monitoring and supervision of academic and administrative activities in school hence quality management. All the above findings reflect staff members have positive attitudes towards ICT integration in school administrative and academic activities.

The study was underpinned by the Unified Theory of Technology Acceptance and Use developed by Venkatesh et al. (2003). Performance expectancy according to this theory guided users' attitudes in this study. Users' attitudes were found to be strong predictor of ICT acceptance and use in government aided secondary schools in Kanungu District. This was in conformity with the variable of performance expectancy as per the theory. According to the study findings, head teachers, teaching and non-teaching staff believed that ICT was useful to them in executing administrative and academic functions in their schools and they showed passion for it.

4.5.2 Users' competencies and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda

Findings from objective two revealed that the relationship between users' competencies and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda was not significant (β = .020, $p=>0.05$). Considering the model summary, ANOVA, and Correlation coefficient, there was no significant relationship between users' competencies and ICT integration in the management of government aided secondary schools in Kanungu District. these findings are related to findings by (Alazam et al., 2013) which showed that ICT training does influence ICT skills acquisition by teachers, whereby those teachers who attended training obtained a significantly higher ICT skills over those who did not attend the training, but based on Chi-square analysis, attending ICT training had no influence on ICT integration. There were some teachers who had been trained in some ICT courses and they had skills, yet they did not integrate ICT in their work.

An application of the UTAUT model that was done by Akbar (2013) investigated the effective factors of students' technology acceptance and use at a higher-education institution in Qatar. The study examined the UTAUT's constructs and moderators and its applicability for the academic environment and introducing educational technologies to students. The findings showed that all the constructs and moderating variables have significant influences, except the level of experience.

However, these results diverge from Susan (2015) who asserted that for ICT integration programs to be effective and sustainable, administrators themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education. ICT

competency envisions sufficient skills and knowledge in the use of computers and associated devices and applications, therefore school administrators are expected to demonstrate the ability to apply knowledge and abilities needed in ICT-related complexities. From the current study, findings revealed that the majority of the respondents were competent in using word processor and could use spreadsheet/excel to do their work where necessary. This means that most staff members in schools are able to use word processor and excel to do their work that is both academic and administrative like in communication, creating documents among other tasks. However, on the other hand results show that there are some teachers who cannot use word processor and excel to do their work. This was reflected by the high standard deviation from the descriptive statistics. From the findings, it can be noted that whereas some staff members are competent in using ICT, some are not competent enough. This affects ICT integration in the management of secondary schools especially in information management which hinders quality management. These results are in relation with findings by Mutisya & Mwania (2017) from their study where they determined the extent to which Information and Communication Technology had been integrated in the management of public secondary schools in Kitui County, Kenya. Results indicated that most of the principals relied on their secretaries for computer related communication and some were reported not to have active emails. However, from the same study, findings from the interviews indicated that some principals were indeed using ICT in management of schools and especially in communication with teachers, parents and suppliers.

Results of the current study further indicated that a good number of the staff was capable of using PowerPoint to organize work for presentation, however, the high standard deviation value that was reflected in the descriptive analysis implies that

respondents were most varied on this aspect. Meaning that there are some staff members who are not conversant with using power point for presentations hence limiting ICT integration in the management of information, monitoring and supervision of school activities.

Study results also indicated that the majority of the staff members can organize computer files in folders and sub folders. However, another section of respondents showed that they were unable to do so. From study findings, it can be noted that whereas some teachers can organize computer files in folders and sub folders, others are unable which may lead to limited ICT integration in the management of secondary schools. When there is limited ICT integration, it may lead to poor information management thereby hampering the quality of school management.

Findings indicated that the majority of the staff members could save files or content and retrieve them once saved and that they could share files and content with colleagues at work using simple tools such as email, SMS. However, results show that the teachers of young age exhibited more capabilities than their older counterparts. From the findings, participants illustrated that some staff members are not competent enough and further indicated that age has something to do with competences showing that older staff members exhibited less competencies in ICT usage compared to their younger counterparts. This is in line with findings by Gudmundsdottir and Hatlevik (2018) who found out that newly trained and qualified teachers had an optimistic approach towards the use of ICT. The inefficiencies among some staff members hinder ICT integration in information management as well as monitoring and supervision hence leading to poor quality secondary school management.

Results further revealed that the majority of the respondents can produce simple digital content (texts, tables) using digital tools and they can apply basic formatting (e.g. insert footnotes, charts) to the content that they or others have produced which leads to proper information management as well as using ICT in monitoring and supervision in school management. The majority of the respondents were aware that content can be covered by copyright, they can create different passwords to access equipment and digital services and they can manipulate simple functions of software and applications such as changing default settings. The high variations in responses indicated by high standard deviations means that respondents were most varied in their responses. This implies that while results reveal that some staff members were competent in the above aspects, others indicated that they were not competent. The above findings support the assertion that digital literacy is not about being able to operate technology, but rather knowing when to use it and how to set the limits (Griesbaum, 2017).

From all the above findings about users' competences, it is evident that whereas the majority of the respondents revealed that they are competent in various aspects of ICT integration in the management of secondary schools, others were not competent which was reflected by high standard deviations on almost every statement that was rated on a likert scale and the qualitative findings from key informants during interviews.

It is believed that these divergent competencies were brought about by different trainings received by different individuals and difference in interests to acquire ICT skills by different staff members in schools that were involved in this study. These results are in line with the findings of the study that was conducted by Aheisibwe (2020) on Utilization of Information Communication Technologies in Effective Administration of Secondary Schools in Mitooma District of Uganda, A cross sectional

survey design results revealed lack of knowledge and skills of ICT as one of the reasons for non-utilization of ICT. Also the results of Amuche and Iyekekpolor (2014) study revealed that most of the teachers had low level of ICT competency. Reynales (2012) showed that the respondents were very literate in using Microsoft Word except for some word processing tasks. These results are similar to the findings of the current study where some respondents indicated that they were competent while others were not and results showed that even the competent ones are not so in all aspects of ICT. Contrary to the above, Oyeronke and Fagbohun (2013) revealed that majority of the teachers in the secondary schools sampled were computer and ICT literate.

The study was underpinned by the Unified Theory of Technology Acceptance and Use which was developed by Venkatesh et al. (2003). In line with this theory, effort expectancy one of its variables helped to explain users' competencies. Head teachers, teaching and non-teaching staff, according to the findings revealed that some of them were able to use ICT in information processing, communication and content creation in their administrative and academic tasks in schools, however, others revealed that they were unable to deal with some aspects of ICT applications in their work and hence ICT was not being used in some aspects of school administrative and academic activities due to limited competencies that were reported by some of the staff members. This is in conformity with the effort expectancy as per the theory which explains that individuals are expected to use the system when they perceive that it requires less amount of effort to be used. Therefore, head teachers, teaching and non-teaching staff would find it easy to integrate ICT in the management of government aided secondary schools in Kanungu District, Uganda, if they possessed the required knowledge and skills (competencies).

4.5.3 Facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda

The relationship between facilitating conditions and ICT integration in the management of selected government aided secondary schools in Kanungu District, Uganda was highly significant ($\beta = .619$, $p=<0.05$). Considering the model summary, ANOVA, and Correlation coefficient, there was a significant relationship between facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. This conforms to the World Bank (2014) which illustrates that basic infrastructures are critical for successful implementation of ICT resource planning in schools.

As shown in the thematic analysis, the participants indicated that facilitating conditions like administrative support in terms of trainings, encouragement to use ICT were quite available in schools and that they were important for ICT integration in the management of secondary schools in Kanungu District, Uganda. Study findings also show that ICT facilities like desktop computers, printers available in schools studied can facilitate the use of ICT in the management of these schools in the areas of information management, monitoring and supervision of school activities. However, it was also revealed that the available resources were not enough compared to the ICT users in schools studied. These findings agree with findings from the study conducted by Wanjala (2015) on teachers' perceptions on the use of information communication technology in the administration of public secondary schools in Kimilili Sub County, Bungoma County, Kenya, the findings of the study revealed that basic ICT hardware and software were available in most schools but they were entirely not adequate for use in performing administrative tasks. Albugami and Ah med (2015) in their study about success factors for ICT implementation in Saudi secondary schools concluded that a successful

implementation of ICT in education requires paying attention to some factors such as providing adequate infrastructure, adequate management support, adequate teacher training on ICT and pedagogy, a clear educational policy and evaluation on an ongoing basis. Also (Thannimalai & Raman, 2018) indicated that the significant relationship between principals' technology leadership and Technology integration is paramount for technology acceptance and use. Similarly, a study carried out by Anderson and Dexter (2010) on technology leadership behaviors of school principals found out that, apart from ICT infrastructure being important in school, school leadership was the most determining factor in the process of effectively implementing ICT projects in schools. This signifies that to effectively integrate ICT in managing secondary schools, facilitating conditions like ICT infrastructure, technical support and administrative support are essential. Findings from one of the studies carried out in Kenya indicated that the availability of technical support specialists was one of the important infrastructure that enhanced the integration of ICT in school. The general technical support required was in the installation, operation and maintenance of ICT. Without on-site technical support, much time and money may be lost due to technical breakdowns and can delay the operations. Enabling conditions must be put in place to facilitate the integration of ICT to enhance quality of service delivery in schools. Current study findings revealed that several schools had clearly articulated the vision and mission of ICT integration in ICT related school activities and that decisions about ICT integration were made at all levels of management in most of the schools. Also, several schools encouraged autonomy to enhance ICT use among the staff, and most schools supports the staff to attend workshops or training programs in order to integrate ICT effectively in managing their work in school. The above findings are in line with recommendations by UNESCO (2015) that before any ICT-based programme is launched in schools,

school managers and other policy planners must carefully consider the following: appropriate rooms or buildings available to house the technology, availability of electricity, availability of adequate and trained human resource as well as adequate information technologies like computers or enough resource to purchase them. The above enabling conditions are ideal for ICT integration in information management as well as monitoring and supervision of academic and administrative activities to improve service delivery in schools through quality management.

On the other hand, the study results showed that all most all schools had no internet connectivity at school. Even those that had routers were not functional to assist in ICT integration as it was expected. This was even at only two school out of all the schools that were involved in the study. This would hinder ICT integration in academic and administrative activities that require internet for example sharing information using internet.

It was also found out that several schools employ ICT technicians who ensure proper functioning of software and hardware, and in addition schools employ computer laboratory attendants who ensure proper access to the computers. It was revealed by the findings that teachers and other employees in several schools have access to the available ICT facilities.

Availability of technical support towards ICT integration in the management of secondary schools has a great contribution to the enhancement of service delivery in schools thus improving the quality of management.

The findings of the current study placed facilitating conditions among the important variables that determine ICT integration in the management of secondary schools just as it was reinforced by the Unified Theory of Technology Acceptance and Use

(Venkatesh et al., 2003). According to this theory, facilitating conditions is one of the predictors of ICT acceptance and use. In line with the theory, head teachers, teaching and non-teaching staff revealed that facilitating conditions in form of ICT infrastructure, administrative support and technical support were available though not enough compared to the number of ICT users in government aided secondary schools in Kanungu District. Furthermore, findings of the current study revealed a strong relationship between facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda.

4.6 Chapter Summary

This chapter provided an interpretation and discussion of the study findings. As part of the discussion process, the researcher compared major findings of the study with other researches in chapter two, and more literature review to explain their point of convergence, and divergence. Sections have been arranged logically according to the research objectives and the research questions. Covered in this section were the discussions related to users' attitudes, users' competencies, facilitating conditions, and users' perceptions about success factors for ICT integration in the management of secondary schools in general.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

Based on the data presented and interpreted in the previous chapters, a summary of the findings, conclusion, and recommendations are successively presented in this chapter. Areas for further study according to the outcomes realized in the study were also presented.

5.2 Summary of Study Findings

A summary of the study findings is presented based on the objectives of the study as below:

5.2.1 Users' attitudes towards ICT integration in the management of government aided secondary schools in Kanungu District, Uganda

The first objective sought to examine the relationship between users' attitudes and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. The findings revealed that users' attitudes were significant (β = .677, p=<0.05). Secondly, it was observed that most head teachers, teaching and non-teaching staff in schools had positive attitudes towards ICT integration in the management of secondary schools in Kanungu District.

Users' attitudes as one of the success factors for ICT integration in the management of secondary schools were depicted in two categories of ICT fondness and ICT usefulness as per the qualitative findings.

5.2.2 Users' Competencies and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda.

The second objective sought to examine the relationship between users' competencies

and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. The findings were that users' competences are not significant predictor of ICT integration in the management of secondary schools in Kanungu District, Uganda ($\beta = .020$, $p=>0.05$).

Secondly, findings revealed that users' competences were limited, most staff members in schools under study were not competent in ICT integration in the management of government aided secondary schools. Only a few members of staff were competent in using ICT tools like computers and smartphones. Staff members of the older age exhibited low competencies and did not integrate ICT in their work compared to their counterparts of younger age.

5.2.3 Facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda

The third objective sought to analyze the relationship between facilitating conditions and ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. The quantitative findings indicated that facilitating conditions variable was significant ($\beta = .619$, $p=<0.05$). The qualitative findings established the availability of some necessary enabling conditions for ICT integration. Findings showed that ICT resources were quite available to facilitate ICT integration. However, it was also revealed that these resources were not enough when compared to the available number of teachers and learners in schools studied. It was also revealed that there were some other challenges as far as ICT integration is concerned, for example challenges like limited space to accommodate the available computers, constant break down of ICT tools like the computers and photocopiers, load shading that is always experienced in Kanungu District among others were mentioned by

participants as key challenges affecting ICT integration in government aided secondary schools in Kanungu District.

5.3 Conclusion

This section presents the conclusion of the study given the findings and interpretation of the study. The conclusion reflects on the findings of the study indicating their implications, which led to the drawing of recommendations of the study. The study sought to examine success factors for ICT integration in the management of government aided secondary schools in Kanungu District, Uganda. A number of conclusions were arrived at based on the study objectives and their respective study questions.

5.3.1 Users' attitudes and ICT integration in the management of government aided secondary schools

In relation to the findings of study objective one, users' attitudes towards ICT integration in the management of secondary schools is an important aspect of ICT integration. The researcher concludes that users' attitudes have a positive significant effect on ICT integration in the management of secondary schools. Users' attitudes were generally positive and had great contribution towards ICT integration in the management of selected government aided secondary schools in Kanungu District, Uganda.

5.3.2 Users' competencies and ICT integration in the management of government aided secondary schools

In the light of findings of the second objective, it can be concluded that users' competencies in ICT integration in the management of secondary schools was not significant for ICT integration, However, it was found to be influenced by age and the

level of training attained by the individual. It is also concluded that Users' competences among the ICT users in the selected schools are generally limited especially to the staff members of older age.

5.3.3 Facilitating conditions and ICT integration in the management of government aided secondary schools

Based on the study objective three findings, the study conclusion was that facilitating conditions for ICT integration in the management of secondary schools is an important aspect of ICT integration. Facilitating conditions have a positive significant relationship with ICT integration in the management of secondary schools. It is also concluded that facilitating conditions in terms of administrative support and technical support were generally available and had great contribution towards ICT integration in the management of selected government aided secondary schools in Kanungu District, Uganda.

5.4 Recommendations

Based on the above discussions and conclusions, this study makes the following recommendations:

5.4.1 Users' attitudes and ICT integration

1. In line with users' attitudes, the school heads should always act timely in responding to teachers' and other staffs' needs concerning ICT usage to enhance and maintain their ICT fondness/passion for effective ICT integration in the administrative and academic functions specifically in information management as well as monitoring and supervision for better management of secondary schools..

2. The government of Uganda through the Ministry of Education and Sports should sensitize head teachers, teaching and non-teaching staff about the benefits of using ICT especially in information management, monitoring and supervision of administrative and academic tasks so that they develop passion for ICT and know its usefulness in better management of secondary schools.

5.4.2 Users' competencies and ICT integration

1. On users' competencies, the government of Uganda through the Ministry of Education and Sports should consider organizing more in-service and on job training in retooling of school-based ICT users including school heads, teachers and other staff within the schools to increase their competencies in information processing, communication and content creation using ICT for effective ICT integration in the administrative and academic functions for better management of secondary schools.

2. The Uganda National Curriculum Development Centre (NCDC) should consider incorporating ICT training in all teacher training courses in tertiary institutions and universities to equip school based ICT users with ICT skills in information processing, communication and content creation to enable them to fully utilize the provided ICT facilities and equipment in executing their administrative and academic functions specifically information management, monitoring and supervision to enhance quality management in secondary schools.

3. The Education Service Commission should provide opportunities for teachers to further their studies. These opportunities include offering paid leaves or scholarships to the serving staff in schools like school heads and teachers to go and attain more training in ICT for effective ICT integration in information

management, monitoring and supervision of both administrative and academic functions for better management of secondary schools.

5.4.3 Facilitating conditions and ICT integration

1. In line with facilitating conditions, the government of Uganda should ensure that more funds are allocated to schools for the purchase of ICT related accessories and materials and for provision of administrative and technical support to facilitate ICT integration in administrative and academic functions for better management of secondary schools.

2. School heads and administrators should provide more ICT resources like computers to ICT departments in schools and employ ICT technical staff to solve the challenge of inadequate ICT infrastructure and limited technical support.

5.5 Suggestions for Further Research

This section suggests areas for further research on some unexplored issues, which were identified as a result of this current study but existed beyond its scope. The current study only focused on only a few factors for ICT integration in the management of government aided secondary schools because of limited time and resources: The following are key areas future research:

i.   The study focused on a few success factors for ICT integration that is, users' attitudes, users' competencies and facilitating for ICT integration in the management of government aided secondary schools. For this reason, there is a need for further research on other success factors for ICT integration in the management of secondary schools.

ii. The study focused on ICT integration in a few management aspects administrative and academic functions specifically in information management, monitoring and supervision of school activities. Therefore, there is a need for further research on other management aspects in secondary schools.

iii. The study was done in a small area of Kanungu District. In future, a similar study should be done in larger areas or regions and Uganda at large.

iv. A similar study could be replicated in private secondary schools in the same area or in another developing country.

REFERENCES

Adila, I., Edzham, A., Abdul, R., Nur, A. A., & Habee, B. A. (2017). *The Use of New Media Technology among New Media Communication Students in UniMAP*. *2*(1), 45–55.

Adu, E. O., & Olatundun, S. A. (2013). The use and management of ICT in schools: Strategies for school leaders. *European Journal of Computer Science and Information Technology*, *1*(2), 10–16.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11–39). Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211.

Akbar, F. (2013). What affects students' acceptance and use of technology. *Dietrich College of Humanities and Social Sciences*.

Akyeampong, K., & Adzahlie-Mensah, V. (2018). Recent trends in school social control in Sub-Saharan Africa. In *The Palgrave International Handbook of School Discipline, Surveillance, and Social Control* (pp. 191–211). Springer. https://doi.org/10.1007/978-3-319-71559-9_10

Al-Mamary, Y. H. S. (2022). Examining the factors affecting the use of ICT in teaching in Yemeni schools. *Journal of Public Affairs*, *22*(1), e2330.

Al Harbi, H. E. M. (2014). *An examination of Saudi high school teachers' ICT knowledge and implementation*. Queensland University of Technology.

Alazam, A.-O., Bakar, A. R., Hamzah, R., & Asmiran, S. (2013). Teachers' ICT skills and ICT integration in the classroom: The case of vocational and technical teachers in Malaysia. *Creative Education*, *3*(08), 70.

Albugami, S., & Ahmed, V. (2015). Success factors for ICT implementation in Saudi secondary schools: From the perspective of ICT directors, head teachers, teachers and students. *International Journal of Education and Development Using Information and Communication Technology*, *11*(1), 36–54.

Altae, M. (2020). *School Teachers' Perceptions and Views about the Use of Technology in Relation to Government Education Policy by School of Education*. *December*.

Amuche, C. I., & Iyekekpolor, S. (2014). A., O.(2014). An Assessment of ICT Competence among Teachers of Federal Unity Colleges in North Central Geo-political of Nigeria. *American International Journal of Research in Humanities, Arts and Social Sciences (AIJRHASS)*, *2*(5).

Anney, V. N. (2014). Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies*, *5*(2), 272–281.

Aslan, A., & Zhu, C. (2018). Starting teachers' integration of ICT into their teaching practices in the lower secondary schools in Turkey. *Educational Sciences: Theory & Practice*, *18*(1).

Bandura, A. (1986). *Fearful expectations and avoidant actions as coeffects of perceived self-inefficacy.*

Bariu, T. N., & Chun, X. (2022). Influence of teachers attitude on ict implementation in kenyan universities. *Cogent Education*, *9*(1), 2107294.

Bentil, A. (2018). *The Use of Information and Communication Technology (ICT) In Students' Records Management: A Case Study of University of Professional Studies, Accra*. University of Ghana.

Bryderup, I. M., & Kowalski, K. (2002). The role of local authorities in the integration of ICT in learning. *Journal of Computer Assisted Learning*, *18*(4), 469–479.

Buabeng-Andoh, C. (2019). Factors that influence teachers' pedagogical use of ICT in secondary schools: A case of Ghana. *Contemporary Educational Technology*, *10*(3), 272–288.

Bush, T., & Glover, D. (2016). School Leadership in West Africa: Findings from a Systematic Literature Review. *Africa Education Review*, *13*(3–4), 80–103. https://doi.org/10.1080/18146627.2016.1229572

Cano, E. V., Garcia, M., & Sevillano, L. (2013). ICT Strategies and Tools for the Improvement of Instructional Supervision. The Virtual Supervision. *Turkish Online Journal of Educational Technology-TOJET*, *12*(1), 77–87.

Catanaoan, H. P. (2017). *Information And Communication Technology (Ict) Competencies Of Selected District II Public Elementary School Teachers In The City Of General Trias: Basis For Ict Development Program For Teachers*. Polytechnic University of the Philippines.

Chan, F. K. Y., Thong, J. Y. L., Venkatesh, V., Brown, S. A., Hu, P. J. H., & Tam, K. Y. (2010). Modeling citizen satisfaction with mandatory adoption of an e-government technology. *Journal of the Association for Information Systems*, *11*(10), 519–549.

Chepkonga, S. (2012). Training needs assessment of principals in financial management. *Published Master's Thesis, German, Saarbrucken: LAP Lambert Academic Publishing*.

Chepkonga, Susan. (2015). An Investigation of the Relationship of ICT Training of Principals in ICT integration in Management Public Secondary Schools: A case of Nairobi County, Kenya. *Journal of Education and Practice*, *6*(18).

Chileshe, G. (2019). *Integration of ICT in the teaching and learning of genetics in Selected secondary schools in Kitwe district, Zambia*. University of Zambia.

Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, *26*(2).

Cohen, D., & Crabtree, B. (2006). *Qualitative research guidelines project*.

Cohen, J. P., Morrison, P., Dao, L., Roth, K., Duong, T. Q., & Ghassemi, M. (2020). Covid-19 image data collection: Prospective predictions are the future. *ArXiv Preprint ArXiv:2006.11988*.

Creswell, J. W. (2014). *Qualitative, quantitative and mixed methods approaches*. Sage.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Darling-Hammond, L., & Adamson, F. (2014). *Beyond the bubble test: How performance assessments support 21st century learning*. John Wiley & Sons.

Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: three experiments. *International Journal of Human-Computer Studies*, *45*(1), 19–45.

Deci, E. L., & Ryan, R. M. (1985). Cognitive evaluation theory. In *Intrinsic motivation and self-determination in human behavior* (pp. 43–85). Springer.

Demiralp, S., Hoover, K. D., & Perez, S. J. (2008). A bootstrap method for identifying and evaluating a structural vector autoregression. *Oxford Bulletin of Economics and Statistics*, *70*(4), 509–533.

Denscombe, M. (2017). *EBOOK: The good research guide: For small-scale social research projects*. McGraw-Hill Education (UK).

Draugalis, J. R., Coons, S. J., & Plaza, C. M. (2008). Best practices for survey research reports: a synopsis for authors and reviewers. *American Journal of Pharmaceutical Education*, *72*(1).

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, *21*(3), 719–734.

Edoru, J. M., & Adebayo, T. S. (2020). *Information and Communication Technology in Ugandan Higher Education : A Case of Makerere University*. *5*(1).

Efron, B. (1979). Computers and the theory of statistics: thinking the unthinkable. *SIAM Review*, *21*(4), 460–480.

Emmert-Streib, F., & Dehmer, M. (2019). Understanding statistical hypothesis testing: The logic of statistical inference. *Machine Learning and Knowledge Extraction*, *1*(3), 945–962.

Evans, D. K., Akmal, M., & Jakiela, P. (2019). *Gender in education: The long view*. CGD Working Paper 523, Center for Global Development.

Ferrari, A. (2012). Digital competence in practice: An analysis of frameworks. *Sevilla: JRC IPTS*, *10*, 82116.

Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the Journal. *American Journal of Pharmaceutical Education*, *72*(2).

Fishbein, M. (1979). *A theory of reasoned action: some applications and implications.*

Flick, U. (2018). *An introduction to qualitative research*. sage.

Fomba, B. K., Talla, D. N. D. F., & Ningaye, P. (2022). Institutional quality and education quality in developing countries: Effects and transmission channels. *Journal of the Knowledge Economy*, 1–30.

Fort, T. C. (2017). Technology and production fragmentation: Domestic versus foreign sourcing. *The Review of Economic Studies*, *84*(2), 650–687.

Griesbaum, J. (2017). Trends in e-learning: Impacts of social mobile technologies on information behavior, formal learning and the educational market. *International Journal of Information and Education Technology*, *7*(2), 123.

Gudmundsdottir, G. B., & Hatlevik, O. E. (2018). Newly qualified teachers' professional digital competence: implications for teacher education. *European Journal of Teacher Education*, *41*(2), 214–231.

Gunawan, J. (2015). Ensuring trustworthiness in qualitative research. *Belitung Nursing Journal*, *1*(1), 10–11.

Hair, J. F., Ortinau, D. J., & Harrison, D. E. (2010). *Essentials of marketing research* (Vol. 2). McGraw-Hill/Irwin New York, NY.

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, *20*(2), 195–204.

Irene, A. (2020). Utilization of Information Communication Technologies in Effective Administration of Secondary Schools in Mitooma District of Uganda. In *African Journal of Teacher Education* (Vol. 9, Issue 2020). https://doi.org/10.21083/ajote.v9i0.5916

Javadi, M., & Zarea, K. (2016). Understanding thematic analysis and its pitfall. *Journal of Client Care*, *1*(1), 33–39.

Kabir, S. (2017). An overview of fault tree analysis and its application in model based dependability analysis. *Expert Systems with Applications*, *77*, 114–135.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *39*(1), 31–36.

Kallio, H., Pietilä, A., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, *72*(12), 2954–2965.

Karanja, M. (2018). Role of ICT in dissemination of information in secondary schools in Kenya: A literature based review. *Journal of Information and Technology*, *2*(1), 28–38.

Kenechukwu, T. N. (n.d.). *Promoting Educational Change And Sustainable Development Through ICT In Nigeria*.

Kerlinger, F. N. (1973). *Foundations of behavioral research: Educational, psychological and sociological inquiry*. Holt Rinehart and Winston.

Kerubo, A. E. M. (2016). *Factors Influencing the Integration of Ict in Resource*.

King, D., Hume, P., Gissane, C., Brughelli, M., & Clark, T. (2016). The influence of head impact threshold for reporting data in contact and collision sports: systematic review and original data analysis. *Sports Medicine*, *46*(2), 151–169.

Kombo, D. K., & Tromp, D. L. A. (2006). Proposal and thesis writing: An introduction. *Nairobi: Paulines Publications Africa*, *5*(1), 814–830.

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, *24*(1), 120–124.

Kothari, C. R. (2004). *Research methodology*.

Kular, S., Gatenby, M., Rees, C., Soane, E., & Truss, K. (2008). *Employee engagement: A literature review*.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. sage.

Luitel, B. C., & Taylor, P. C. (2019). Introduction: Research as transformative learning for sustainable futures. In *Research as transformative learning for sustainable futures* (pp. 1–16). Brill.

Lutalo, F., & Bisaso, S. M. (n.d.). *Information Communication Technology Integration in School Systems and Management of Secondary Schools in Nakawa Division, Uganda*.

Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology*, *19*(5), 469–479.

Mahoney, S. A. (2018). *Persistence: The Lived Experience of Successful Accelerated Associate Degree Nursing (ADN) Students*. Keiser University.

Makewa, L., Meremo, J., Role, E., & Role, J. (2013). ICT in secondary school administration in rural southern Kenya: An educator's eye on its importance and use. *International Journal of Education and Development Using ICT*, *9*(2).

Makhanu, E., & Kamper, G. (2012). The relationship between principals' access to information and communication technology (ICT) and school performance in Kenya. *Education and General Studies*, *1*(1), 38–047.

Marcial, D. E., & Rama, P. A. (2015). ICT competency level of teacher education professionals in the Central Visayas Region, Philippines. *Asia Pacific Journal of Multidisciplinary Research*, *3*(5), 28–38.

Maree, J. G. (2012). Career adapt-abilities scale—South African form: Psychometric properties and construct validity. *Journal of Vocational Behavior*, *80*(3), 730–733.

Markon, A. G. (2013). *Perspectives on ICT adoption in Ugandan schools*.

Menashy, F. (2017). The limits of multistakeholder governance: the case of the global partnership for education and private schooling. *Comparative Education Review*, *61*(2), 240–268. https://doi.org/10.1086/690839

Midoro, V. (2013). Guidelines on adaptation of the UNESCO ICT competency framework for teachers. *UNESCO Institute for Information Technologies in Education, Statistics of Russia. Moscow. Http://Iite. Unesco. Org/Publications/3214726*.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.

Mingaine, L. (2013). *Skill challenges in adoption and use of ICT in public secondary schools, Kenya*.

Moatlhodi, T. M., & Kalusopa, T. (2016). An assessment of e-records readiness at The Ministry of Labour and Home Affairs, Gaborone, Botswana. *Mousaion*, *34*(3), 1–22.

Motl, R. W., Dishman, R. K., Saunders, R., Dowda, M., Felton, G., & Pate, R. R. (2001). Measuring enjoyment of physical activity in adolescent girls. *American Journal of Preventive Medicine*, *21*(2), 110–117.

Muchai, D. N., & Kimuyu, P. (2016). *ICT Enabled Services: The Case of Mobile Money Transfer in Kenya*. WIDER Working Paper Helsinki: UNU-WIDER (forthcoming). Available at: https ….

Mue, J. S. (2014). Application of Information Communication Technology in school administration in public secondary schools in Langata Division, Nairobi County, Kenya. *Unpublished M. ED Thesis*.

Mugenda, O. M., & Mugenda, A. G. (2003). Research methods: Quantitative and. *Qualitative. Approaches. Nairobi; African Centre for Technology Studies*.

Mugizi, W. (2018). The Role of Higher Education in Achieving Uganda Vision 2040. *Elixir International Journal*, *115*(April 2013), 49831–49837.

Muinde, S. M., & Mbataru, P. (2019). Determinants of implementation of public sector projects in Kenya: a case of laptop project in public primary schools in Kangundo sub-County, Machakos County. *International Academic Journal of Law and Society*, *1*(2), 328–352.

Mutisya, A. M., & Mwania, J. M. (2017). The extend of ICT integration in the management of public secondary schools in Kitui county, Kenya. *International Journal of Education and Research*, *5*(11), 193–204. https://doi.org/10.5281/zenodo.252872

Nchunge, D. M., Sakwa, M., & Mwangi, W. (2012). User's perception on ICT adoption for education support in schools: a survey of secondary school teacher's in Thika district Kenya. *International Journal of Humanities and Social Science*, *2*(10), 17–29.

Newby, L. S., Hite, J. M., Hite, S. J., & Mugimu, C. B. (2013). Technology and education: ICT in Ugandan secondary schools. *Education and Information Technologies*, *18*(3), 515–530. https://doi.org/10.1007/s10639-011-9180-x

Nilsen, D. M., Gillen, G., Geller, D., Hreha, K., Osei, E., & Saleem, G. T. (2015). Effectiveness of interventions to improve occupational performance of people with motor impairments after stroke: An evidence-based review. *American Journal of Occupational Therapy*, *69*(1), 6901180030p1-6901180030p9.

Nistor, N., & Heymann, J. O. (2010). Reconsidering the role of attitude in the TAM: An answer to Teo (2009a). *British Journal of Educational Technology*, *41*(6), E142–E145.

Nordholm, D. (2015). Organising for school improvement at the middle tier. *Studies on Temporary Organisations*.

Nsubuga, Y. K. K. (2008). *Analysis of leadership styles and school performance of secondary schools in Uganda*. Nelson Mandela Metropolitan University Port Elizabeth.

O'Leary, M. (2014). *Developing a national framework for the effective use of lesson observation in further education*.

Oguta, J. O., Egessa, R. K. W., & Musiega, D. (2014). Effects of information communication and technology (ICT) application on strategic educational quality standards management in Bungoma County, Kenya. *International Journal of Business and Management Invention*, *3*(5), 11–17.

Olfert, M. D., Hagedorn, R. L., White, J. A., Baker, B. A., Colby, S. E., Franzen-Castle, L., Kattelmann, K. K., & White, A. A. (2018). An impact mapping method to generate robust qualitative evaluation of community-based research programs for youth and adults. *Methods and Protocols*, *1*(3), 25.

Omogi, J. O. (2016). *Institutional factors influencing integration of Information Communication Technology in administration of secondary schools in Mbita sub-county, Homabay county, Kenya*. http://erepository.uonbi.ac.ke/handle/11295/91084

Onen, D. (2016). Appropriate conceptualisation: The foundation of any solid quantitative research. *Electronic Journal of Business Research Methods*, *14*(1), pp28-38.

Onwuagboke, B. B. C., & Singh, T. K. R. (2016). Faculty attitude and use of ICT in instructional delivery in tertiary institutions in a developing nation. *International Journal of Research Studies in Educational Technology*, *5*(1), 77–88.

Owen, S. (2014). Teacher professional learning communities: going beyond contrived collegiality toward challenging debate and collegial learning and professional growth. *Australian Journal of Adult Learning*, *54*(2), 54–77.

Oyeronke, A., & Fagbohun, M. (2013). An assessment of computer and ICT skills among secondary school teachers in Ota Ogun State. *Library Philosophy and Practice (e-Journal)*, 846.

Papaioannou, P., & Charalambous, K. (2011). Principals' attitudes towards ICT and their perceptions about the factors that facilitate or inhibit ICT integration in primary schools of Cyprus. *Journal of Information Technology Education: Research*, *10*(1), 349–369.

Patton, C. V, Sawicki, D. S., & Clark, J. J. (2015). *Basic methods of policy analysis and planning*. Routledge.

Patton, W., & McMahon, M. (2014). *Career development and systems theory: Connecting theory and practice* (Vol. 2). Springer.

Peter, N. (2012). *an Investigation Into the Extent of the Use of Ict in Education Management in Public Secondary Schools in Naivasha District , Kenya By*.

Polit, D. F., & Beck, C. T. (2006). The content validity index: are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, *29*(5), 489–497.

Rodrigues, G., Sarabdeen, J., & Balasubramanian, S. (2016). Factors that influence consumer adoption of e-government services in the UAE: A UTAUT model perspective. *Journal of Internet Commerce*, *15*(1), 18–39.

Sachs, J., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). *Six Transformations to Achieve the Sustainable Development Goals (SDGs)*. JSTOR.

Salele, N., & Khan, M. S. H. (2022). Engineering Trainee-Teachers' Attitudes Toward Technology Use in Pedagogical Practices: Extending Computer Attitude Scale (CAS). *SAGE Open*, *12*(2), 21582440221102436.

Sang, G., Valcke, M., Van Braak, J., Tondeur, J., & Zhu, C. (2011). Predicting ICT integration into classroom teaching in Chinese primary schools: exploring the complex interplay of teacher-related variables. *Journal of Computer Assisted Learning*, *27*(2), 160–172.

Schepers, J., & Wetzels, M. (2007). A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects. *Information & Management*, *44*(1), 90–103.

Schwandt, T. A., Lincoln, Y. S., & Guba, E. G. (2007). Judging interpretations: But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Evaluation*, *2007*(114), 11–25.

Shafik J. K., Abu R. M., & Kum C. C. (2016). *Role of ICT in Higher Educational Administration in Uganda* (Vol. 3, Issue 1). www.scholink.org/ojs/index.php/wjer

Shah, M. (2014). Impact of management information systems (MIS) on school administration: What the literature says. *Procedia-Social and Behavioral Sciences*, *116*, 2799–2804.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, *15*(3), 325–343.

Sideridis, G. D., & Simos, P. (2010). What is the actual correlation between expressive and receptive measures of vocabulary? Approximating the sampling distribution of the correlation coefficient using the bootstrapping method. *The International Journal of Educational and Psychological Assessment*, *5*, 117–133.

Sivathanu, B., & Pillai, R. (2019). Technology and talent analytics for talent management–a game changer for organizational performance. *International Journal of Organizational Analysis*.

Smith, L. M., Denzin, N., & Lincoln, Y. (1994). Biographical method. *The SAGE*.

Stromquist, N. P., & Monkman, K. (2014). *Globalization and education: Integration and contestation across cultures*. R&L Education.

Susan, C. (2015). *Determinants Of Principals'level Of Integration Of Information Communication Technology In Management Of Public Secondary Schools In Nairobi County, Kenya*.

Teo, T., Lee, C. B., & Chai, C. S. (2008). Understanding pre-service teachers' computer attitudes: applying and extending the technology acceptance model. *Journal of Computer Assisted Learning*, *24*(2), 128–143.

Thannimalai, R., & Raman, A. (2018). *The Influence of Principals' Technology Leadership and Professional Development on Teachers' Technology Integration in Secondary Schools*. *September*. https://doi.org/10.32890/mjli 2018.15.1.8

The State of Broadband: (Issue September). (2018).

Tigere, M. T. (2020). *Perceptions of school management teams on information and communication technology integration in township and rural secondary schools in KwaZulu-Natal*.

Truong, Y., & McColl, R. (2011). Intrinsic motivations, self-esteem, and luxury goods consumption. *Journal of Retailing and Consumer Services*, *18*(6), 555–561.

UNESCO. (2015). ICT in Education in Sub-Saharan Africa: comparative analysis of basic e-readiness in schools. In *UNESCO Institute for Statistics* (Issue 25). http://uis.unesco.org/sites/default/files/documents/information-and-communication-technology-ict-in-education-in-sub-saharan-africa-2015-en.pdf

Vanderlinde, R., & van Braak, J. (2010). The e-capacity of primary schools: Development of a conceptual model and scale construction from a school improvement perspective. *Computers & Education*, *55*(2), 541–553.

Vanderlinde, R., Van Braak, J., & Dexter, S. (2012). ICT policy planning in a context of curriculum reform: Disentanglement of ICT policy domains and artifacts. *Computers & Education*, *58*(4), 1339–1350.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 425–478.

Wanjala, A. S. (2013). *Teachers' Perceptions on the Use of Information Communication Technology in the Administration of Public Secondary Schools in Kimilili District, Bungoma County, Kenya.*

Wilcox, R. (2017). *Modern statistics for the social and behavioral sciences: A practical introduction*. Chapman and Hall/CRC.

Willis, J. W., Jost, M., & Nilakanta, R. (2007). *Foundations of qualitative research: Interpretive and critical approaches*. Sage.

World Bank. (2016). World Development Report, 2016: digital dividends. In *Choice Reviews Online* (Vol. 53, Issue 11). World Bank Publications. https://doi.org/10.5860/choice.196952

Yin, R. K. (2011). *Applications of case study research*. sage.

Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology*, *9*(2), 79–94.

Yusoff, M. S. B. (2019). ABC of content validation and content validity index calculation. *Resource*, *11*(2), 49–54.

APPENDICES

Appendix I: A Replica of the D.E.O Consent Form

KANUNGU DISTRICT LOCAL GOVERNMENT

Office of the District Education Officer
Kanungu District Local Government
P. O Box 1, Kanungu – Uganda
Tel: 0772660234

REPUBLIC OF UGANDA

Our Ref.   1st March 2022
Your Ref

The Head teacher

……………………………………………………..

Dear Sir/Madam

RE: ISAIAH NIWAGABA – (MS/R/5281/21)

This is to introduce to you the above named person who is a 2nd year Master of Education (M.ED) Student at Moi University, School of Education, Department of Educational Management and Policy Studies.

It is a requirement of his M.ED studies that he conducts research and produces a thesis. Therefore he wishes to use your school as a source of data for his study. Entitled "critical success factors for integration of information communication technology in management of schools in Uganda".

Any assistance rendered to enable him conduct research successfully will be highly appreciated.

Yours faithfully,

……………………………
SUNDAY CHARLES,
DISTRICT EDUCATION OFFICER/KANUNGU

Appendix II: Consent Letter for Teaching/Non-Teaching Staff

CONSENT LETTER FOR TEACHERS/HOD

ISAIAH NIWAGABA
MOI UNIVERSITY,
P.O BOX 3900 -30100,
ELDORET, KENYA

RE: LETTER OF CONSENT

I am a postgraduate student at Moi University. I intend to conduct a study; Critical success factors for integration of ICT in management of secondary schools in Uganda. This study has been approved by Moi University in Kenya and Uganda Christian University Research Ethics Committee in Uganda. You are requested to take part in filling the questionnaire items about critical success factors for integration of ICT in management of secondary schools in Uganda. The information gathered from this questionnaire will be used only for this study. To ensure confidentiality, your responses in the questionnaire will remain secret to you and the research team and no names shall be referenced in the final research report. feel free to respond to all questionnaire items, there is no wrong response to these questionnaire items. We need to hear a wide range of responses and might want to get responses from many individuals.

I understand this information and consent to participate fully under the conditions articulated above.

Name: Nankuunda Rebecca

Signed: Nankuunda

Date: 29/3/2022

Appendix III: Head teacher's Consent Letter

CONSENT LETTER FOR HEADTEACHERS

ISAIAH NIWAGABA
MOI UNIVERSITY,
P.O BOX 3900-30100,
ELDORET, KENYA.

RE: LETTER OF CONSENT

I am a Master's student from Moi University carrying out a study titled "Critical success factors for integration of ICT in management of secondary schools in Uganda. The study has been approved by Moi University, Kenya, and Uganda Christian University Research Ethics Committee (UCUREC). Therefore, you are requested to participate in this interview whose purpose is to comprehend your views about teachers' attitudes, competencies, and facilitating conditions towards integration of ICT in management of your school. The information gathered from the interview will only and only be used for the purposes of this study. You can choose whether to take part in the face-to-face interview with the audio recording and there is no penalty for withdrawing from the interview at any time. Although the interview will be recorded, your responses and reactions will remain confidential and no name will be referenced in the research report. Feel free to respond to questions as there is no wrong response to this Interview.

I understand this information and consent to participate fully under the above-articulated conditions.

Name: BYABASHEIJA DAN

Signed: ....

Date: ....11th / 04 / 2022.....

Appendix IV: Consent Form For The Head Of Institution

CONSENT FORM FOR HEAD OF INSTITUTION

TITLE OF THE STUDY

Critical success factors for integration of Information Communication Technology in management of secondary schools in Uganda.

Head teachers' consent form

I give consent for you to approach teachers/heads of department to participate in the research study; Critical success factors for integration of ICT in management of secondary schools in Uganda. I have read the Project Information Statement explaining the purpose of the research project and understand that:

- The role of the school is voluntary

- I may decide to withdraw the school's participation at any time without penalty

- Teachers will be invited to participate and that permission will be sought from them.

- Only individuals who consent will participate in the project

- All information obtained will be treated with high level of confidenciality.

- Participants' names will not be used and individuals will not be identifiable in any written reports about the study.

- The school will not be identifiable in any written reports about the study.

- Participants may withdraw from the study at any time without penalty.

- A report of the findings will be made available to the school.

- I may seek further information on the project from Isaiah Niwagaba on +256788832596 or through email: niwagaba271isaiah@gmail.com

Signature..   Date...15/3/2022

Name ...MSINGUZI E

Head of institution

HEADTEACHER
KINKIIZI HIGH SCHOOL-NYAKATA
P O BOX, 39 KANUNGU

Appendix V: An Informed Consent Document for Participants

Title of the study: Success factors for integration of Information Communication Technlogy in the management of secondary schools in Uganda.

Researcher(s): Isaiah Niwagaba

Institution: Moi University

Introduction

The reseacher is a postgraduate student at Moi University, Kenya undertaking Masters of Education in Research at the department of Educational Management and Policy Studies, school of Education. I intend to conduct a study titled **Success factors for integration of Information Communication Technlogy in the management of secondary schools in Uganda.** I strongly encourage you to read the following explanation of this study. This statement describes the purpose and procedures of the study. Also described is your right to withdraw from the study any time if you wish so. After reading it to your satisfaction, you will be asked to sign a consent, which you will be given a copy to keep.

A brief description of the research project funders.

This research study is funded by the East and South African- German Centre of Excellency (CERM-ESA) which is a joint project between Moi University (Kenya), Nelson Mandela University (South Africa), University of Dar es Salaam (Tanzania), University of Oldenburg (Germany), and Uganda Management Institute (Uganda) and is funded by the German Academic Exchange Service (DAAD) with funds from the German Federal Foreign Office.

Purpose

This study is designed to examine success factors for ICT integration in the management of secondary schools in Kanungu District, Uganda. Hopefully, the study

findings will be significant to both the academic audience, secondary school administrators and policy makers. Schools' administrators and relevant Education policy makers will get to know about success factors for integration of Information Communication Technlogy in the management of secondary schools in Uganda.

Procedure

Participation in the study involves face to face interview and/or questionnaire. The interview will be conducted by the researcher, audio tapped and latter transcribed for the purpose of data analysis. Once you agree to participate in this study, you will be required to fill or respond to a questionnaire/interview questions/survey questions that will be presented to you.

Risks and discomforts

You are assured that there are no risks of harm or discomfort that are anticipated to occur as a result of your participation in this study, the only possible risk or discomfort maybe the inconvenience concerning your time spent during this research exercise.

Benefits

Study findings will help school administrators and other policy makers on how to handle issues concerning successful implementation of ICT in the management of secondary schools. This study will also offer a chance to school administrators to raise their voices concerning success factors for integration of ICT in the management of secondary schools. Similarly, feedback on the findings and progress of this study will also be availed to you as the research participant.

Confidentiality

Information gathered during this study will remain confidential in secure premises during this project. Only the research team will have access to the data and information. There will not be any identifying names on the surveys or interview transcripts. The

researcher shall only use codes to identify participants. Your names and any other identifying details will never be revealed in any publication of this study. Soft copies of the data will be protected by password and hard copy files will be kept under lock and the recordings will be destroyed at the completion of the study.

Withdrawal without prejudice.

Participation in this study is voluntary, refusal to participate will not involve any penalty. You are free to withdraw consent and discontinue or refuse to answer certain questions. Know that you have an alternative, you do not have to participate in this study if you are not interested.

Cost:

There will be no additional cost incurred as a result of participating in this study.

Further questions and follow-up:

You are welcome to ask the researcher in case you have any further questions related to the study as a research participant, you can contact the principal investigator, **Isaiah Niwagaba** on telephone number (+256) 788832596 or via email: niwagaba271isaiah@gmail.com

Statement of Consent

I……………………………………………have read the above information, I freely agree to participate in this study. I understand that I am free to refuse to answer any question and to withdraw from the study any time and I understand that by signing this consent form, I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing and freely willing to participate in.

Signature of participant ………………….……… Date ……………….........
Principal Investigator ……………………………….…………………………..
Investigator's Signature ………………………….. Date……………………

Appendix VI: Questionnaire For Teachers

I am a student at Moi University, pursuing Master of Education in Research. I kindly request you to assist me with some information by filling out this questionnaire. The information you will give will be treated with the utmost confidentiality and will be used for study purposes only. Do not write your name or institution name. Please answer the questions as honestly and truthfully as possible by following the instructions indicated as per section.

SECTION A: Demographic information

Instruction
Given below are some items that seek information about you. Kindly put a tick ( ) on the option that describes your situation.

A	DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS
A1	What is your Gender? 1. Male ( ) 2. Female ( )
A2	What is your age bracket? 1. Below 25 ( ) 2. 25 - 30 ( ) 3. 31 - 35 ( ) 4. 36 - 40 ( ) 5. Above 40 ( )
A3	What is your highest academic qualification? 1. Diploma ( ) 2. Bachelor's ( ) 3. Post Graduate Diploma ( ) 4. Master's ( ) 5. PhD/Doctorate ( ) Any other specify _____
A4	Position held in school 1. HOD ( ) 2. Class teacher ( ) 3. Teacher ( ) 4. Others (specify)…………….

SECTION B: AREAS OF ICT INTEGRATION IN MANAGEMENT OF SCHOOLS

Please indicate the extent to which the school has integrated ICT by putting a tick against the response which applies in the appropriate box. The numbers assigned to stand for;

1=Never (N), 2=Seldom(S), 3=Sometimes (ST), 4=Often (O), 5=Always (A).

	Administrative Functions	N	S	ST	O	A
ID	**Please estimate how often your school use ICT to achieve the listed functions**	1	2	3	4	5
IMA1	Create and produce documents such as departmental reports, class lists.					

IMA2	Look for information online using search engines like getting information from the school website, UNEB portal,					
IMA3	Security Surveillance (CCTV).					
IMA4	Retrieving information at any time when needed for decision making.					
IMA5	Share files and content with colleagues at work using simple tools such as email, SMS, social networks.					
IMA6	Attend meetings using advanced features of communication tools (e.g. video conferencing and zoom).					
IMA8	Make presentations during meetings e.g. departmental, PTA, and staff meetings.					
IMA9	Disseminate information to staff members and other school stakeholders (e.g. emails, social networks)					
	Academic Functions					
ID	**Please estimate how often your school use ICT to achieve the listed functions**	**1**	**2**	**3**	**4**	**5**
IMAF1	Prepare Teaching timetables and assign work to staff in order to utilize time properly and avoid collisions of tasks.					
IMAF2	Preparation of assessment timetables and materials					
IMAF3	Monitor class attendance (CCTV)					
IMAF4	Preparation of teaching materials & content					
IMAF5	Preparation of annual schedule of academic activities					
IMAF6	Online teaching of students during school holidays					
IMAF7	Processing of Examination results and reports					

SECTION C: USERS' ATTITUDES

A number of statements on users' attitudes are listed below. Please pick the option that most closely matches the extent to which you disagree or agree with the following statements on user attitudes that influence ICT implementation in secondary schools. **Use 1=Strongly Disagree (SD), 2=Disagree (D), 3=Not Sure (NT), 4=Agree (A) and 5=Strongly Agree (SA).** Kindly put a tick on your level of agreement against each item

ID	Please indicate the extent to which you disagree or agree with the following statements	SD	D	NS	A	SA
	ICT fondness/liking	1	2	3	4	5
UAL1	I like working with ICT in carrying out my work/tasks in school.					

UAL2	Using ICT in information management in school is enjoyable and stimulating.					
UAL3	When there is a problem with the computer that I cannot solve immediately, I stick with the computer until the task intended is executed					
UAL4	When I start to work with the computer, I find it hard to leave it/stop.					
UAL5	I prefer doing as much of my duties related work/tasks using ICT as possible.					
	ICT usefulness	**1**	**2**	**3**	**4**	**5**
UAU1	It is important to me to integrate ICT in carrying out my daily school work.					
UAU2	Using ICT in managing information in school is worthwhile.					
UAU3	Using ICT in information management in school eliminates a lot of tedious work to improve job performance.					
UAU4	I believe ICT has much use in my day to day work/activities in school.					
UAU5	Computers are a fast and efficient means of managing information in a school setting.					
	ICT Confidence	1	2	3	4	5
UAC1	I am good at using ICT in carrying out ICT related tasks in school as far as information management is concerned.					
UAC2	Generally, I feel ok about trying a new problem/task on a computer.					
UAC3	Using ICT to manage information in my daily tasks like maintaining documents, class records is very easy for me.					
UAC4	I have a lot of confidence when it comes to working with ICT.					

SECTION D: USERS' COMPETENCIES

A number of statements on users' competencies are listed below. Please pick the option that most closely matches the extent to which you disagree or agree with the following statements on your competencies that influence ICT implementation in secondary school. **Use 1=Strongly Disagree (SD), 2=Disagree (D), 3=Not Sure (NT), 4=Agree (A), 5=Strongly Agree (SA).** Kindly put a tick on your level of agreement against each item.

ID	**Please indicate the extent to which you disagree or agree with the following statements**					
	Information processing	1	2	3	4	5
UCIP1	I am competent using a word processor to develop and produce text documents such as letters.					

UCIP2	I can easily look for information online using a search engine.					
UCIP3	I can organize computer files in folders and subfolders.					
UCIP4	I am aware that not all online information is reliable.					
UCIP5	I can save/store files or content and retrieve them once saved and stored.					
	Communication	**1**	**2**	**3**	**4**	**5**
UCC1	I can actively use a wide range of communication tools (e-mail, chat, SMS, social networks) for online communication.					
UCC2	I can share files and content with colleagues at work using simple tools such as email, SMS, social networks.					
UCC3	I can use advanced features of communication tools (e.g. video conferencing, data sharing, zoom) to attend meetings and communicate with colleagues.					
UCC4	I can use online services to meet school and my own needs (e.g., e-banking, online shopping, online application...etc.).					
	Content creation	1	2	3	4	5
UCCC1	I can produce simple digital content (e.g. text, tables, images, audio files) using digital tools.					
UCCC2	I can apply basic formatting (e.g. insert footnotes, charts, and tables) to the content that I or others have produced.					
UCCC3	I am aware that content can be covered by copyright.					
UCCC4	I can manipulate simple functions of software and applications such as changing default settings.					
UCCC5	I can create different passwords to access equipment, and digital services					

SECTION E: FACILITATING CONDITIONS

A number of statements on facilitating conditions are listed below. Please pick the option that most closely matches the extent to which you agree or disagree with the following statements on facilitating conditions that influence ICT integration in schools. **Use 1=Strongly Disagree (SD), 2=Disagree (D), 3=Not Sure (NT), 4=Agree (A), 5=Strongly Agree (SA).** Kindly put a tick on your level of agreement against each item.

ID	**Please indicate the extent to which you agree or disagree with the following statements**					
	Administrative support	**1**	**2**	**3**	**4**	**5**
FCS1	The school has clearly articulated the vision and mission of ICT integration in ICT related school activities.					
FCS2	Important decisions about ICT integration are made at all levels of management					

FCS3	The school encourages autonomy to enhance ICT use among the staff					
FCS4	The school gives flexibility for staff to adapt ICT integration in executing their tasks					
FCS5	The school supports the staff to attend workshops or training programs in order to integrate ICT effectively in managing my day to day work at school					
	Technical support	1	2	3	4	5
FCT1	The school has employed an ICT coordinator who can provide technical support.					
FCT2	The school provides consistent hardware and software updates					
FCT3	Training programs are provided for staff to increase their awareness about the value of ICT use.					
FCT4	The school employs an ICT technician who ensures proper functioning of software and hardware.					
FCT5	The school employs a computer laboratory attendant who ensures proper access to the computers					
	ICT infrastructure	1	2	3	4	5
FCI1	ICT facilities like desktop computers, printers, scanners are available.					
FCI2	ICT infrastructure available is quite enough to allow ICT integration in managing the school					
FCI3	The school has reliable internet connectivity					
FCI4	The available ICT facilities can be accessed by the users when needed for use					

Thank you for taking time to complete the questionnaire.

Appendix VII: An Interview Schedule For Head Teachers

Introduction

Dear respondent

I am Isaiah Niwagaba, a Moi University student undertaking a Master's Degree of Educational Research. I am researching "Critical success factors for the integration of ICT in management of secondary school in Uganda" and you have been selected to participate in this study because you are regarded to have information about the integration of ICT in the management of your school. The purpose of this interview is to seek your views about the success factors for integration of ICT in the management of your school. Your responses will be used for this study only while your identity will be treated with confidentiality.

1. Comment briefly on the extent to which ICT in your school has been integrated in:

   a) Administrative functions (security, communication, information storage, document processing, etc.)

   …………………………………………………………………………………

   ………………………………………………………………………………….

   b) Academic functions (timetabling, exam processing, generating students' records, lesson planning, etc.)

   …………………………………………………………………………………

   …………………………………………………………………………………

2. Comment briefly on your staffs' attitudes towards the integration of ICT in both administrative and academic functions/tasks in your school

   a. ICT fondness

   ………………………………………………………………………………….

   b. Consider ICT usefulness in their day-to-day work

   …………………………………………………………………………………..

3. In your view, to what extent has the staffs' attitude influenced the integration/use of ICT in their day-to-day work in school?

   …………………………………………………………………………………

   …………………………………………………………………………………

4. To what extent do you think that your staff members are competent in using ICT for:

    a) Information processing?

    …………………………………………………………………………………

    b) Communication purposes?

    ……………………………………………………………………………….

    c) Content creation?

    …………………………………………………………………………………

5. How have the staffs' competencies influenced the integration of ICT in the day-to-day-tasks in your school that are both administrative and academic?

………………………………………………………………………………………

………………………………………………………………………………………

6. Comment briefly on how the integration of ICT in this school has been supported in terms of:

    a) School support (training, internet connectivity, encouragement to staff)

    ………………………………………………………………………………

    b) Technical support (hardware and software updates, availability of ICT technician)

    ………………………………………………………………………………

    c) ICT infrastructure (availability of machine and gadgets, power supply)

    ………………………………………………………………………………

7. How have these facilitating conditions influenced the integration of ICT in both administrative and academic tasks in your school?

………………………………………………………………………………………

……………………………………………………………………………………..

8. Do you have any other comments or views that you would like to share that I may not have asked you about the integration of ICT in management of secondary schools?

THANK YOU FOR YOUR TIME

Appendix VIII: An Interview Schedule for Directors Of Studies

Introduction

Dear respondent

I am Isaiah Niwagaba, a Moi University student undertaking a Master's Degree of Educational Research. I am researching "Success factors for the integration of ICT in the management of secondary school in Uganda" and you have been selected to participate in this study because you are regarded to have information about the integration of ICT in the management of your school. The purpose of this interview is to seek your views about success factors for integration of ICT in management of your school. Your responses will be used for this study only while your identity will be treated with confidentiality.

1. Comment briefly on the extent to which ICT in your school has been integrated in academic functions (timetabling, exam processing, generating students' records, lesson planning, etc.)

   ……………………………………………………………………………………

   ……………………………………………………………………………………

2. Comment briefly on teachers' attitudes towards the integration of ICT in academic functions/tasks in your school

   a. ICT fondness

   ………………………………………………………………………………….

   b. Consider ICT usefulness in their day-to-day work

   ………………………………………………………………………………….

3. In your view, to what extent has the teachers' attitude influenced the integration/use of ICT in their day-to-day work in school?

   ……………………………………………………………………………………

   ………………………………………………………………………………….

4. To what extent do you think that teachers are competent in using ICT for:

   a) Information processing?

   ……………………………………………………………………………………

   b) Communication purposes?

   ……………………………………………………………………………………

c) Content creation?

…………………………………………………………………………………….

5. How have teachers' competencies influenced the integration of ICT in academic functions?

…………………………………………………………………………………………

…………………………………………………………………………………………

6. Comment briefly on how the integration of ICT in this school has been supported in terms of:

a) School support (training, internet connectivity, encouragement to staff)

…………………………………………………………………………………

b) Technical support (hardware and software updates, availability of ICT technician)

…………………………………………………………………………………

c) ICT infrastructure (availability of machine and gadgets, power supply)

…………………………………………………………………………………

7. How have these facilitating conditions influenced the integration of ICT in academic functions/tasks in your school?

…………………………………………………………………………………………

…………………………………………………………………………………………

8. Do you have any other comments or views that you would like to share that I may not have asked you about the integration of ICT in management of secondary schools?

THANK YOU FOR YOUR TIME

Appendix IX: An Interview Schedule for Non-Academic Heads Of Department

Introduction

Dear respondent

I am Isaiah Niwagaba, a Moi University student undertaking a Master's Degree of Educational Research. I am researching "Critical success factors for the integration of ICT in management of secondary school in Uganda" and you have been selected to participate in this study because you are regarded to have information about the integration of ICT in the management of your school. The purpose of this interview is to seek your views about the critical success factors for integration of ICT in management of your school. Your responses will be used for this study only while your identity will be treated with confidentiality.

1. Comment briefly on the extent to which ICT in your school has been integrated in administrative functions (security, communication, information storage, document processing, etc.)

   ………………………………………………………………………………

2. Comment briefly on your attitude towards the integration of ICT in administrative functions/tasks in your school

   a. ICT fondness

   ………………………………………………………………………………

   b. ICT usefulness in your day to day work

   ………………………………………………………………………………

3. Comment briefly on your staff's attitude towards the integration of ICT in administrative functions/tasks in your school

   ………………………………………………………………………………

4. In your view, to what extent has your attitude influenced your integration/use of ICT in your day-to-day administrative work in school?

   ………………………………………………………………………………

5. In your view, to what extent has your staff's attitude influenced their integration/use of ICT in their day-to-day administrative work in school?

   ………………………………………………………………………………

6. To what extent are you competent in using ICT for:

   a) Information processing?

      …………………………………………………………………………..

   b) Communication purposes?

      …………………………………………………………………………..

   c) Content creation?

      …………………………………………………………………………..

7. To what extent are your staff competent in using ICT for administrative tasks? (information processing, communication purposes, content creation)

   …………………………………………………………………………………

8. How have the ICT competencies influenced integration of ICT in administrative tasks in your school?

…………………………………………………………………………………..

9. Comment briefly on how the integration of ICT in this school has been supported in terms of:

   a) School support (training, internet connectivity, encouragement to staff)

      ………………………………………………………………………………….

   b) Technical support (hardware and software updates, Availability of ICT technician)

      …………………………………………………………………………………

   c) ICT infrastructure (availability of machine and gadgets, power supply)

      …………………………………………………………………………………

10. How have these facilitating conditions influenced the integration of ICT in administrative tasks in your school?

…………………………………………………………………………………..

11. Is there anything that you would like to share that I may not have asked you about integration of ICT in the management of your school?

THANK YOU FOR YOUR TIME

Appendix X: Letter of Introduction From Moi University
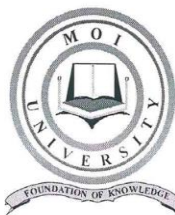
MOI UNIVERSITY

Office of the Dean School of Education

Tel: (053) 43001-8
(053) 43555
Fax: (053) 43555

P.O. Box 3900
Eldoret, Kenya

REF: MS/R/5281/21   **DATE:** 17th January, 2022

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: **RESEARCH PERMIT IN RESPECT OF NIWAGABA ISAIAH – (MS/R/5281/21)**

The above named is a 2nd year Master of Education (M.Ed) student at Moi University, School of Education, Department of Educational Management and Policy Studies, School of Education.

It is a requirement of his M.Ed Studies that he conducts research and produces a thesis. His research is entitled:

"**Critical Success Factors for Integration of Information Communication Technology in Management of Secondary Schools in Uganda.**"

Any assistance given to enable him conduct research successfully will be highly appreciated.

Yours faithfully,

17.01.2.22

MOI UNIVERSITY
SCHOOL OF EDUCATION
DEAN

17 JAN 2022

P.O Box 3900-30100, ELDORET

PROF. J. K. CHANG'ACH

DEAN, SCHOOL OF EDUCATION

(ISO 9001 – 2015 Certified Institution)

Appendix XI: Research Permit Approval Letter

UGANDA CHRISTIAN UNIVERSITY
A Centre of Excellence in the Heart of Africa

09/03/2022

To: ISAIAH NIWAGABA

0788832596

Type: Initial Review

Re: UCUREC-2022-272: CRITICAL SUCCESS FACTORS FOR INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGY IN MANAGEMENT OF SECONDARY SCHOOLS IN UGANDA, Proposal 05.02.2022, 2022-02-05

I am pleased to inform you that the Uganda Christian University REC, through expedited review held on 09/03/2022 approved the above referenced study.
Approval of the research is for the period of **09/03/2022** to **09/03/2023**.

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of **09/03/2023** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by Uganda Christian University REC:

No.	Document Title	Language	Version Number	Version Date
1	Protocol	English	Proposal 05.02.2022	2022-02-05
2	Data collection tools	English	Head teachers' interview guide 05.02.2022	2022-02-05
3	Data collection tools	English	Teachers' questionnaire 05.02.2022	2022-02-05
4	Informed Consent forms	English	Head of institution consent form 05.02.2022	2022-02-05
5	Informed Consent forms	English	Participants informed consent form 05.02.2022	2022-02-05

Yours Sincerely

Peter Waiswa
For: Uganda Christian University REC