RELATIONSHIP BETWEEN HEAD TEACHERS' LEVEL OF ICT LITERACY AND ICT INTEGRATION IN MANAGEMENT OF PUBLIC PRIMARY SCHOOLS IN TINDERET SUB-COUNTY, NANDI COUNTY, KENYA

PAUL KIPKEMBOI CHOGE

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER
OF EDUCATION IN THE DEPARTMENT OF EDUCATION, SCHOOL OF
HUMANITIES AND SOCIAL SCIENCES OF AFRICA NAZARENE
UNIVERSITY

SEPTEMBER 2019

DECLARATION

I declare that this document and the research it describes are my original work and that

they have not been presented in any other university for academic work

Signed: ————————————— **Date:** —————————————

PAUL KIPKEMBOI CHOGE

13M06CMED019

This research was conducted under our supervision and is submitted with our approval

as University supervisors

Signed: ————————————— Date: —————————————

Dr. Richard Tuimur

Signed: ————————————— Date: —————————————

Dr. Boniface Njuguna Mwangi

AFRICA NAZARENE UNIVERSITY

NAIROBI, KENYA

DEDICATION

I dedicate this Thesis to my beloved wife Dorcas Jelimo and children Nahasion Kiptoo, Eudiah Jepkosgei, Claire Jepngetich, Cheryl Jepchumba and Victor Kipruto. Thank you for the unconditional support and understanding while I was away for my studies.

.

ACKNOWLEDGEMENT

First I wish to salute the Almighty God for giving me physical, mental strength and good health to undertake and accomplish this work. Secondly, I wish to convey my sincere gratitude to my supervisors, Dr. Richard Tuimur and Dr. Boniface Mwangi for their guidance, support and encouragement during the course of this academic work. Your suggestions, corrections and overall professional guidance culminated to the final refined thesis document. I am truly grateful to all my lecturers in the department of education for being there during my course work and when I needed clarification on various issues concerning the proposal and later thesis. This study would not have been possible without support from the sampled public primary school head teachers and their senior teachers who participated in the study. Your willingness to participate in this study is acknowledged and much appreciated. Am also grateful to NACOSTI, Nandi County Commissioner and County Director of Education for granting me permission to conduct my research. Lastly and not least, I wish to thank my family for their immeasurable patience, love, encouragement and support. I lack appropriate words to express my gratitude to my dear wife for her support and concern. Your love, moral and material support was great.

ABSTRACT

Integration of Information Communication Technology (ICT) in educational management has become one of the most effective factors that lead to provision of quality education worldwide. Thus, as schools are increasingly becoming ICT-mediated environments, the head teachers' role as far as promoting their use and integration for teaching, learning and management cannot be gainsaid. Incidentally, most of the public primary schools in Tinderet Sub County are still stuck in the inefficient non digital management approach albeit having the basic ICT infrastructure. The purpose of the study was to establish the relationship between the level of head teachers' ICT literacy and the level of ICT integration in public primary school management in Tinderet Sub County. The study was to specifically establish the relationship between the head teacher ICT literacy and ICT integration in communication, teaching and learning, financial management, and management of human resource data. The study was premised on diffusion of innovations theory by Everett Rodgers. The study employed a correlational research design. The study targeted 124 principals and 124 senior teachers from 124 public primary schools in Tinderet Sub County. Through simple random sampling, 94 head teachers and their 37 senior teachers were selected for the study. Data collection were collected through the head teachers' questionnaire and senior teachers' interview schedule. The questionnaire reliability was estimated by computing Cronbach alpha coefficient while validity of data collection instruments was ascertained through the university supervisors' scrutiny and pilot testing. The study collected both quantitative and qualitative data. Descriptive and inferential statistics were used to analyze the data. The four formulated hypotheses of the study were tested by determination of the Pearson product moment correlation coefficients. Qualitative data were analyzed by thematic analysis. The level of ICT integration in school management in public primary schools in Tinderet Sub County was found to be low. The study found that there was a statistically significant and positive strong correlation between head teachers ICT literacy and ICT integration in human resource data management ($r = 0.821$, $p = 0.02$). Similarly, there was a significant correlation between head teacher's ICT literacy and ICT integration in electronic communication and teaching and learning. However, the relationship between head teachers ICT literacy and ICT integration in financial management was found to be statistically insignificant ($r = 0.348$, $p = 0.218$). In order to improve ICT integration in public primary school management, TSC should make ICT literacy and book keeping competence as some of the requirements for one to become a head teacher.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

OPERATIONAL DEFINITION OF TERMS

Computer Literacy- refers to the respondents' self-perception of their level of knowledge, skills and understanding regarding computers and the ability to manipulate hardware and the common software applications.

Educational Management Information System (EMIS)-refers to a planned system of collecting, Processing, storing and disseminating school management data in form of information needed to carry out the functions of school management.

Information Communication Technology (ICT)-refers to a diverse set of technology, tools and resources used to communicate, create, disseminate, store and manage information.

Integration-refers to the capacity of using ICT to combine data processing from different data sources to present a single collection of data to the school staff.

ICT Literacy- refers to the ability to use digital technology, communications tools and networks to access, integrate, manage, evaluate and create information in order to function in a knowledge-driven society.

Management-refers to the process of planning, organizing, directing and controlling activities related to school activities for the purpose of producing information desired by users.

LIST OF ABBREVIATIONS AND ACRONYMS

DEB   District Education Board

DOI   Diffusion of Innovations

GOK   Government of Kenya

ICT   Information and Communication Technology

KCSE   Kenya Certificate of Secondary Education

MOEST   Ministry of Education Science and Technology

TPAD   Teachers' Performance Appraisal and Development System

TSC   Teachers Service Commission

UNESCO   United Nations Educational Scientific and Cultural Organizations

MOE   Ministry of Education

IT   Information Technology

PTA   Parents Teachers Association

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

This chapter presents an introduction and background to the study under the following sub headings; Background of the study, statement of the problem, purpose of the study, research objectives, and hypotheses of the study. The chapter also describes the significance, scope, limitations, and assumptions of the study. Further, the study theoretical framework and conceptual framework are delineated.

1.2 Background of the Study

The demands of the 21st century dictates that learners, teachers and administrators in educational institutions be well prepared to adequately meet the demands of the new information age (UNESCO, 2016). The 21st century skills set for life and work are best developed using the intense learning opportunities presented by computer electronics communication. Ekua and Asare (2016) opine that, even at its most fundamental level, the ability to find, manipulate and use information must necessarily be grounded in ICT literacy.

The real novelties in Information and Communication Technologies (ICTs) began with the development of electronics which are solid-state integrated circuits, which harness electrical power in miniature forms and facilitate the generation, recording, receiving, processing, storage, transmission or display of analog or digital data (Jan, 2018). Generations of computers have evolved and each reflected a change to hardware of decreased size but with increased capabilities to control computer operations (Lee, Kim & Lee, 2015).

The miniaturization of electronics hence microelectronics combined with the calculating possibilities of computers and the global reach of telecommunications facilities, have greatly transformed people's ability to individually acquire, store, manipulate, use and disseminate information in numeric, texts, pictures and sounds (UNESCO, 2016).

As regards to global adoption of ICT in education Globally, Sweden and Singapore top the rankings of the Global Information Technology Report (GITR) 2010-2011 as the most innovative and digitized nations. Other countries in Europe, North American and some Asian countries, are also in the forefront in leveraging ICT to transform their economies. Singapore's education system key pillar is its focus on integration of ICT into the classroom. Teachers, school principals and students' use of ICTs form the cornerstone of Singapore's education system (Lee et al. 2015).

Conversely, Sub-Saharan Africa's 2012 GITR's ranking of the level of ICT readiness is still very low due to insufficient infrastructure which largely remains costly. Africa has low levels of skills that do not allow for an efficient use of the available technology. Nine of the last ten countries in GITR report belong to the African region which serves as evidence to the digital divide that it suffers vis-à-vis more developed regions of the world (Dutta & Bibao, 2012). The pivotal role of school managers in the use and integration of ICT is fundamental if the education sector is to achieve its goals and compete effectively on the global platform. Klomsri and Tedre (2016) assert that successful implementation of ICT in schools will only be realized if the principal actively supports it, learns it as well, provide professional development and support staff in the process of change.

Afshari (2012) aver that the school leadership is an important factor in the effective integration of ICT in school management. As leaders of school development, including

ICT integration in schools, head teachers are expected to be proficient in computer use (Thannimalai & Raman, 2018). In a similar sentiment, Roblyer and Doering (2014) posit that head teachers are required to act as technology leaders and teachers as facilitators, to provide the skills and knowledge for the 21st century education. They further note that, a head teacher's responsibility is becoming even more challenging as schools are expected equip the students with the essentials in ICT technological ready to meet the demands of digital economy. Therefore, in order to motivate, guide and spearhead initiatives for teachers to integrate technology in their teaching, head teachers should possess adequate ICT knowledge and skills. However, Thannimalai and Raman (2018) observes that, though head teachers have been formally entrusted to offer leadership in technology development most of them do not have background or suitable training to feel confident in dealing with technology.

ICT literacy is a critical tool in Kenya's vision of knowledge based economy which aims at shifting the current industrial development path towards innovation where creation, adoption, adaptation and use of knowledge as the key source of economic growth are key (Tanui, 2013). Different countries have different needs for ICT literate people due to their society standards and level of technology.

Whereas news reports indicate that ICT has penetrated many sectors including banking, transportation, communications and medical services, the Kenyan educational systems seem to lag behind. Kiptalam (2010), found that, access to ICT facilities is a major challenge facing most African countries, with a ratio of 1:15 students in the developed countries. Further, a report by the National Council for science and Technology (2010) indicated that computer use in Kenyan classrooms is still in its early phase. It was also

concluded that the perceptions and experiences of teachers and administrators do play an important role in the use of computers in the Kenyan classrooms.

School administrators and managers are a key determinant for the realization of desired outcomes and successes in both public and private schools hence seen as a critical by all stake holders. Jan (2018) observes that the 21st century school managers face numerous challenges emanating from the technology. This requires effective and dynamic school administration.

According to Ekua and Asare (2016), ICT provides several facilities and possibilities for educational managers to perform their tasks. In this regard, Motshegwe and Batane (2015) observe that the development of computer technology from processing information to supporting communication augmented its potential for education. Society without exception is in transition towards an information society due to the enormous impact of these technologies in all facets of life.

The work of school managers has changed from manual and mechanical to electronic data processing, storage, output and communication. Ogundele and Etejere (2013) suggest that the transformational rate of change might find professionals outdated in their own profession. Thus, as schools are increasingly becoming ICT-mediated environments, the head teachers' role as far as promoting their use and integration for teaching, learning and management cannot be gainsaid.

In Kenya, the Teachers Service Commission has spelt out school head teachers' responsibilities or functions (TSC, 2007). These include the organization and management of the approved school curriculum; the management and control of school finances and stores; the management and motivation of human resources in the school; functioning as a secretary to the school Board

of Governors (BOG) and the Parents Teachers Association (PTA) and the management and maintenance of the school plant and equipment. According to Makhanu (2010), head teachers must embrace modern technology in order to effectively accomplish these tasks and pass the test of accountability and good governance. In order to achieve efficient and effective school management in communication, staff and students' data, finance, discipline, and monitoring of students' academic progress, the school management requires to not only be computer literate but also be an active user of ICT (Tanui, 2013).

Currently, head teachers are expected to correspond to the Teachers Service Commission (TSC) and Ministry of Education (MOE) through digital platform. In addition, all the essential school data such as enrollment, teacher management data, and school budget has to be electronically sent to the relevant office. Tanui (2013) observes that the new dispensation of using digital platform has caused varied reaction from principals. Some have hailed the move due to its preservation of data and confidentiality as opposed to use of paper work. However, Okeyo (2013) observes that the move has also led to leakage of confidential information as some principals engage other people to upload and download the required information owing to the fact that they have little ICT literacy skills.

1.3 Statement of the Problem

It is a fact that traditional paperwork is being overtaken by electronic devices as the standard working tools in educational institutions (Thannimalai & Raman, 2018). Electronic information system will especially enable school managers to acquire, process, store and disseminate vocal, pictorial, textual and numerical information. This will make their work effective and efficient. However, adequate use of electronic information systems in the schools demands effective ICT literacy skills and acquisition (Ogundele & Etejere, 2013).

According to Nandi County schools' census report 2016/2017 (MOE, 2018), Tinderet Sub County had the most varied report in regard to the level of ICT integration in school administration and in teaching and learning. The report indicated that while some schools were well endowed in computers and ICT connectivity, some operated with only one or no computers. However, the report also noted that though some schools had acquired modern and adequate ICT equipment such as laptops, internet connectivity and projectors, some head teachers' were yet to embrace electronic technology in their various tasks in school management. Further, the report noted with concern the frequent incidences of misplacement of hard copy files in several schools. Misplacement of vital books of accounts has to a large extent jeopardized the auditing process. Thus, head teachers should embrace the use of ICT integrated financial management, in order to minimize the issues associated with use of hard copy files. To this end, the current study set out to investigate the possible nexus between the head teacher' ICT literacy and ICT integration in public primary schools management in Tinderet Sub County, Nandi County.

1.4 Purpose of the Study

The purpose of the study was to investigate the relationship between the head teachers' level of ICT literacy and ICT integration in management of public primary schools in Tinderet Sub-County, Nandi County. The researcher aimed at proffering useful suggestions which could lead to enhancing head teachers' ICT literacy and its application for effectiveness school management.

1.5 Research Objectives

This study was guided by the following objectives;

i. To establish the relationship between the level of the head teacher's ICT literacy and ICT integration in communication management in public primary schools in Tinderet Sub-County;

ii. To examine the relationship between the level of the head teachers' ICT literacy and ICT integration in teaching and learning in public primary schools in Tinderet Sub-County;

iii. To establish the relationship between the level of the head teacher's ICT literacy and ICT integration in financial management in public primary schools in Tinderet Sub-County;

iv. To determine the relationship between the level of head teacher's ICT literacy and ICT integration in human resource data management in public primary schools in Tinderet Sub-County, Nandi County.

1.6 Hypotheses of the Study

The following null hypotheses will be tested at 95% confidence level

H_{O1}: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in communication management

H_{O2}: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in management of teaching and learning

H_{O3}: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in financial management

H_{O4}: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in human resource data management

1.7 Significance of the Study

Oso and Onen (2009) aver that significance of the study refers to the relevance of the study in terms of academic contributions and practical use that might be made of the findings. It shows how the research benefits or impacts others in part or whole. It also highlights the contributions of the research to other researchers, practitioners and policy makers.

The study aimed at establishing the relationship between the level of head teachers' ICT literacy and ICT integration of school management. The findings of this study may be important to several stake holders. The study was expected bring to the fore the level of head teachers' ICT literacy in Tinderet Sub County. This information would inform the content and nature of capacity building in service courses targeting the principals offered by MOE and Non-Government Organizations (NGOs). Moreover, the study findings would create impetus for a policy formulation in which appointment of principals will be pegged on proficiency in computer literacy as one of the mandatory competencies. The study findings might also enable Quality Assurance Officers (QASOs) gain insight on the influence of head teachers ICT literacy on ICT integration in school management. Further, it may shed light on why some schools are slow in ICT integration albeit the school being well equipped in ICT infrastructure.

The study findings may also be used as a reference point by the school management committee to mobilize funds for securing ICT infrastructure and capacity building of the entire teaching and subordinate staff in information communication technology. Additionally, the study enriches the literature on ICT integration in public primary schools in Kenya.

1.8 Scope of Study

The scope of the study is the geographical area and methodological boundary within which the study operates (Marylin & Goes, 2013). The study was carried out in public primary schools in Tinderet Sub County, Nandi County. It involved head teachers and senior teachers in their schools. The study gathered information on head teachers' ICT literacy and the extent to which ICT has been integrated in school management. The study aimed at using correlational research design to establish the nexus between the head teachers' ICT literacy and level of ICT integration in various school management areas. Thus, the possible causal-effect between the independent and dependent variables was not within the scope of the current study.

1.9 Limitations of the Study

Limitations refer to potential weaknesses in the study that are not within control of the researcher (Kombo & Tromp, 2006). This study was likely to encounter a number of limitations. The head teachers' computer literacy was assessed using a self-rating questionnaire and as Sharma (2008) noted, individuals tend to over-rate themselves on desirable traits and under-rate themselves on undesirable traits. Thus, some head teachers may tend to overate themselves and which may lead to inaccurate information. However, to mitigate againist such possibility of gathering inaccurate information, the respondents were assured of confidentiality, and that the information gathered would not lead to any adverse consequencies. Further, they were made aware that, the study would be solely for academic purposes and that anonymity would be maintained. Additionally, an option of withdrawing from the study without penalties was offered.

The second part of data collection included information on the principals' application of ICT literacy to accomplish administrative tasks. Such information could elicit suspicion

and mistrust prompting some head teachers to distort information in order to protect their reputation. To mitigate against such eventuality, triangulation of information source was done by subjecting senior teachers to similar questions as those answered by head teachers. Additionally, the researcher employed an observation check list and a field note book in order to ascertain the actual situation in regard to the availability of ICT infrastructure in various schools.

1.10 Delimitations of the Study

The delimitations of the study are the boundaries set by the researcher by conscious exclusionary and inclusionary decisions in regard to the subject of interest (Simon & Goes, 2014). Delimitations are within the researcher's control. There are many tasks undertaken by principals in the course of school management. However, this study focused on principals' use of electronic technology in communication, teaching and learning, financial management, and management of the school human resource data. The use of ICT can range from simple to very complicated tasks. However, this study assessed principals' elementary knowledge in use of ICT in school management. Delimitations were set so that the study goals do not become impossibly large to complete.

1.11 Assumptions of the Study

Assumptions in a study are things that are somewhat out of researcher's control, but if they disappear the study would become irrelevant (Simon, 2011). This study was carried out under the assumption that most of public primary schools are linked to electricity or have a generator to enable smooth use of computers and other gadgets essential in ICT use. It was also assumed that most of the schools in Tinderet Sub County are within the network of the major providers such as 'Safaricom' and that all head teachers have the most basic computer literacy such as typing a letter.

1.12 Theoretical Framework

The theoretical framework accounts for or explains phenomena and tries to clarify why things are the way they are based on theories (Kombo & Tromp, 2006). They further explicate that theoretical framework enables the researcher to conceptualize the topic in its entirety as an outgrowth of the larger society. Thus, the researcher is enabled to acknowledge the problem from a wider objective perspective and not from a narrow personalized self-interest and prejudiced stance.

The proposed study was premised on Diffusion of Innovations theory (DOI) by Everett Rodgers in 1962 (Rodgers, 1995). The DOI theory as explicated in the book *Diffusion of Innovations*, is a set of generalizations regarding the typical spread of innovations and trends within a social system and therefore explains why some innovations are adopted while others are ignored or take a longer time to be adopted (Rodgers, 1995). More importantly, DOI explains how communication channels and opinion leaders shape adoption of ideas and technologies in a community such as a school (Koperlainen, 2011). According to Rogers (1995), Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system while an innovation is an idea, process, practice or device perceived as new by an individual or social unit of adoption. Diffusion is a social process that involves and occurs through the mass media, interpersonal communications and other social networks.

The theory predicts that media and interpersonal contacts of a lead person such as a head teacher, provide information and influences opinions and judgments of would be users and facilitators. Head teachers' as opinion leaders can exert influence on teachers, non-teaching staff, students' and other school members to adopt an innovation. It therefore, follows that

when a head teacher is proficient in computer use and embraces ICT, there is a likelihood of high rate of diffusion of innovation among all members in the school community.

1.12.1 Categorization of Adopters in DOI

Rodgers (1995) observes that one of the striking features of DOI is that for most members of the social system, innovation-decision depends heavily on other members of the system. This is because people are generally risk-averse and this uncertainty leads to postponement of adoption till further evidence is gathered. The attitudes of the initial persons to adopt an innovation will consequently influence the other members in the social system. Head teachers, teachers and non-teaching staff adopt new ideas and technologies at varying degrees and at different times. Figure 1.1 shows the various adopter categories and the corresponding proportion in Diffusion of Innovations according to DOI theory.

Categories of Adopters
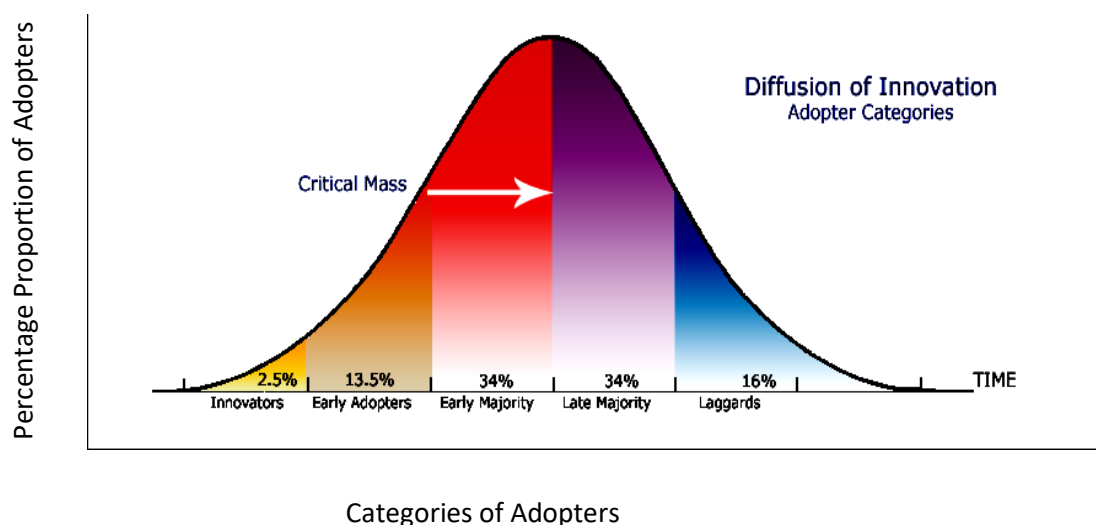
Source: Kaminski, (2011).

Figure 1.1: Adopter Categories and Proportion in Diffusion of Innovations

The adopters of a new technology fall into five groups: innovators, early adopters, early majority, late majority and laggards as shown in Figure 1.1 Innovators (venturesome) represent 2.5% of adopters who are usually adventurous. Early Adopters (respectable)

represent 13.5% of a social system and include respected opinion leaders. If a school head teacher is keen to adopt ICT for learning, teaching and school management, the rest of the school community will look up to their leaders and this will influence the management of various sectors in a school. Early Majority (deliberate) constitute 34.0% members of a community who although are not leaders and take longer to decide, they deliberately decide to use something new. Late Majority (skeptical) are 34.0% members of a social system who generally approach technology with great caution often adopting it out of economic need or social pressure such as a government directive. Laggards (traditional) represent 16.0% of a social system; are often isolated and hold conservative views, highly suspicious and even resistant to new innovation and change.

Earlier adopters of an innovation say 10.0-25.0% of a school assume the role of opinion leaders and will profoundly affect the innovation-decision of later adopters especially if the principal is among them. Innovation decision of a school's teachers, students and non-teaching staff depend heavily on the innovation-decisions of other school members such as the principals who are respected opinion leaders.

DOI theory was found relevant for the current study since the adaptation of ICT in various schools in Tinderet Sub County was attributed to not only the available ICT infrastructure but also to human innovation-decisions factor (MOE, 2018). The Nandi County schools census report indicated that though some schools were endowed with ICT infrastructure, the rate of adaptation of ICT was very low. Thus, there was a possibility that most of the head teachers were in the category of late majority or laggards and their influence on the other members in the schools was weak.

1.12.2 Weaknesses of Diffusion of Innovation Theory

Chile (2012) outlined that the DOI theory depicts a weaknesses by just classifying adopters without giving the causal explanations as to why and how people adopt different technological innovations. It is simplified to focus solely on an innovation disregarding the complex societal, cultural and economic factors while attempting to explain failed attempts of diffusion. Poor schools see little relevance for social networking and latest wireless internet. Additionally, DOI may stimulate adoption by groups that do not want the innovation making it unsustainable after change agents leave such as the transfer of a principal. This necessitates the specification of the roles of the head teacher to ensure continuity of adoption irrespective of the absence of the initial early adopter or opinion leader.

1.13 Conceptual Framework

Conceptual framework is a graphical or diagrammatic representation of the researcher's conceptualization of the relationship between variables in the study (Kombo & Tromp, 2006). It is therefore a linked set of variables backing up in the critical analysis. It is made up of dependent and independent variables. Figure 1.2 shows the conceptual framework that guided the current study.

Independent Variable   **Dependent Variables**
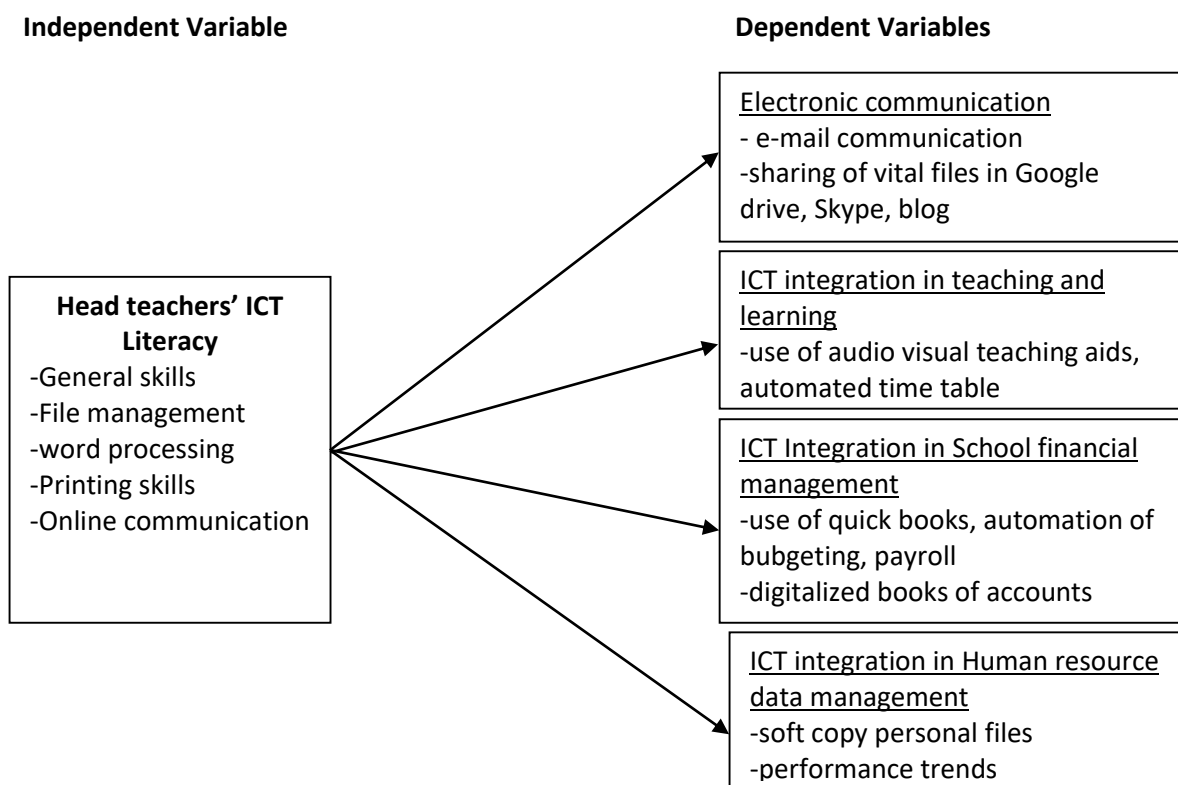
Figure 1.2: Conceptual Framework showing the Envisaged Relationship between Independent and Dependent variables

In reference to Figure 1.2, the head teachers' ICT literacy is conceptualized to have a relationship with the level of ICT integration in various school management areas. A positive relationship may imply that head teachers who are techno savvy are more inclined to influence ICT integration in school key management areas. These areas include, communication, teaching and learning, financial management and human resource data management. Further, the level of ICT literacy among head teachers is crucial in adoption of technology by other members of school community. Head teachers' as opinion leaders can exert influence on teachers, non-teaching staff, students' and other school members to adopt an innovation in accordance with Diffusion of Innovations theory (Rogers, 1995). It therefore, follows that when a head teacher is proficient in computer use and embraces

ICT, there is a likelihood of high rate of diffusion of innovation among all members in the

school community.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the review of the relevant literature in view of the research problem. The chapter commences with an overview of the concept of computer and ICT literacy followed by the empirical literature review relevant in the proposed study. The empirical literature review is in accordance to the study objectives. The chapter closes with the summary of the reviewed literature and research gaps.

2.2 Concept of Computer and ICT Literacy

A computer is an electronic machine capable of inputting, processing, and outputting data based on a logic supply (Omotayo, 2015). Computer literacy instructions are meant to introduce a person to the use of the computer and some basic applications. There is no consensus among scholars on the definition and measurements of computer literacy. Some researchers define and measure computer literacy in terms of computer course completed, the amount of time spent on the computer and having computer at home while others consider the familiarity with computer terms, experiences and ability (Osunwusi & Abifarin, 2013). Omotayo (2015) regards computer literacy as the ability to identify and operate the software and hardware of a computer so as to achieve a desired goal. Bada, Adewole and Olalekan (2009) define computer literacy as the ability to instruct the computer what you want it to do and understand what the computer says while Oluwatayo (2012) regards computer literacy as the skills and knowledge possessed by an individual to accomplish tasks using a computer. Thus, from the various definitions, it can be deduced that computer literacy entails the ability to operate computer by feeding it, extracting, sending and processing information for meaningful interpretation. The proposed study will

consider computer literacy as the acquisition of knowledge, skills and understanding regarding computers and the ability to manipulate hardware and the common software applications. The common software applications include word processor (Micro Soft (MS) Word), spreadsheet (MS Excel), presentation (MS Power point), data base (MS Access), web browser (MS Internet explorer, and communication too (e-mail).

Ivankovic, Spranec and Miljko (2013), observe that the term computer literacy is gradually getting replaced by the term ICT literacy. While the two terms almost refer to the same concept, ICT literacy is broader and comprehensive and includes the use of computers, cell phones, radios, television, robots, LCD projectors, cameras, broadcasting networks and the unseen satellites orbiting the earth constantly sending signals from one place to another. Ivankovic et al., (2013) considers computer literacy to be a precursor to ICT literacy. Perez and Murray (2010) advance that most of the skills that an individual should acquire to be considered computer literate, are components of the more comprehensive concept of ICT literacy. Thus, in some instances the concepts of computer literacy and ICT literacy are used interchangeably.

According to the international literacy panel cited in Kennedy (2006), ICT literacy is defined as the ability to use digital technology, communications tools and networks to access, integrate, manage, evaluate and create information in order to function in a knowledge-driven society. Wijaya and Sunrendro (2007) consider the concept of ICT literacy to consist of the terms 'ICT' and 'literacy'. They further explicate that ICT literacy is a bridge between technical literacy and information literacy. In technical literacy, one learns basic skills in databases, word processing and data presentation; while information literacy is access, evaluation and use of information by means of technology.

In order to assess the level of ICT literacy possessed by a person, several measuring scales or surveys have been developed. For instance an ICT literacy survey developed by Morales (2013) assesses the general skills of operating the computer hard ware, and the software skills such as file management, word processing, printing, and online communication. Using a Likert form of a rating scale and sometimes combining it with a practical assessment the level of ICT literacy of an individual can be established. The information thus, generated can be used for placement, plan for further training or for academic research as in the current proposed study.

2.2 Empirical Literature Review

2.2.1 Head teachers' ICT Literacy and Electronic Communication

Afzaal (2012) aver that, chief administrators, school head teachers should be able to apply the basic computer skills in accomplishing school administrative and managerial tasks. For effective school management and leadership, head teachers need to be in constant communication with teachers, pupils, parents, Board of Management (BOM), MOE, TSC, school suppliers, and other stakeholders. Ghavifekr, Afshari, Siraj and Seger (2013) observe that the head teacher use of email to inform teachers of a meeting, send a memorandum, send important internal and national policy documents has several advantages.

The e-mail system is fast and convenient, retains evidence of the sent information, can accommodate any length of the uploaded material, can effectively be used to send visual and audio visual materials and above all is cost effective as compared to the traditional method of using paper written information (Ghavifekr et al. 2013). Additionally, Oulo (2013) notes that, a school manager who is computer literate can typeset most of the information meant for different stakeholders without involving secretaries. In so doing the

necessary confidentiality can be maintained. Omotayo (2015) argues that through Skype, head teachers can initiate a fruitful engagement with members of school alumni who are not able to visit the school physically or are residing abroad. Through the Skype, the head teacher can maintain better rapport with school sponsors and other stake holders who can enrich the head teacher skills in management.

Head teachers act as role models to the entire school community when they apply ICT to administrative and managerial tasks. When principals apply power point presentation to enhance their communication, teachers are encouraged to embrace ICT technology in their presentation of subjects' content in class and in other fora (Singh & Muniandi, 2012).

Afshari, Bakar, Luan, Fool and Samar (2010) conducted a study in Turkey, to identify the extent to which Iranian secondary school principals used computers and secondly to explore the relationship between certain variables related to the use of ICT. The study found that, high level of computer access, high level of computer competence, high level of transformational leadership behaviors as well as strong perceptions of the attributes of ICT, all contributed significantly to the level of computer use by principals. However, the study did not establish the relationship between the principal's level of computer use and their electronic communication to various school stakeholders. The current study, embarked on establishing the relationship and possible influence of school principals' ICT literacy on electronic communication as a component of effective school management.

A study conducted in Nigeria by Omotayo (2015) aimed at assessing the level of computer literacy and phobia among private secondary schools' principals in Kaduna North Local Government area of Kaduna State. The study results revealed that the level of computer literacy of private secondary schools principals in handling computer, using E mail

communication and using cyber-café was significantly higher than vice-principals. The study recommended private secondary schools should have a fully computerized center with internet facilities for e-library-information and e-communication system.

In Kenya, Tanui (2013) sought to establish the principals' role in promoting use and integration of information and communication technology in public secondary schools in Wareng Sub-County. The study found that despite the fact that some schools had adequate number of internet connected computers, constant electric power supply and other ICT resources, principals hardly used electronic communication. For instance, teachers were summoned to school over the holidays to be given information which could have been easily conveyed through an email. Further, principals were stuck in producing so many hard copies to convey vital information during meetings involving teachers, BOM or other stakeholders. However, Tanui's study did not establish the level of the principals' ICT literacy and which might have influenced their level of electronic communication. The current study embarked on assessing the Head teachers' level of computer literacy and also sought to establish the envisaged relationship to the level of ICT integration in electronic communication.

2.2.2 Head Teachers` ICT Literacy and Management of ICT Integration in Teaching and Learning

Head teachers have been described as having the greatest impact on the use of technology for instructional use in schools (Sergiovanni, 2009). Green (2009) postulates that, in order for head teachers to effectively initiate ICT integration in teaching and learning, creation of technology plan to support teachers and students is crucial. Afshari (2012) asserts that head teachers' involvement in implementation of technology for instructional use involves

three major functions namely: leading technology literacy, support of teachers and technology planning.

Students in technology-rich environments experience positive effects on achievement in all subject areas. Sivin-Kachala and Bialo (2009) analyzed 311 research studies on the effectiveness of technology on student instruction in USA. The research findings showed that when teachers adopt ICT integrated teaching, students experience significant gains and achievement in all subject areas, acquire positive attitudes toward learning, and increased self-esteem. In a similar study, O'Dwyer, Russell, Bebell, and Tucker-Seeley (2009) cited in Dunham (2012), controlling for both socioeconomic status and prior instruction, found that fourth grade students who reported greater frequency of technology use at school to edit papers, scored higher total English/Language Arts test scores and higher writing scores.

Ogundele and Etejere (2014) investigated the relationship between computer literacy and teacher's job effectiveness of secondary schools in Kwara State, Nigeria. The study employed Computer Literacy Questionnaire (CLQ) and Teacher's Job Effectiveness Questionnaire (TJEQ) were used to collect data from 600 respondents. The findings revealed that computer literacy encourages appreciation and utilization of computers during teaching learning processes which invariably aid teachers' job effectiveness, such as record keeping, communication, and management of students' data. It also revealed that teachers who had higher level of computer literacy, performed better in the schools than non-computer literate teachers. The use of computers arouse students' interest in the teachings which supports effective student academic performance. It was recommended that the government should plan for in service computer training opportunities for all teachers. However, the study did not pay attention to the head teacher computer literacy as

the focal point of the school instructional leadership and whose overarching influence is instrumental in effective ICT integration in teaching and learning. Thus, the identified lacuna spurred the undertaking of the current study.

A study by Kidombo, Gakuo and Kindachu (2011) cited in Kisirkoi (2015), established that, integration of ICT in curriculum delivery in secondary schools in Kenya depended on schools' leadership, school manager's level of ICT skills and competence, professional training of the teachers in ICT, and presence of school ICT policy. Additionally, private schools were found to have had ICT policy which the public schools lacked. Mutwiri, Kafwa and Kyalo (2017), conducted a study to establish the role of head teachers in ICT policy formulation in public secondary schools in Kenya with a focus on Meru County. The study found that principal instructional leadership role in formulating ICT policies to enhance the use of ICT in curriculum implementation in public secondary school in Meru County was significant. However, teachers were not well informed by the leadership on the role of ICT in teaching and learning and were left on their own. The study recommended an improvement in pedagogical leadership by equipping school principals with ICT skills through regular training. It was however, noteworthy that Mutwiri et al., (2017) findings, conclusion and recommendations were not based on a robust empirical findings since the principals' computer or ICT literacy was never assessed. Lack of principals' effective pedagogical leadership in regard to ICT integration in teaching and learning could have been due to negative attitude or lack of the necessary infrastructure and not necessarily due to lack of skills and knowledge. Thus, it is through interviews and assessment of the principals' ICT literacy that one can ascertain the factors influencing the management of ICT integration in teaching and learning in a school.

2.2.3 Head teachers' Computer Literacy and Financial Management

Despite the progress realized in ICT integration in teaching and learning in many schools in developing countries, ICT is yet to permeate other institutional functions and in particular, financial management in educational institutions (Muema, 2015). There are many benefits accrued from successful integration of ICTs in financial management such as enhanced efficiency, transparency and accountability. In addition, integration of ICTs in financial management assist in detection of corruption and fraud (Muema, 2015).

Idolor (2010) defines financial management as the managerial activity concerned with the planning and controlling of a firms' financial resources. According to Niemann (1997) cited in Motsamai, Jacobs & Wet, (2011), school's financial management is the execution by a person in a position of authority of those management actions (regulated tasks) connected with the financial aspects of schools and having the sole purpose of achieving effective education. Similarly, Joubert and Bray (2007) regard school financial management as the performance of management actions connected with the financial aspects of a school for the achievement of effective education. The two definitions are in consonance due to the fact that a connection is made between the management tasks and the financial aspects of a school which leads to achievement of effective or quality education. This implies that the management of school finances involves the task of planning (budgeting), organising (coordinating), leading (communicating and motivating), as well as controlling (auditing) (Motsamai, et al., 2013).

Ngugi (2012) aver that ICT has become valuable for storing and analyzing data in school financial management which includes budgetary allocations, expenditures, students' fees payment and general accounting. Similarly, Roberts and Sikes (2011) argue ICT integration in financial management is indispensable in fast tracking budgeting process

which involves budgetary allocations, an intricate processes requiring reliable, timely, user-friendly information for supporting management decisions.

Muema (2015) conducted a study on exploration of ICT integration in school financial management with a view of understanding the role it plays in enhancing the quality of educational management in Tanzania. The study purposively targeted a school with a history of ICT integration in financial management. The participants targeted were staff involved in managing the school's finances or maintaining the ICT technologies. Thus, the study interviewed the head teacher, the finance manager, the IT technician, the BOG chairman and the auditor in a bid to get insight into how ICTs were integrated in managing the school's finances. The researcher also used observation to collect data on availability of ICT resources and human resource activities. For instance, the head teacher and the finance manager were observed as they undertook financial management duties such as posting payments and expenditure requisitions, cash book reconciliation and preparing both trial balances and financial statements to establish whether and how they integrated ICT in these processes. Observing the finance manager and the head teacher as they worked provided first hand practical experience on how the ICT facilitated the process.

The study also sought documentary evidence from the school books of accounts, school budgets, school development plans, school strategic plans, and monitoring and evaluation frameworks were analyzed. Muema (2015) study found that all financial transactions undertaken in the sampled school were effected through bank and online bookkeeping facilitated by a certain ICT software. Analysis of bank statements revealed that the bank sends weekly statements of accounts to the school electronically via e-mail. The bank statements enabled the finance office and the head teacher to countercheck and authenticate the receipts issued with the banking slips submitted. Through the integrated ICT system

the staff salaries were transacted through cheque or electronic funds transfer (EFT) to bank accounts, thus ensuring that the school did not lose money through fraud. In addition, daily balancing off of the cash book, preparation of the monthly trial balance and income expenditure accounts at the end of the year was also generated through the computerized system.

Oyier, Odundo, Ganira and Kahiga (2015), investigated effects of ICT in management in private secondary schools in Nairobi. The study found that the adoption of ICT was high in private schools irrespective of curriculum offered. It was also found that ICT integration enabled institutions achieve improvements in instruction, financial, and administrative management. Further, it was found that 62.5% of schools had automated accounts, 71.9% and 53.1% had automated payroll and budgeting operations. The study recommended regular training of administrators and staff on emerging technologies in school management. It is noteworthy that Oyier et al., (2015) study focused on private secondary school in the capital city and which are likely to be well endowed in ICT resources. The current study focused on public primary schools which are mainly in rural setting in Tinderet Sub County.

2.2.4 Head Teachers' ICT Literacy and School Human Resource Data Management

Usage of ICT in schools administrative management of human resource and material resources involves harnessing technology for better records, planning, and monitoring the changes that occur throughout the year. A study carried by Oboegbulem and Ugwu (2013), in South Eastern States, Nigeria established that influence of ICT on management systems has revolutionized administration in secondary school by enabling transfer, store, and retrieval of information easily. On human resource management, Alexander (2012) observes that ICT has enabled monitoring of staff attendance, allocation of work, leave

management and performance appraisal. Oguta, Egessa and Musiega (2014) note that ICT helps in staff management by processing of voluminous records in a quick, meticulous, and impeccable manner.

Oyier et al., (2015), maintains that when stores are automated, schools are able to safeguard assets and ensure they are used solely for authorized purposes. Owing to the fact that maintaining school stores records is a very tedious and time-consuming task, principals should embrace ICT assisted systems. Other benefits of using ICT integrated systems, include getting lost item information, inventory balances, minimum stock, and outward and inward transaction details.

Ngugi (2012) investigated the extent of the use of ICT in education management in public secondary schools in Naivasha District. The study sampled 20 principals, 20 secretaries and 20 bursars from 20 schools. Questionnaires were used to collect the data from the sampled principals while interview schedules were used to collect the data from the secretaries and the school Bursars. The study finally found that ICT was used in different areas of management in schools such as curriculum instructional management as indicated by 67% of the respondents, financial management 61%, student management 67%, material resources management 44% and personnel management 50%. The study also found that 61% of the respondents were computer literate. However, the study's head teachers' questionnaire had a major flaw in that it used a 'yes' and 'no' item to ascertain the percentage of head teachers' computer literacy. Thus, data cannot give a conclusive information in regard to head teachers' level of their computer use proficiency. The current study used a validated computer literacy survey or inventory to ascertain the level of the principals' computer literacy.

Oyier et al., (2015) found that 68.75% of private schools in Nairobi County have automated their stores, 62.50% staff records and 56.25% students' records. The finding was consistent with Meryo and Boit (2012) assertion that usage of ICT in administrative management involves harnessing technology for better planning, setting standards, effecting change and monitoring results of the core functions. Oyier et al., study concluded that owing to the fact that most private schools in Nairobi County have integrated ICT in management human resource and stores, they are more likely to provide a well-balanced education, starting from the documentation of each student academic needs and capabilities, financial needs, the adequacy of ICT resources and skills acquired by teachers through various in service courses. Additionally, automation of timetabling and preparation of professional books has enabled teachers to have ample time to cover the subject content matter. However, Mutwiri et al., (2017) caution that while some schools may be have made great strides in ICT aided automation in administrative and management, some head teachers remain as spectators as techno savvy teachers, bursar and account clerks take charge. Some head teachers delegate any task demanding computer literacy to other knowledgeable people. Such a situation puts the head teacher in potentially risky situation as the school overall manager. Some have lost huge sums of money, have failed to register students for major examinations and failed to submit crucial information to their seniors due to inability to take charge in ICT integration in management. Thus, it was prudent to establish the nexus between head teachers's computer literacy and the application of technology in school management.

2.5 Summary of Literature Review

The reviewed literature is replete with studies on computer and ICT literacy in general, integration of ICT in teaching and learning and the head teacher's role in ICT integration as the school manager (Afshari, 2012; Afzaal, 2012; Ghavifekr et al., 2013; Ivankovic et

al., 2013; Mutwiri et al., 2017; Muchiri, 2014; Ngugi, 2012; Omotayo, 2015; Oulo, 2013; Ogundele & Etejere, 2014; Tanui 2013). In most of these studies, head teachers have been recognized as the key pedagogical leaders and, as such, their views and action in relation to ICT in particular can have a major bearing on the extent to which technology will become embedded and permeate in all facets of school management. The reviewed literature has also discussed in details the various benefits and challenges in integration of ICT in school management. However, there was paucity of literature on ICT integration in financial management. Additionally, most of the studies focus was on ICT integration in secondary schools management. The current study focus was on ICT integration in management of public primary schools.

2.6 Knowledge Gaps

Although most of the studies reviewed recognized the head teacher as the key person in ICT integration in all components of school management, none of the studies attempted to establish statistically the nexus between the head teachers' level of computer literacy and the extent of ICT integration in school management. Ngugi (2012) attempted to assess the principals' level of computer literacy in Naivasha Sub County, but the use of yes/no response failed to capture a comprehensive audit. Taking into account that some public primary schools in Tinderet Sub County have acquired substantial ICT resources from the national government, parents and NGOs (MOE, 2017), and yet have failed to digitalize their operations, it was imperative to evaluate the relationship and possible influence of school principal's ICT literacy on ICT integration in school management.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter describes the research methodology and design to be adopted for this study. The chapter is organized under the following subsections; research methodology, research design, study location, target population, sample size and sampling procedures, data collection instruments, validity and reliability of research instruments. The chapter culminates with a delineation of data analysis techniques and, ethical and legal considerations.

3.2 Research Design

Creswell (2012) defines a research design as the scheme, outline or plan that is used to generate answers to research problem. It constitutes the blue print for the collection of measurement and analysis of data (Kothari, 2014). The proposed study adopted correlational research design. Correlation research design allows testing of expected relationships between and among variables and the making of predictions (Stangor, 2011). In this regard, the study aimed at establishing the relationship between the level of head teachers' ICT literacy and ICT integration in school management. Thus, correlational research design was found appropriate for the proposed study.

3.3 Location of the Study

The importance of research site is to identify where the actual site and data will be collected (Kombo & Tromp, 2006). The study was conducted in Tinderet Sub County, Nandi County. According to Nandi county schools census report of 2017, most of the schools in Tinderet Sub County were slow in uptake of ICT and digitalization of school management

areas despite having benefitted from donations of ICT resources from various cooperate bodies and NGOs (MOE, 2018). Thus, the site was found appropriate for the proposed study.

3.4 Target population

Stangor (2011) considers population as all individuals or items with the characteristics that a researcher wishes to study. According to Nandi County schools census report 2017 (MOEST, 2017), there were 124 public primary schools in Tinderet Sub County. Thus, the study targeted all the 124 head teachers and 124 senior teachers. The head teachers were targeted since they are considered instrumental in uptake of ICT and digitalization of vital operations in a school. Senior teachers were targeted since they can provide vital information in regard to head teachers ICT literacy and usage. Additionally, most of the senior teachers are involved in managerial tasks similar to head teachers' and thus likely to give vital information on the extent of ICT integration in the school management.

3.5 Sample Size and Sampling Techniques

A sample is a representative part of a population that is studied to give information about the entire group (Kothari, 2014). By observing the characteristics of the sample, one can make certain inferences about the characteristics of the population from which it was drawn (Best & Kahn, 2006). To determine the sample size for head teachers, the Krejcie & Morgan (1970) formula was applied. Thus,

$n = X^2NP (1-P) / d^2 (N-1) + X2P (1-P)$

Where n = sample size

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level

$(X^2 = 3.841)$

N = the population size = 124 head teachers

P = the population proportion (assumed to be 0.5 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (0.05)

Thus, n = 3.841x 124 x 0.5 (1- 0.5) / (0.05 x 0.05) x (124-1) + 3.841 x 0.5 x (1- 0.5)

   = 94 head teachers.

Thus, through simple random sampling, 94 head teachers were selected to take part in the study. Orodho (2012) posit that unlike the use of questionnaires which can be administered to a large number of respondents, interviews should be conducted to a relatively smaller manageable number since it takes more time. Gay, Mills & Airasian (2009) postulates that a sample size of 10% to 30% of the population is sufficient for reliable findings. As such, the researcher sampled 30% of the senior teachers. Thus 37 senior teachers were selected randomly from the 94 schools whose head teachers were also slated to take part in the study. Table 3.1 shows the sample frame.

Table 3.1: Sample Frame

Category	Population	Sample	Proportion	Sampling Technique
Head teachers	124	94	75.8%	Simple random sampling
Senior teachers	124	37	29.8%	Simple random sampling
Total	**248**	**131**	**52.8%**	

3.6 Research Instruments

The study employed head teachers' questionnaire and senior teachers' interview schedule to collect data. Babbie (2014) opine that questionnaires are preferred because they are easy to administer and cost and time effective. Further, Kothari (2014) observes that

questionnaires are usually free from the interview bias as the answers are in respondent own words. Respondents also have adequate time to give well thought out answers. Questionnaires also save time and information can be collected from a very large sample. However, in order to get an in depth information on the head teachers' literacy in ICT and the level of ICT integration in school management, the senior teacher interview schedule was employed.

3.6.1 Head Teachers' Questionnaire

The head teachers' questionnaire was a structured questionnaire in that it consists of closed ended Likert type items. It consisted of sections A, B, C, D, E and F (see Appendix II). Section A collected head teachers' demographic information. Section B was the ICT literacy survey adapted and modified from Morales (2013). Sections C, D, E, and F sought information on the head teachers' handling of various management tasks by applying the ICT literacy knowledge.

3.6.2 Senior Teachers' Interviews schedule

Bhattacherjee (2012) aver that interview method of collecting data is superior to other instruments in that it creates rapport between the respondent and the researcher. In addition, it guards against confusing the questions since the interviewer can clarify the questions thereby helping the respondent give relevant responses. The senior teachers' interview guide sought in depth information on how the head teachers' level of computer literacy influenced management of various aspects in a school. The questions were in accordance to the objectives of the study. The information gathered was used to validate the information gathered from the head teachers' self-assessment survey thereby improving the study's internal validity.

3.7 Piloting of the Research Instruments

Creswell (2012) observes that it is vital for a researcher to test tools before using them to ensure their validity, reliability and practicability. Piloting was done in order to ascertain the credibility of the tools by testing clarity of language, time taken to respond, procedure of administering, length and layout of tools. Gay, Mills and Airasian (2010) maintain that participants in the pilot test should have similar characteristics to the intended participants. Thus, the pilot testing for this study involved 10% of each category of respondents as recommended by Creswell (2012). Thus 8 head teachers and 8 senior teachers from the neighbouring Kessos Sub County participated. The participants were encouraged to make comments and suggestions that were later used to improve the items.

3.7.1 Reliability

Reliability is a measure of the degree to which a research instrument yields consistent results after repeated trials (Orodho, 2012). The data collected during piloting were used to estimate the reliability of the data collection instruments. The reliability of the head teachers' questionnaire was determined by computing the Cronbach Alpha coefficient. A Cronbach alpha of 0.87 was obtained. According to Creswell (2012), in social sciences, a reliability coefficient of 0.6 and above is satisfactory for any research instrument.

3.7.2 Validity

Validity is defined as the accuracy and meaningfulness of influences which are based on the research results (Stangor, 2011). To ensure content and construct validity, the research instruments were availed to the two assigned university supervisors. In addition, the responses during the pilot study was used to enhance the validity of the data collection instruments.

3.8 Data Analysis Techniques and Procedures

The collected data was thoroughly edited and checked for completeness and comprehensibility. The edited data was summarized and coded for easy classification in order to facilitate interpretation. The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 22. Both inferential and descriptive statistics were used. Descriptive statistics such as frequency, percentages, mean and standard deviation were used to describe the meaning of the analyzed data. The Pearson product moment correlation coefficient analysis was done to test the study four formulated null hypotheses. By use of Pearson analysis, the strength and direction of relationships were established.

Analysis of the interview data commenced as soon as each session ended. Notes taken during the interviews were checked for gaps immediately in order to record all that could be remembered and had not been written down. Identification labels were given according to the respondent such as (SN I) for the first senior teacher interviewee, SN 2 for the second senior teacher and so on. Qualitative data generated from interview schedule were put into simple narratives for easier interpretation. However, verbatim quotations and filed note book excerpts were used in order to maintain the message as given and enrich the analyzed data

3.9 Legal and Ethical Considerations

Ethical and legal consideration is a key part in research since it helps to ensure that no one suffers harm or undesirable consequences as a result of the research activities. Due to the normally sensitive relationships between the researcher and the respondents, reasonable safeguards were built during the field work study that is based on appropriate ethical requirements and measures. The researcher got a letter of introduction from African Nazarene University. The letter assisted the researcher secure a research permit from

National Commission for Science, Technology and Innovation (NACOSTI). Further, a research permission letter was secured from the Nandi County Director of Education to visit the sampled schools for data collection. In order to avoid suspicion and scepticism the researcher assured the respondents utmost confidentiality and that the information provided would be used for academic purposes only. Furthermore, while collecting data the researcher acknowledged all the sources of information collected from textbooks and other research materials.

CHAPTER FOUR

RESULTS AND ANALYSIS

4.1 Introduction

This chapter presents the results and analysis of the data collected in this study. The chapter contains the response rate, analysis of demographic data, and analysis of head teachers' response in accordance to research objectives. In addition, the senior teachers' response through interview schedule was incorporated. The chapter ends with hypotheses testing. The purpose of the study was to investigate the relationship between the head teachers' level of ICT literacy and ICT integration in management of public primary schools in Tinderet Sub-County, Nandi County, Kenya. The study objectives were: to establish the relationship between the level of the head teacher's ICT literacy and ICT integration in communication management, to examine the relationship between the level of the head teachers' ICT literacy and ICT integration in teaching and learning, to establish the relationship between the level of the head teacher's ICT literacy and ICT integration in financial management and to determine the relationship between the level of head teacher's ICT literacy and ICT integration in human resource data management in public primary schools in Tinderet Sub-County, Nandi County. Data were collected through the head teachers' questionnaire and the senior teachers' interview schedule.

4.2 Response Rate

The study sampled 37 senior teachers and 94 head teachers. Ninety head teachers filled and returned the questionnaires while 28 senior teachers were interviewed. Thus, the study response rate was 75.7 % for senior teachers and 95.7 % for head teachers. This rate was

considered adequate for data analysis since according to Fraenkel et al. (2012), return rates of more than 60% are considered to be good and sufficient for a study.

4.3 Demographic Information

The study found it necessary to analyze the demographic information of respondents, which formed the basis under which some of the interpretations were made. The demographic information sought included: gender, age bracket, the highest level of professional training in education, skills in computer use, and use of computer in official work.

4.3.1 Gender of Respondents

The researcher sought to establish the gender distribution of the respondents. Table 4.1 depicts the finding.

Table 4.1: Gender Distribution of Teachers

Category	Gender					
	Male		Female		Total	
	f	%	f	%	f	%
Head Teachers	57	**63.3**	33	**36.7**	90	**100.0**
Senior Teachers	20	**71.4**	8	**28.6**	28	**100.0**
Total	77	**65.3**	41	**34.7**	118	**100.0**

It was evident from Table 4.1 that there was a gender disparity in appointment of head teachers and senior teachers in among public primary schools in Tinderet Sub County. This was because of 90 head teachers, 63.3% were male while 36.7% were females. Similarly, 65.3% of senior teachers were male while 34.7% were females. It was imperative for the

TSC to consider appointing more of female head and who in turn might appoint more females to be the school senior teachers.

4.3.2 Respondents Age

The researcher sought to establish the respondents' age bracket distribution. Table 4.2 depicts the findings.

Table 4.2: Respondents' Age Bracket Distribution

Age in years	Category			
	Head Teachers		**Senior Teachers**	
	f	**%**	**f**	**%**
< 30	0	0.0	0	0.0
31-40	19	21.1	8	28.6
41-50	42	46.7	12	42.9
> 50	29	32.2	8	28.6
Total	**90**	**100.0**	**28**	**100.0**

As shown in Table 4.2, there were no head teachers and senior teachers below 30 years of age. Thus, the Tinderet Sub County lacked young teachers who were likely to be the most venturesome and innovators in ICT. Most of the head teachers (46.7%) were in the bracket of 41 to 50years while 29 head teachers constituting 32.2% were over 50 years. Similarly, majority of senior teachers (42.9 %) were in the bracket of 41 to 50 years while 28.6 % were over 50 years. This implied that most of the head teachers and senior teachers had been managing school work and data manually for long in public schools in Kenya. Thus, the diffusion of ICT among teachers who have been introduced to the new technology at middle age was bound to encounter hindrances ranging from skepticism to open resistance to innovation and change.

4.3.3 Head Teachers' Highest Level of Professional Training in Education

The study also sought to establish the head teachers' highest professional training. The higher a teacher progresses in professional training, the more one is likely to be exposed to ICT application. Figure 4.1 shows the distribution of head teachers according to their highest level of professional training.
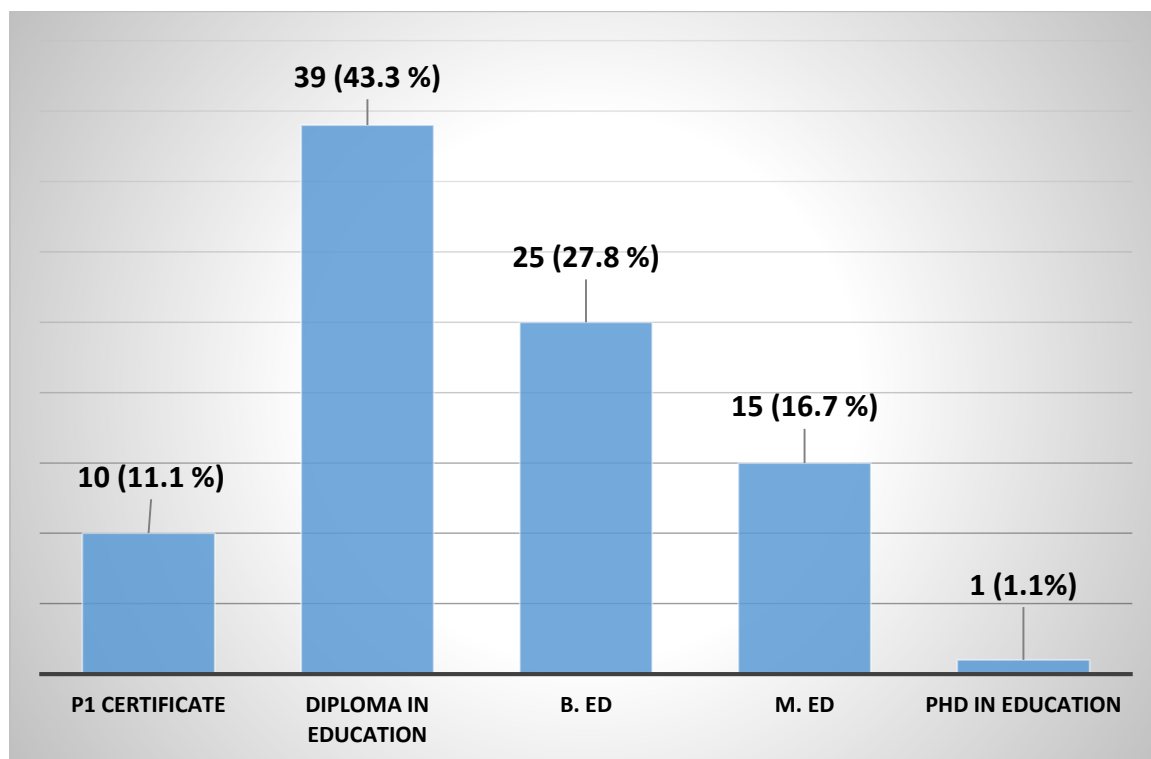
Figure 4.1: Head Teachers' Highest Level of Professional Training

It was evident from Figure 4.1, that all the sampled head teachers were professionally trained, though at different levels. Most head teachers (43.3 %) had a diploma in education as their highest level of professional training, followed by 27.8 % of them who had bachelor's degree education. Only 11.1 % of head teachers were trained up to P1 certificate level showing that most of them had advanced education through in service training. Fifteen head teachers constituting 16.7 % had advanced to a master degree while one head teacher had attained a doctorate degree in education. This implied that most of the head

teachers had applied ICT and more so use of computer as they accomplished their academic work at different levels of education.

4.3.4 Head Teachers' Computer Skills

The study sought to establish the level to which head teachers' rate their computer skills and which could have a bearing on self-efficacy in applying ICT in school management. Figure 4.2 shows the head teachers self-rating in computer skills
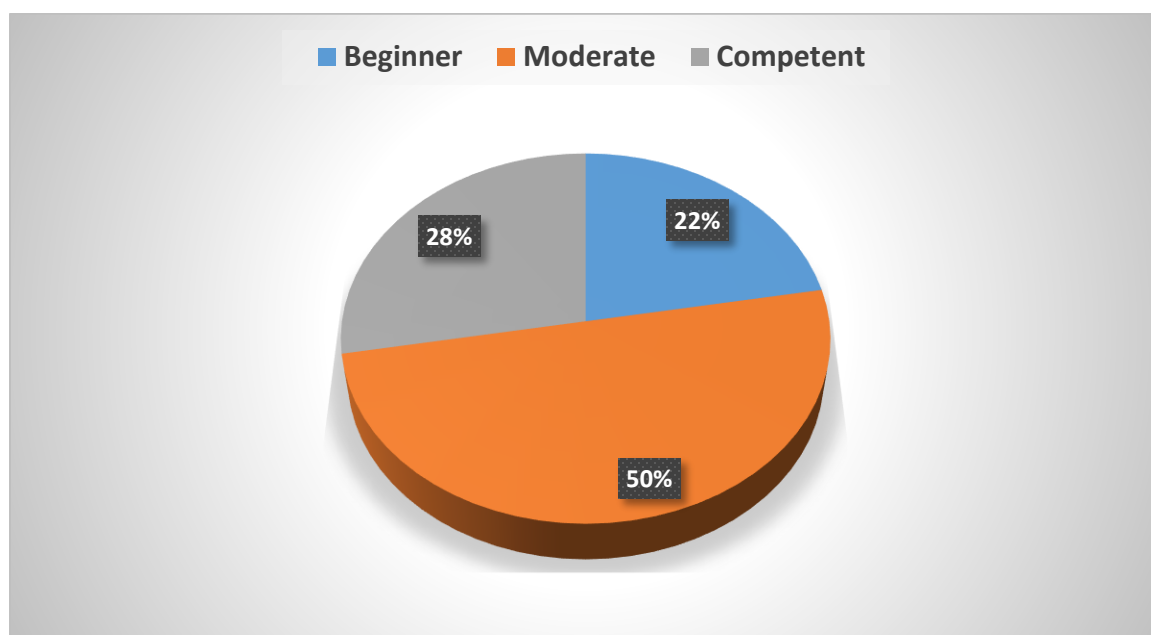
Figure 4.2: Head Teachers' Self Rating in Computer Skills

Figure 4.2 shows that half of the head teachers (50 %) considered their computer skills as moderate while 28% as competent. However, a considerable 22% of teachers felt that they were only beginners in regard to their computer skills level albeit having qualified as trained teachers. This implied that ICT literacy is not a prerequisite to qualify as a professional teacher in Kenya. Thus, Over 70 % of head teachers lacking the basic ICT literacy does not augur well with the Kenya planned pace to digitalize all public transactions.

4.3.5 Computer use in Daily Office Work

The study further sought to establish whether head teachers use computers in regard to their office daily tasks. In a related question the head teachers were also to indicate whether their secretaries were using a computer to accomplish the various tasks in the school. Figure 4.3 depicts their responses.
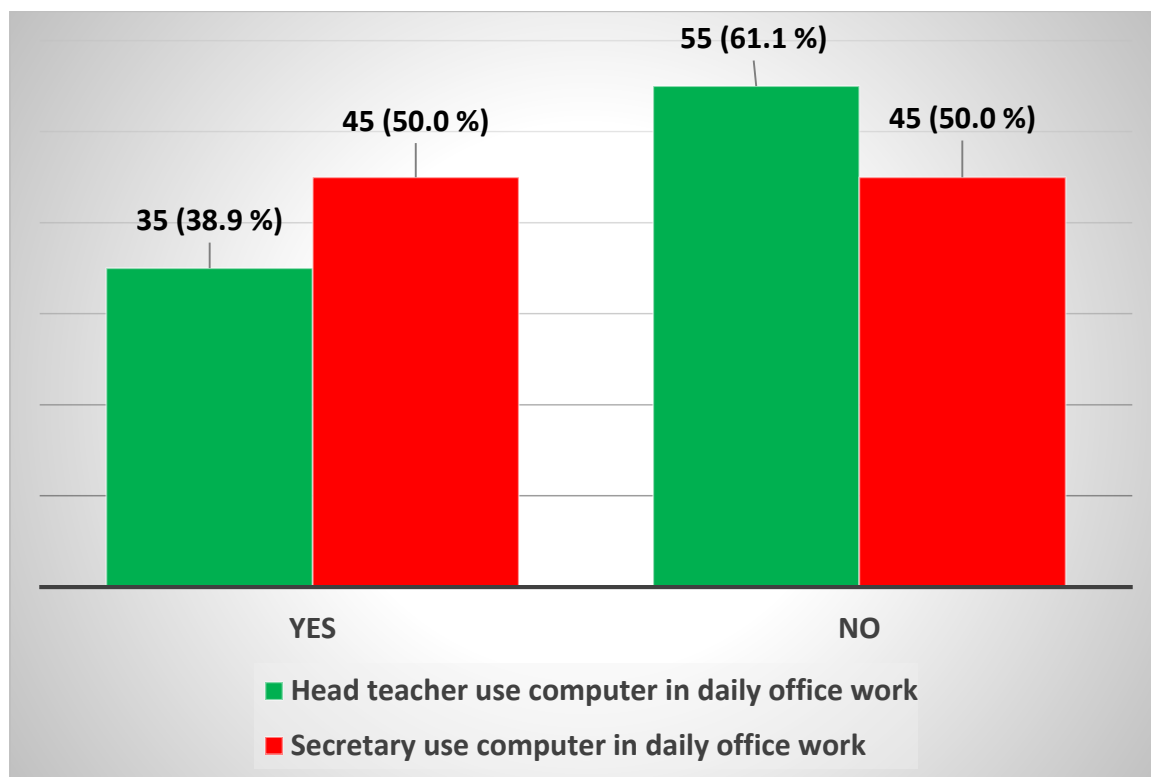
Figure 4.3: Head teachers' Response on use of Computer in Daily Office Work

As evident in Figure 4.3, more than half of head teachers (61.1 %) and half of the school secretaries indicated that they did not use computer in their daily office work. This meant that while half of public schools in Tinderet Sub County have adapted digital mode of conducting their daily office transactions, about half of the schools were still operating through hard copies. It is through daily practice that technology becomes familiar and easier to use.

4.4 Head Teachers' Level of ICT Literacy

The study's independent variable was the head teachers' level of ICT literacy and which was conceptualized to have a relationship with ICT integration in the management of public primary schools in Tinderet Sub County. To assess the head teachers' level of ICT literacy, head teachers were requested to respond to the items in the ICT literacy survey as adapted and modified from Morales (2013). The ICT literacy survey had five parts that aimed at assessing general computer skills, digital file management skills, computer word processing skills, computer printing skills and online communication. The self-rating questionnaire items were in the form of likert scale where levels of ICT literacy were rated as None-1, Little-2, Average-3, Above average-4, and Master-5. At level one (None), the person has no understanding of technology while at 'Little' level, the person has a basic understanding of the technology, but cannot perform the task successfully without assistance. At level 3 (Average), the person can perform the technology task, but struggles in some areas while at level 4 (Above average), the person can perform the technology task repeatedly with great success, but has not mastered all the elements. At level 5 (Master), the person has mastered the technology and can perform the task without any problems as well as mentoring others. Table 4.3 shows the analyzed head teachers' responses in terms of means and standard deviations (SD).

Table 4.3: Head Teachers' Response on their Level of ICT Literacy

Statement	Mean	SD
General Skills		
Familiar with basic computer system parts and concepts (e.g. hard drive, RAM, etc.)	3.4	0.8
Able to use Help menus to find answers to my questions	2.6	0.9
Understand file extensions and differences between file types (e.g. .doc, .gif, .html, .ppt. etc.)	2.5	0.7
Able to shut down a computer appropriately	4.3	0.5
Able to perform a safe reboot of the operating system with keystrokes	2.5	1.1
Understand the difference between closing/minimizing/hiding windows and quitting a program	2.8	0.6
Able to use the mouse right-click menu functions	3.2	0.5
Aggregate Mean score and SD	**3.0**	**0.7**
File Management Skills		
Able to navigate through files and directories (e.g. using Windows Explorer)	2.7	0.9
Able to organize, copy and paste files in directories	3.0	0.8
Able to move unwanted files into my recycle bin and delete them permanently from my hard drive	3.4	0.7
Aggregate Mean score and SD	**3.0**	**0.8**
Word Processing Skills		
Able to edit, copy, cut and paste a block of text or selected objects	3.8	0.9
Able to use undo/redo functions	3.9	0.7
Able to save, print and preview documents	3.3	1.0
Able to select and change fonts sizes and types, styles (e.g. boldface, italics, underlining, etc.)	2.8	0.7
Able to create itemized lists (e.g. bullets, numbered lists)	2.7	1.1
Aggregate Mean score and SD	**3.3**	**0.9**
Printing Skills		
Able to change printer parameters like page numbers, paper orientation, margins and proportions, etc.	1.8	0.8
Able to change printing options from grayscale, normal, fast draft or best	1.7	0.5
Aggregate Mean score and SD	**1.8**	**0.7**
Online Communication. Browser and Navigation Skills Online		
I am able to use the browser basic commands to surf the Internet	3.5	0.8
I am able to request, activate my ODU email account	2.8	0.9
I am able to compose, send, receive, reply to and forward email messages	3.1	1.0
I am able to attach/detach documents to/from email messages	2.8	0.5
I am able to use search engines to locate desired information	1.8	0.9
I am able to understand the difference between Search Engines (e.g. Google) and Directories (e.g. Yahoo)	1.7	0.8
I am able to understand that some copyright restrictions apply to computer software and Internet documents	2.2	1.0
I am able to understand how I can use gathered information from the Internet without violating copyright laws	2.8	0.9
I am able to demonstrate an understanding of what constitutes plagiarism	2.9	0.7
I am able to know basic steps to ensure your online privacy and computer security	2.8	0.8
Aggregate Mean score and SD	**2.6**	**0.8**

n = 90

In reference to Table 4.3, most of the head teachers indicated that they were familiar with basic computer system parts and concepts such as the central processing unit and hard drive (Mean = 3.4, SD = 0.8). Similarly, a majority of head teachers indicated that they were above average in regard to being able to shut down a computer appropriately (Mean = 4.3, SD =0.5). This implies that most of the head teachers can perform the technology task repeatedly with great success, though they may not have mastered all the elements. Further, most of the head teachers rated their ability to use the mouse right-click menu functions as average (3.2, SD =0.5). Still under general skills in regard to ICT technology, most head teachers affirmed that they had little knowledge in regard to several vital functions. These skills include: use of help menus to find answers to my questions; understand file extensions and differences between file types such as doc, .gif and html; able to perform a safe reboot of the operating system with keystrokes; and understanding the difference between closing/minimizing/hiding windows and quitting a program. The little knowledge possessed by head teachers in these operations was a major drawback to head teachers' capability to accomplish their tasks using the computer. For instance, in human resource data management, minimizing, hiding and quitting a programme are essential operations. Overall, it was found that the head teachers capability in ICT general skills and in particular basic computer operations was average (Mean = 3.0, SD = 0.7).

In regard to file management skills, most of the head teachers' indicated that they had little capability to navigate through files and directories such as the use of Windows Explorer (Mean = 2.7, SD = 0.9). They however, rated their capability to organize, copy and paste files in directories as average (Mean = 3.1, SD = 0.8). Similarly, most head teachers indicated that their ability to move unwanted files into recycle bin and delete them permanently from my hard drive, as average. Overall, file management skills had a mean

of 3.0 and standard deviation of 0.8 showing that head teachers had average skills and thus, needed advanced training to develop technology competence.

The head teachers' response on their level of low ability in regard to some computer operations was echoed by the interviewed senior teachers. The senior teachers came up with mainly four themes in regard to the head teachers' proficiency in computer. These main themes were: below average, beginner, average and literate. Only 7(25 %) senior teachers rated their head teachers as being ICT literate while the rest were rated as below average (21.4 %), beginner (32.1 %) and average (21.4 %). The following comments by various senior teachers better describes head teachers level of ICT literacy, thus:

> My head teacher is completely Kaput in terms of ICT. He cannot go beyond opening the computer and he is not ready to learn anything….he claims his time is over and wants retire peacefully without the bother of modern technology. He does not go beyond calling and sending messages through the phone…so i do everything for him..sometimes he enlists the assistance of the nearby cyber café. (Senior Teacher 5).

> The TSC and MOE requires all returns to be done online. However, though the school has invested in a laptop and several desk tops, our head teacher is technophobic. Apart from reading her emails, she has delegated all the other correspondence and uploading of vital returns to the secretary. This has led to compromise on some confidential information about teachers and students. Occasionally, serious antagonism arise between management and teachers over the leaked information. (ST 24).

> Although we have a well-equipped computer laboratory that was set up by an NGO, we hardly make use of it…our head teacher is not fond of digital technology and claims that even before soft copy information storage, schools were run very efficiently. Thus, he is not keen in maintaining internet connectivity…the school laptop is only used when filling TSC and MOE mandatory returns. (ST 25)

Such comments from senior teachers showed that though the ICT semi illiterate head teachers managed to delegate their work for online transmission to the relevant bodies, their inability in ICT and technophobia influenced the entire school to be slow in technology diffusion.

Word processing skills are some of the most basic competencies essential for attainment of ICT literacy. Most of the head teachers rated themselves as average in the ability to edit, copy, cut and paste a block of text or selected objects (Mean = 3.8, SD = 0.9). Similarly, head teachers had average ability in using undo/redo functions (Mean = 3.9, SD = 0.7) as well as being able to save, print and preview documents (Mean = 3.3, SD = 1.0). However, the relatively large standard deviation in regard to the ability to save, print and preview documents is a manifestation that there were head teachers who felt that they were not able to accomplish the tasks. In regard to selection and change of fonts sizes, types, and styles such as boldface, italics and underlining, most of the head teachers' indicated that they had little capability (Mean = 2.8, SD = 0.7). Similarly, most head teachers had little capability in creating itemized lists such as bullets and numbered lists. Overall, head teachers ability in word processing was rated as average (Mean = 3.3, SD = 0.9) showing that though they could perform the technology task, they were bound to struggle in most of the areas and thus not accomplishing the task satisfactorily.

In regard to printing skills, most of the head teachers indicated that they had no knowledge on how to change printer parameters like page numbers, paper orientation, margins and proportions (Mean = 1.8, SD = 0.8). In addition, they had no understanding of technology to change printing options from grayscale, normal, fast draft or best (Mean = 1.7, SD = 0.5). This implied that, though they might rely on their secretaries to deal with printing, most head teachers could face challenges when printing confidential information. Overall, the rating of head teachers' skills in printing was at the lowest and meant that they had no understanding of the technology (Mean = 1.8, 0.7).

Online communication is perhaps the hall mark of ICT literacy. For a head teacher to accomplish most of the ICT integrated management tasks, constant communication,

coordination and control is best done online. As such one is bound to familiar with the basic navigation skills such as the use of browser to surf the internet. It was encouraging as most of the head teachers in Tinderet Sub County rated themselves as average in being able to use the browser basic commands to surf the Internet (Mean = 3.5, SD = 0.8). This meant they could do quick research on any issue so long as they have connection to internet. Additionally, most of them were able to compose, send, receive, reply to and forward email messages (Mean = 3.1, SD =1.0). The relatively high standard deviation, however, meant that there were some head teachers who were still incapacitated in dealing with messages through email. Most of the interviewed senior teachers disclosed that the head teachers were fond of using sending messages through the phone instead of emails. One of the teacher commented:

> Our head teacher is good in communication and we get to know about the running of the school very well in advance. She makes of short message services (SMS) and also through our school 'Whats app group chat'. She hardly uses the email. Some teachers have in some instances taken advantage of the limitations of SMSs by claiming they have not received the personal messages and thus fail to take up some tasks. Thus, I prefer communication through emails, especially the personal ones. (ST 8).

Online communication entails more than receiving and sending messages, since it also important to about the different search engines to generate information and copyright laws. It is also important for the head teachers to be aware that not all information from the internet is authentic and thus should not be used indiscriminately. In addition, they should also know how to acknowledge the authors of information to avoid plagiarism. In reference to Table 4.3, most head teachers had no knowledge on how to use search engines to locate desired information (Mean = 1.8, SD = 0.9) and did not understand the difference between search engines such as Google and Yahoo (Mean = 1.7, SD = 0.8). Most head teachers also indicated that they had little ability and knowledge in regard to request, activate their email

accounts, copyright restrictions that apply to computer software and Internet documents, how to gather information from the Internet without violating copyright laws, able to demonstrate an understanding of what constitutes plagiarism and ability to know basic steps to ensure online privacy and computer security. Overall, most of the head teachers were found to have basic understanding of ICT, but could not perform the various tasks successfully without assistance and more training was required (Mean = 2.6, SD = 0.8). Lack of adequate knowledge and skills in regard to online communication could impact negatively on head teachers ICT integration in various areas of school management. The next section analysis the extent to which head teachers have been able to integrate ICT in different areas of school management in Tinderet Sub County.

4.5 Head Teachers' Level of ICT Literacy and Management of Electronic Communication

The first objective of the study was to establish the relationship between the level of the head teacher's ICT literacy and ICT integration in communication management in public primary schools in Tinderet Sub-County. In order to achieve the objective, head teachers were requested to rate the extent to which they manage communication in school electronically. The head teachers were mad to respond to statements in form of five point Likert scale ranging from 'never-1, to a small extent-2, to a moderate extent-3, to a large extent-4 and to a very large extent-5'. Table 4.4 shows the analyzed data I terms of means and standard deviations (SD).

Table 4.4: Head Teachers' Response on Management of Electronic Communication

Statement	Mean	SD
I have an email account	4.1	0.5
My school has an email account	4.8	0.6
I use e-mail to communicate to teachers	2.6	0.9
I use e-mail to communicate to BOM	2.2	1.0
I use e-mail to communicate to PTA members	2.1	0.7
I use email to communicate to TSC, MOE	3.4	0.9
I file and send vital school returns to the TSC/MOE online	4.6	0.6
I pass important academic articles to teachers through e-mail	1.6	0.5
We communicate with members of school alumni residing outside the country through skype	1.4	0.4
We share school development ideas through an online blog	1.1	0.4
I share important documents such as school policies and national educational policies through google drive	1.3	0.5
I sometimes prepare and use power point as a part of my communication during the staff meeting and other fora	2.6	0.8

n = 90

It was evident from Table 4.4 that most of the head teachers had personal email accounts (Mean = 4.1, SD = 0.5). This signified the head teachers' readiness to communicate online in regard to both official and personal issues. In regard to the school email account, almost all head teachers affirmed that they have accounts (Mean = 4.8, SD = 0.5). This was in line with the Ministry of Education requirement that the school returns should be filed online and that vital communication should be through the school email. However, most head teachers indicated that had very minimal use of e-mail when communicating to teachers

(Mean = 2.6, SD =0.9). Similarly, the head teachers communicated to BOM and PTA members through e-mail to a small extent. Most head teachers, however, communicated to their employer the TSC as well as MOE through email to a moderate extent (Mean = 3.4, SD = 0.9). Surprisingly, though most head teachers as well as schools had email accounts, head teachers hardly shared academic materials through email accounts (Mean = 1.6, 0.5). Similar sentiments were echoed by the interviewed senior teachers who indicated that their head teachers were quite technophobia to the extent of allowing one of the teachers or the school secretary to operate their personal emails. A comment from one of the senior teachers exemplifies the extent to which some head teachers have exposed themselves through such delegation, thus:

> My head teacher hides his ICT illiteracy by claiming he is so busy with school administration and often involves the secretary in both school and person email accounts. Unfortunately, since he has linked his phone with the Google account, the secretary gets nosy and checks on his picture gallery. I consider this as giving too much of your personal secrets and information because of being ignorant of essential technology and which can be attained through minimum effort. (ST 7).

It was further revealed that most of the head teachers never communicated with members of school alumni residing outside the country through skype (Mean = 1.4, 0.4). Similarly, most head teachers never shared school development ideas through an online blog (Mean = 1.1, SD = 0.4) and hardly shared important documents such as school policies and national educational policies through Google drive (Mean = 1.3, 0.5). However, some head teachers indicated that they sometimes prepare and use power point as a part of their communication during the staff meeting and other fora to a small extent (Mean = 2.6, SD = 0.8). This implies that some head teacher were conversant with various software packages and had confidence to use projectors to present their work. In support of this observation some interviewed senior teachers had the following comments:

Our head teacher is well trained in ICT and even runs his college of computer training and other ICT courses. Through his efforts, the school has benefited from an ICT empowerment programme run by a consortium of NGOs. He has digitalized the school time tabling, examination results processing, communication within and outside the school, students, subordinate and teachers person details and teaching and learning to some extent. However, he is yet to digitalize the school financial management. Through his encouragement, most of the teachers have now integrated ICT in their teaching (ST 14).

I have been in this school for 14 years and I have worked with many head teachers. One of the things that I have noted is that the head teachers' behavior towards teaching and learning, interactions with parents and the local leaders and skills and knowledge possessed greatly influences the other teachers and pupils. The current head teacher has almost an obsession with the ICT and rarely puts aside his laptop. Within a year, the school is now well connected with internet and all teachers have vowed to be ICT literate by the end of this year. (ST 3).

However, some senior teachers had a slightly different view in regard to the head teacher

being ICT literate. The following are some of their comments:

I rate my head teacher's ICT literacy as moderate. She has a desk top but rarely makes use of it. She brings her lap top to school when it is time to upload the government required information such as registration of pupils in the national final examination. During such a time, she hires an expert who uploads and downloads all the required information. Most of the other ICT related tasks are done by the school copy typist and the deputy head teacher. So, I consider her ICT literacy as never a hindrance to the smooth running of the school affairs. (ST 10).

My head teacher is completely literate in computer and ICT. However, almost everything in our school is done through hard copies due to lack of ICT infrastructure. Any vital task that requires soft copy and online uploading is done in the nearest cyber café. Thus, I cannot see any correlation between the head teachers ICT literacy and ICT integration in management areas in our school. I am also a beginner in use of ICT, but I produce good results in my subject in KCPE. (ST 12).

Such comments from senior teachers demonstrates the different perceptions In regard to

the importance of head teachers' literacy in ICT. It was evident that some of the senior

teachers were laggards in diffusion of ICT and thus were inclined to justify the head

teachers' capability in ICT.

4.6 Head Teachers' Level of ICT Literacy and Management of Teaching and Learning

The second objective of the study was to examine the relationship between the level of the head teachers' ICT literacy and ICT integration in teaching and learning in public primary schools in Tinderet Sub-County. To achieve this objective, head teachers were required to rate the extent to which they had integrated ICT in teaching and learning in their schools. Table 4.5 shows the analyzed responses in terms of means and standard deviations (SD).

Table 4.5: Head Teachers' Response on Management of Teaching and Learning

Statement	Mean	SD
Computers and projectors are used in teaching and learning in my school	2.6	0.7
I personally use projector and audio visual materials to enhance my teaching	2.6	0.9
Teachers use information from internet to supplement information from the recommended text books	3.3	0.8
We have syllabi and schemes of work in soft copy	2.8	1.0
We have automated school academic time table	2.9	1.1
Our examination time table is normally in both soft and hard copy	2.4	0.6
We use ICT in processing exam results/students report forms	3.2	1.2
We make use of the vast teaching aids from internet such as charts and pictures to enhance teaching in especially science and other subjects	3.0	0.9

n = 90

In reference to Table 4.5, head teachers indicated that computers and projectors are used in teaching and learning in their schools to a small extent (Mean = 2.6, SD = 0.7). Most head teachers rated their use of projector and audio materials to enhance their teaching to a small extent (2.6, SD = 0.9). Nonetheless, most head teachers considered the extent to which teachers use of information from internet to supplement information from the

recommended text books to be moderate (Mean = 3.3, SD = 0.8). Access of information

from internet was more widespread than teaching and learning using projected information

due to the fact that teachers could access online information through their phones as

explained by the interviewed senior teachers. One of them commented, thus:

> Nowadays we are able to use information from internet through our mobile phones. For my case I use online dictionary to check the meaning, spelling and pronunciation of several words. I however, use less of projected information since am not good in the connections of the gadgets involved. I also use videotaped programmes to enhance my teaching… (ST 14).

In regard to syllabi and schemes of work, most head teachers indicated that they had put

them in soft copies to a small extent (Mean = 2.8, SD = 1.0). Similarly, head teachers

indicated that they had automated school time table to a small extent (Mean = 2.9, SD

=1.1). Further, head teachers rated the extent to which they prepared their examination time

table in soft copy as to a 'small extent' (Mean = 2.4, SD = 0.6). This implied that most of

the examinations were in hard copies and could not be stored to last long for future use.

However, most head teachers rated their use of ICT in processing exam results and students

report forms as to a 'moderate extent' (Mean = 3.2, SD = 1.2) implying that there were a

number of schools where examination analysis was digitalized. Similarly, most head

teachers rated their use of the vast teaching aids from internet such as charts and pictures

to enhance teaching especially science and social studies as moderate (Mean = 3.0, SD =

0.9). For head teachers to take initiative of using online charts and pictures, they must have

taken the initiative of getting acquainted with ICT and which can also encourage other

teachers.

4.7 Head Teachers' Level of ICT Literacy and Management of School Finance

The third objective of the study was to establish the relationship between the level of the

head teacher's ICT literacy and ICT integration in financial management in public primary

schools in Tinderet Sub-County. To achieve the objective, the head teachers were requested to rate the extent to which they integrated ICT in different tasks in financial management. Table 4.6 depicts the analysis in terms of means and standard deviations (SD).

Table 4.6: Head Teachers' Response on Management of School Finance

Statement	Mean	SD
We have digitalized the management of books of accounts	2.0	0.8
Payment of school levies is digitalized	2.3	0.9
School Management Committee (SMC) workers payroll has been automated	2.4	0.6
We have digitalized Budget preparation and forecasting	1.7	0.9
I Present the school budget to SMC in a soft copy	2.3	0.7
I can access any pupil financial details through a computerized system	3.5	1.0
Daily balancing off of the cash book, preparation of the monthly trial balance and income expenditure accounts at the end of the year was also generated through the computerized system.	1.9	0.8

n = 90

Table 4.6 shows that most of the public primary schools had digitalized their financial management to a small extent. Specifically, only a few school had digitalized the payment of school levies where parents or guardians can pay levies through the bank, pay bill through their phones and other digitalized modes. Similarly school management committee (SMC) workers payroll had been automated in most schools (Mean = 2.4, SD = 0.6). Most schools were also found to have never digitalized budget preparation and forecasting (Mean = 1.7, SD = 0.9).

In most of the schools, head teachers' hardly presented the school budget to SMC in a soft copy (Mean = 2.3, SD = 0.7). Prevalence of hard copies in most of the financial transactions

was a manifestation that most head teachers were averse to the use of technology. However, most head teachers rated their access to pupils' financial details through a computerized system as to a moderate extent (Mean = 3.5, SD = 1.0). This meant that some schools had uploaded their financial records in a computer system and thus retrieval could be done at will. Conversely, daily balancing off of the cash book, preparation of the monthly trial balance and income expenditure accounts at the end of the year was never generated through the computerized system in majority of schools (Mean = 1.9, SD = 0.8).

In concurrence with the head teachers' response, most of the interviewed senior teachers confirmed that financial management was the least digitalized section in their schools. The following are comments from some of the interviewed senior teachers.

> Our school does not have an account clerk or bursar and all money transactions are handled by the school copy typist and the head teacher. They fill all transactions in the relevant books of accounts and hardly do they upload the information into the computer. However, there are some returns made to the MOE in regard to the expenditure of free primary education funds. To accomplish the required returns, an accountant is normally hired from a neighbouring secondary school… (ST 13).

> Most of money transactions in our school is done manually and I think we need to go digital and make use of quick books computer software so as to become more transparent and accountable. Our head teacher does his expenditure accounting returns in a cyber café and since he lacks competency in book keeping, he is liable to send the wrong figures. All head teachers should be appointed on the bases of competency in accounting and ICT literacy. (ST 17)

> The issue of finance is very sensitive in any institution…I have witnessed many head teachers being demoted due to mismanagement of school funds. Most of these head teachers protested of their innocence in wrong doing since though they were the school chief accounting officers, they had delegated the recording and management of books of accounts to other people. In digitalized system the head teacher can monitor daily transactions and can easily refer to these transactions at the end of accounting period for accountability. It thus, important for all schools to go digital in financial management for the ease of auditing and accountability. (ST 25).

The various comments from the senior teachers shows that they perceive the absence of ICT integration in the financial management in their school as a potential source of

financial mismanagement, lack of transparency and accountability. Additionally, a common theme of head teachers' need of competency in book keeping and ICT literacy emerged. Some further suggested that the appointment of head teachers should be pegged on competency in these two fields.

4.8 Head Teachers' Level of ICT Literacy and Management of School Human Resource Data

The fourth objective of the study was to determine the relationship between the level of head teacher's ICT literacy and ICT integration in human resource data management in public primary schools in Tinderet Sub-County, Nandi County. To achieve the objective, the head teachers were requested to rate the extent to which they integrated ICT in students, teachers and support staff data management. Table 4.6 depicts the analysis in terms of means and standard deviations (SD).

Table 4.7: Head Teachers' Response on Management of School Human Resource Data

Statement	Mean	SD
Each student has a file in soft copy apart from the hard copy	1.8	0.8
I can access pupils' information such as age, parent name, occupation, last visit and contact through my computer.	2.4	0.9
I monitor individual pupils academic progress through soft copy	1.9	0.8
I can tell each student's talents and offer appropriate motivation through the computer	1.5	0.9
I can track my teachers' allocation of work, attendance, and leave through a soft copy	3.3	1.0
I have a track record of teachers professional development in soft copy	2.5	1.0
I have digitalized teachers work appraisal	2.0	0.6
We have details of the subordinate staff such as job description, academic qualification and salary details in a soft copy	3.2	0,9

n = 90

In reference to Table 4.7, most head teachers indicated that they had not digitalized pupils' office files (Mean = 1.8, SD = 0.8). This meant that pupils' physical files had the possibility

of being misplaced unlike the soft copies. Most head teachers affirmed that they could access pupils' information such as age, parent name, occupation, last visit and contact through their computers to a small extent (Mean = 2.4, SD = 0.9). This implied that, head teachers made little use of ICT in filing pupils and their parents' details. Most of the head teachers indicated that they never monitor individual pupils' academic progress through a soft copy, implying that their schools have not digitalized students' academic performance (Mean = 1.9, SD = 0.8). Similarly, most head teachers could not tell each student's talents in order to offer appropriate motivation through the computer (Mean = 1.5, SD = 0.9). However, most head teachers could track teachers' allocation of work, attendance, and leave through a soft copy (Mean = 3.3, SD =1.0). The relatively high standard deviation was however, an indication the response was varied. Further, most head teachers indicated that they kept the track record of teachers professional development in a soft copy to a small extent (Mean = 2.5, SD = 1.0). Thus, only a few schools managed to keep track of the progress teachers made in course of their career (Mean = 2.5, SD = 1.0). Lack of such progress may sometimes jeopardize appropriate teachers' appraisal. Most head teachers were had details of the subordinate staff such as job description, academic qualification and salary details in a soft copy to a moderate extent (Mean = 3.2, SD = 0.9). This meant that most of such information was kept in hard copies and which could be manipulated and thus not safe unlike a digit storage which could be wisely locked as well as be put in a separate back up.

In regard to head teachers' ICT integration in human resource management, some of the interviewed senior teachers expressed discontent while others appreciated that their head teachers' effort in capturing crucial personal data. The following comments exemplifies the senior teachers varied views.

Our head teacher initiated a programme where teachers, pupils and support staff details such as gender, date of birth, employment date and dates of various promotions are captured in soft copy. As such that, we do not need to keep on filling certain monthly and termly return forms as we have been doing for many years. Nowadays, we only supply information that is bound to change with time such newly acquired certificates from professional development and work load. (ST 20).

In my school the personal teachers details and work appraisal is captured in a soft copy in line with TSC and MOE directive. But since the head teacher if ICT semi-illiterate the work is done by a subordinate staff to which most teachers do not approve. All the confidential comments from the head teachers get to be known by teachers, pupils and parents and it sometimes brings a lot of mistrust and ill feelings. All head teachers should make an effort of taking charge with such data. This can only be achieved by ICT literate head teachers… (ST 28).

I am tired of filling my details every month, why can't the office digitalize all the human resource data in order to save us from annoyance of filling monotonous data when I cannot see any personal development. The head teacher should also spearhead the filling of pupils' details in a soft copy which makes it easier for retrieval. Besides, the pupils' physical files are poorly kept and manipulation of facts by a non-entity is an obvious possibility. (ST 22).

The major themes that emerged from most of the senior teachers' comments were: the extent of digitalization of human resource records, the confidentiality of the process and the head teachers' role in the process. Most of the teachers aspired a situation where the head teacher could take charge of managing the confidential part of the uploaded information.

4.9 Hypotheses Testing

The four formulated null hypotheses of the study were tested using Pearson product moment correlation coefficient analysis. The mean response values generated from the four dependent variables were correlated with the corresponding mean response values generated from the independent variable (head teachers' level of ICT literacy). Table 4.8 shows the Pearson correlation analysis output.

Table 4.8: Pearson Correlation Analysis

		1	2	3	4	5
1. ICT integration in management of electronic communication	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	90				
2. ICT integration in management of teaching & learning	Pearson Correlation	0.138	1			
	Sig. (2-tailed)	0.429				
	N	90	90			
3. ICT integration in financial management	Pearson Correlation	0.542	0.234	1		
	Sig. (2-tailed)	0.021	0.176			
	N	90	90	90		
4. ICT integration in management of human resource data	Pearson Correlation	0.62*	0.427	0.326	1	
	Sig. (2-tailed)	0.035	0.886	0.239		
	N	90	90	90	90	
5. Head Teachers' level of ICT literacy	Pearson Correlation	**0.787***	**0.512***	**0.348**	**0.821***	1
	Sig. (2-tailed)	**0.007**	**0.042**	**0.218**	**0.02**	
	N	90	90	90	90	90

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

The result in the Table 4.8 was used to test the null hypotheses as follows:

H$_{O1}$: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in communication management

As evident from Table 4.8, there was a statistically significant and strong positive correlation ($r = 0.787$, $p < 0.05$) between head teachers' level of ICT literacy and ICT integration in management of electronic communication. Thus, the first null hypothesis

was rejected. This meant that the head teachers who had a higher level of ICT literacy had also integrated ICT in communication to a greater extent.

H_{O2}: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in management of teaching and learning

Table 4.8 shows that there was a statistically significant and strong positive relationship between the head teachers' level of literacy and ICT integration in management of teaching & learning (r = 0.512, p < 0.05). Thus, the second null hypothesis was rejected as well. This implied that head teachers who were ICT literate were able to initiate ICT integrated teaching and learning and thus influencing other teachers. Likewise, the head teachers who had none or little ICT literacy as was the case of most head teachers in Tinderet Sub County, hardly initiated ICT integration in teaching and learning.

H_{O3}: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in financial management

In reference to Table 4.8, head teachers' level of ICT literacy had a statistically insignificant positive weak correlation with the level of ICT integration in financial management in public primary schools in Tinderet Sub County ($r = 0.348$, $p = 0.218$). Therefore, the third null hypothesis of the study was retained. This implied that most of the head teachers, regardless of their level of ICT literacy had only integrated ICT to a small extent.

H_{O4}: There is no statistically significant relationship between head teachers' level of ICT literacy and ICT integration in human resource data management

As evident from Table 4.8, there was a statistically significant and positive strong correlation between head teachers ICT literacy and ICT integration in human resource data management ($r = 0.821$, $p = 0.02$). Hence, the fourth null hypothesis was rejected. This

implied that head teachers who had at least an average level of ICT literacy, had integrated

ICT in human resource management to some extent. It could also be inferred that most of

the head teachers who were ICT literate were more likely to initiate ICT integration in

human resource data management.

CHAPTER FIVE

DISCUSSION, SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of the results as per research objectives, summary of the findings and conclusions derived from the findings and discussion. The chapter closes with the recommendations as per the objectives and suggestions of areas of further study. The purpose of the study was to investigate the relationship between the head teachers' level of ICT literacy and ICT integration in management of public primary schools in Tinderet Sub-County, Nandi County. Data were collected through head teachers questionnaire and senior teachers' interview schedule.

5.2 Discussion

This section discusses the results and analysis of data (in chapter four) as per the four objectives.

5.2.1 Relationship between Head Teachers' Level of ICT Literacy and ICT Integration in Communication Management

The first objective of the study was to establish the relationship between the level of the head teacher's ICT literacy and ICT integration in communication management in public primary schools in Tinderet Sub-County, Nandi County. In reference to section 4.5, most of the head teachers had personal email accounts (Mean = 4.1, SD = 0.5) as well as the school accounts. The finding was in line with Ghavifekr et al., (2013) who noted that the e-mail system is fast and convenient, retains evidence of the sent information, can accommodate any length of the uploaded material, can effectively be used to send visual and audio visual materials and above all is cost effective as compared to the traditional

method of using paper written information. The finding was however, contrary to Oulo (2013) who found that 75% of head teachers in Bondo district had no email accounts and were computer illiterate. As noted by Oguta et al. (2014) and Oyier et al. (2015), the surge of head teachers, principals and teachers opening of email accounts was in line with the Ministry of Education requirement that all teachers should have email accounts and that vital communication and school school returns should be filed online.

However, most head teachers were found to have very minimal use of e-mail when communicating to teachers on personal or academic affairs (Mean = 2.6, SD =0.9). Similarly, the head teachers communicated to BOM and PTA members through e-mail to a small extent. Similar sentiments were echoed by the interviewed senior teachers who observed that their head teachers' technophobia was to the extent of abdicating the management of their personal emails and entrusted them to the school secretaries. The finding concurs with Tanui (2013) who found that despite the fact that some schools had adequate number of internet connected computers, constant electric power supply and other ICT resources in Wareng Sub County, principals hardly used electronic communication. Tanui (2013) attributed minimal use of their email accounts to the fact that most of them were either in the technology adopter category of 'slow majority' or were among the 'laggards' as advanced by Rogers (1995) in DOI theory.

Rogers posit that the 'late majority' are normally skeptical and constitutes about 34.0% members of a social system who generally approach technology with great caution often adopting it out of economic need or social pressure such as a government directive. Further, laggards are normally traditional and mostly people who come across new technology at middle or old age. This category represents about 16.0% of a social system; are often

isolated and hold conservative views, highly suspicious and even resistant to new innovation and change (Rogers, 1995).

It was further revealed that most of the head teachers never communicated with members of school alumni residing outside the country through skype (Mean = 1.4, 0.4). Similarly, most head teachers never shared school development ideas through an online blog (Mean = 1.1, SD = 0.4) and hardly shared important documents such as school policies and national educational policies through Google drive (Mean = 1.3, 0.5). These findings corroborate Ogundele and Etejere (2013) and Osunwusi and Abifarin (2013) studies that established that though most heads of institutions made efforts to acquire the basic ICT knowledge and skills as a matter of necessity, they rarely ventured into higher level interactions through ICT. Thus, apart the email communication most head teachers in Tinderet Sub County hardly ventured into skype communication, blogs or even sharing through Google drive.

Nonetheless, some head teachers indicated that they sometimes prepare and use power point as a part of their communication during the staff meeting and other fora to a small extent (Mean = 2.6, SD = 0.8). This implies that some head teacher were conversant with various software packages and had confidence to use projectors to present their work. The study finding was similar to Oulo (2013) study which established that with revealed that, though the training levels of head teachers in the use of ICT in public primary schools in Bondo Sub County was low, the head teacher's attitude towards the use of computers in public primary schools was positive and that the head teachers levels of awareness in the use of computer as a suitable tool for administrative purposes being high. Oulo (2013) recommended the government intervention in upgrading the ICT infrastructure such as computer laboratories and internet connectivity. Additionally, the ICT programmes that

aimed at just equipping the headteachers, teachers and learners with basic ICT skills needed to scaled up to ensure teachers acquire pedagogical value of ICT.

The current study further established that there was a statistically significant and strong positive correlation ($r = 0.787$, $p < 0.05$) between head teachers' level of ICT literacy and ICT integration in management of electronic communication as evident from Table 4.8. This meant that the head teachers who had a higher level of ICT literacy had also integrated ICT in communication to a greater extent in their schools. The finding was consistent with Ogundele and Etejere (2013) assertion that ICT literacy inevitable for both the teachers and principals, if schools are to be effective in communication and if their academic goals are to be achieved.

5.2.2 Relationship between Head Teachers' Level of ICT Literacy and ICT Integration in Management of Teaching and Learning

The second objective of the study was to examine the relationship between the level of the head teachers' ICT literacy and ICT integration in teaching and learning in public primary schools in Tinderet Sub-County. In reference to section 4.6, head teachers indicated that computers and projectors are used in teaching and learning in their schools to a small extent (Mean = 2.6, SD = 0.7). The finding was contrary to Kisirkoi (2015) whose case study of a secondary school established that the students and teachers were computer literate and were able to manage computer applications for teaching and learning. Further, the Learning process was found to be practical with learner interactions and activities based learning. It was also noted that the school was using ICT as teaching learning tool and there was improvement of learning environment and outcomes. Kisirkoi (2015) particularly noted that the teachers and students motivation mainly blossomed from the visionary, and supportive school leadership.

Similarly, most head teachers rated their use of projector and audio materials to enhance their teaching to a small extent (2.6, SD = 0.9). This finding was inconsistent with Sergiovanni observation that head teachers have the greatest impact on the use of technology for instructional use in schools. In support of the crucial part played by the head teacher, Green (2009) postulates that, in order for head teachers to effectively initiate ICT integration in teaching and learning, creation of technology plan to support teachers and students is paramount.

Nonetheless, most head teachers considered the extent to which teachers' use of information from internet to supplement information from the recommended text books as moderate (Mean = 3.3, SD = 0.8). Access of information from internet was more widespread than teaching and learning using projected information due to the fact that teachers could access online information through their phones as explained by the interviewed senior teachers. The finding was consistent with Afshari (2012) assertion that modern technology has equipped all people who can afford smart cell phone with unlimited information. As such lack of computer laboratory and other ICT gadgets should not thwart teachers' initiative of exploring internet to enrich information from other sources.

In regard to syllabi and schemes of work, most head teachers indicated that they had put them in soft copies to a small extent (Mean = 2.8, SD = 1.0). Similarly, head teachers indicated that they had automated school time table to a small extent (Mean = 2.9, SD =1.1). In a similar study Tanui (2013) found that most schools in Wareng Sub County had no timetabling software, school website and school social media despite being well endowed with other ICT infrastructure. Further, the study established that there were many soft wares available and yet not being used by teachers and students.

Further, most head teachers in Tinderet Sub County indicated that they hardly rated the extent to which they prepared their examination time table in soft copy as to a 'small extent' (Mean = 2.4, SD = 0.6). Further, most head teachers rated their use of ICT in processing exam results and students report forms as to a 'moderate extent' (Mean = 3.2, SD = 1.2) implying that there were a number of schools where examination analysis was digitalized. Additionally, most schools lacked examination analysis software and had to process their examinations were in hard copies and which cannot last long for future use. Contrary to the finding, most secondary schools have invested in examination analysis software. Studies by Kisirkoi (2015), Oyier et al. (2015) and Tanui (2013), showed that the ICT software that was most available and used by secondary schools included past mock and past KCSE questions and answers, exams analysis software, Kiswahili and English language set books/plays and e-mail.

The study findings also showed that most head teachers rated their use of the vast teaching aids from internet such as charts and pictures to enhance teaching especially science and social studies as moderate (Mean = 3.0, SD = 0.9). As noted by Kisirkoi (2015), use of ICTs also demands teacher creativity, innovativeness hard work. This is because teachers would have to search the web for relevant resource material which they would customize for use in class to meet learner's individual needs. Besides, the innovation also demands costly infrastructure to be in place, facilities, resources policy, professional support, secure storage and maintenance. In order to appropriately integrate ICT for improved education quality both technology and pedagogy must be addressed in the aspect Koehler calls Technological pedagogic Content Knowledge (TPACK) (Koehler, 2011).

In support of Koehler, Polizzi (2011) aver that effective use of ICTs as teaching learning resources has been found to significantly increase students' achievement as well as

promoting students critical thinking and problem solving skills needed in life. Polizzi (2011) further establishes principals' support for ICT integration behaviors depend on both contextual-level and individual-level variables. Contextual variables include the amount of ICT equipment available for teachers in their school, teachers' competence and frequency of use and teachers' attitudes towards the ICT usage. Individual-level variables includes principals' attitudes towards ICT integration into school teaching, their exposure to ICT training courses and their own perceptions of their competence in using ICT. Thus, it requires the head teacher to be in the fore front in regard to ICT diffusion in teaching and learning in a school.

5.2.3 Relationship between Head Teachers' Level of ICT Literacy and ICT Integration in Financial Management

The third objective of the study was to establish the relationship between the level of the head teacher's ICT literacy and ICT integration in financial management in public primary schools in Tinderet Sub-County. In reference to section 4.7, most public primary schools had digitalized their financial management to a small extent. Specifically, only a few school had digitalized the payment of school levies where parents or guardians can pay levies through the bank, pay bill through their phones and other digitalized modes. Similarly school management committee (SMC) workers payroll had been automated in most schools (Mean = 2.4, SD = 0.6). Most schools were also found to have never digitalized budget preparation and forecasting (Mean = 1.7, SD = 0.9). The finding was similar to Mutisya and Mwania (2017) who found that most schools in Kitui County were yet to embrace ICT in their financial management. In a similar study, Ojera (2016) found that the head teachers' lack of capacity in book keeping and ICT was a major factor in poor financial management among public primary schools in Migori County.

In most of the schools, head teachers' hardly presented the school budget to SMC in a soft copy (Mean = 2.3, SD = 0.7). Prevalence of hard copies in most of the financial transactions was a manifestation that most head teachers were averse to the use of technology. However, some of the interviewed senior teachers attributed lack of ICT integration in management areas including financial management to lack of electrical power and ICT infrastructure. In a similar study, Nzwili (2018) found that though most teachers had positive perception on ICT integration and majority were skilled in ICT use in Kitui County, lack of electrical power and inadequacy of ICT resource materials in some primary schools, thwarted their plans to integrate ICT in school management.

However, most head teachers rated their access to pupils' financial details through a computerized system as to a moderate extent (Mean = 3.5, SD = 1.0). This meant that some schools had uploaded their financial records in a computer system and thus retrieval could be done at will. Conversely, daily balancing off of the cash book, preparation of the monthly trial balance and income expenditure accounts at the end of the year was never generated through the computerized system in majority of schools (Mean = 1.9, SD = 0.8). The finding was inconsistent with Ghasemi et al. (2011) observation that ICT networks and computer systems have shortened the time needed by accountants to prepare and present financial information to management. Further, ICT integrated accounting system allow organizations to create individual reports quickly and easily for management decision making. Additionally, ICT integrated systems lead to increased functionality, improved accuracy, faster processing, and better external reporting (Ghasemi et al. 2011).

Nevertheless, as shown in Table 4.8, the head teachers' level of ICT literacy had a statistically insignificant positive weak correlation with the level of ICT integration in financial management in public primary schools in Tinderet Sub County (r = 0.348, p =

0.218). The result could be attributed to the fact that, most of the head teachers, regardless of their level of ICT literacy had only integrated ICT to a small extent. Oguta et al. (2014) and Oyier et al. (2015) were of the opinion that all schools should as a matter of promoting transparency and accountability invest and plan to digitalize their financial management. Parents and other stake holders should be sent periodical school financial status and which could form the basis of soliciting more funds.

5.2.4 Relationship between Head Teachers' Level of ICT Literacy and ICT Integration in Human Resource Data Management

The fourth objective of the study was to determine the relationship between the level of head teacher's ICT literacy and ICT integration in human resource data management in public primary schools in Tinderet Sub-County, Nandi County. In reference to section 4.8, most head teachers indicated that they had not digitalized pupils' office files (Mean = 1.8, SD = 0.8). The finding was contrary to Oyier et al., (2015) study that established that found that 68.75% of private schools in Nairobi County have automated their stores, 62.50% staff records and 56.25% students' records. Lack of digital student files, meant that pupils' physical files had the possibility of being misplaced unlike the soft copies.

Most head teachers affirmed that they could only access pupils' information such as age, parent name, occupation, last visit and contact through their computers to a small extent (Mean = 2.4, SD = 0.9). This implied that, head teachers made little use of ICT in filing pupils and their parents' details. In a similar finding, Meryo and Boit (2012) note that unlike secondary schools and some private schools in Kenya, most of the public primary schools are still stick in physical files and which becomes a problem and prone to damage due to poor storage. The finding was however contrary to Alexander (2012) observation that both primary and secondary schools in most of the European countries have digitalized

their data management ranging from students, teachers and support staff. In so doing, the man power resource gaps are easily identified and an existing vacancy can lead to a competitive recruitment within and across the borders of a certain country.

Most of the head teachers indicated that they never monitor individual pupils' academic progress through a soft copy, implying that their schools have not digitalized students' academic performance (Mean = 1.9, SD = 0.8). Similarly, most head teachers could not tell each student's talents in order to offer appropriate motivation through the computer (Mean = 1.5, SD = 0.9). The finding was similar to Ngugi (2012) who found that most schools in Naivasha that had integrated ICT in their students and teachers' data management mainly confined their application to examination result analysis. Other students' details such as the academic history could only be traced from the class or subject teachers mark books. That implied that when a mark is misplaced students' performance data for several terms can no longer be available for scrutiny. A similar observation was made by Mwitiri et al. (2017) that despite the progress made in schools internet connectivity and installation of computer laboratories, many public secondary schools are slow in ICT integration in their personnel data management. Further Mwitiri et al. (2017) observes that the laxity has persistently jeopardized submission of accurate data for Government educational planning.

The current study, however, found that most head teachers could track teachers' allocation of work, attendance, and leave through a soft copy (Mean = 3.3, SD =1.0). The relatively high standard deviation was however, an indication the response was varied. Similar studies by Miranji (2017) and Ojera (2016) established that teachers' development and performance data are progressively updated in many schools following the performance contract for all headteachers and principals in Kenyan public schools.

 Further, most head teachers indicated that they kept the track record of teachers professional development in a soft copy to a small extent (Mean = 2.5, SD = 1.0). Thus, only a few schools managed to keep track of the progress teachers made in course of their career (Mean = 2.5, SD = 1.0). Lack of such progress may sometimes jeopardize appropriate teachers' appraisal. The finding was inconsistent with Oguta et al. (2014) recommendation of keeping updated information in regard to the personnel qualifications in order to give commensurate motivation as well as strategic planning. A well updated record of teachers' professional development could enable the head teacher to recommend or assign various responsibilities to teachers appropriately. Such an action could greatly motivate both the teaching and the subordinate staff.

The study also found that most head teachers were had details of the subordinate staff such as job description, academic qualification and salary details in a soft copy to a moderate extent (Mean = 3.2, SD = 0.9). Omotayo (2015) posit that job description and salary scales and promotions forms a part of information which should be well protected and be made accessible to only designated persons. Keeping such information in hard copies could be prone to convenient manipulation unlike a digit storage which could be wisely locked as well as be put in a separate back up.

Finally, the study found that there was a statistically significant and positive strong correlation between head teachers ICT literacy and ICT integration in human resource data management ($r = 0.821$, $p = 0.02$). This implied that head teachers who had at least an average level of ICT literacy, had integrated ICT in human resource management to some extent. It could also be inferred that most of the head teachers who were ICT literate were more likely to initiate ICT integration in human resource data management. The finding concurs with Mwitiri et al. (2017), Oboegbulem and Ugwu (2013) and Ojera (2016) who

all concluded that an ICT literate head teacher was more inclined to influence ICT integration in not only school data management but also to all school management areas. However, apart from most head teachers low efficacy in ICT usage, lack of steady electric power supply and ICT infrastructure remains a major impediment to ICT integration in school management.

5.3 Summary of the Major Findings

This section presents the summary of the study findings in accordance to the objectives of the study.

The study found that most of the head teachers and teachers had email accounts in line with TSC directive that required each teacher to open an email account for official correspondence. Most schools had also opened school email accounts in line with the government directive. However, most head teachers indicated that apart from the official communication, they rarely use their emails accounts. Furthermore, some of them have to travel to the nearest major town in order to access their online services. Thus, in most schools correspondence through email form the head teachers to teachers and other stakeholders was rare. Communication through Skype and blogs was a strange thing to some head teachers. However, teachers communicated through phone calls, short messages and through 'WhatsApp'.

The study found that most head teachers hardly used computers and projectors in teaching and learning (Mean = 2.6, SD = 0.7). However, the interviewed senior teachers indicated that some head teachers were well trained in ICT and they served as role models in their school as they utilized videos from 'You tube' to enhance their teaching and learning. Most head teachers also considered the extent to which teachers' use of information from internet to supplement information from the recommended text books as moderate (Mean = 3.3,

SD = 0.8). Teachers made use of their smart phones to gather resourceful information from internet. Overall, the study found ICT integration in teaching and learning in public primary schools to be low.

In regard to ICT integration in financial management, most of the schools had not digitalized their systems and relied on physical books of accounts (Mean = 2.4, SD = 1.0). In addition, most head teachers relied on a hired expert to file financial returns in accordance to MOE. Some of the interviewed senior teachers disclosed that due to lack of competent personnel and unreliable electrical power most schools hesitated to digitalize their financial systems.

Most head teachers affirmed that they could only access pupils' parents/guardians information such as age, name, occupation, last visit and contact through their computers to a small extent (Mean = 2.4, SD = 0.9). However, most head teachers had information in regard to pupils' age, class, and gender as required by MOE to facilitate free primary education. Most of the head teachers indicated that they never monitor individual pupils' academic progress through a soft copy, implying that their schools have not digitalized students' academic performance (Mean = 1.9, SD = 0.8). Similarly, most head teachers could not tell each student's talents in order to offer appropriate motivation through the computer (Mean = 1.5, SD = 0.9). Further, most head teachers indicated that they kept the track record of teachers professional development in a soft copy to a small extent (Mean = 2.5, SD = 1.0). Thus, only a few schools managed to keep track of the progress teachers made in course of their career (Mean = 2.5, SD = 1.0).

5.4 Conclusion

From the study findings and discussions the following conclusions were made:

Most of the head teachers' level of ICT literacy in public primary schools in Tinderet Sub County could be termed as little implying that the person has a basic understanding of the technology, but cannot perform the task successfully without assistance and more training may be required.

In some schools head teachers ICT literacy was 'above average' (the person can perform the technology task repeatedly with great success, but has not mastered all the elements) or was a 'master' (the person has mastered the technology and can perform the task without any problems and can mentor others). This category of head teachers do electronic communication through various channels such as email, skype and sharing of information through Google drive and blogs. Through such media, the head teachers have been able to solicit some assistance from old boys and girls and other stakeholders.

Most of the head teachers have not been good role models in ICT integration in teaching and learning in public primary schools in Tinderet Sub County. Despite the fact that some school have adequate ICT infrastructure, teachers are yet to embrace ICT in teaching and learning.

ICT integration in financial management in most of public schools in Tinderet Sub County is at the minimum level. However, head teachers make efforts to file financial returns online as per the MOE requirement. The physical management of books of accounts has made the process become prone to malpractices.

ICT integration in human resource management in most of the public primary schools in Tinderet Sub County is moderate. Most head teachers have ensured that pupils' details

have been captured in line to the MOE requirements in order to facilitate FPE. Similarly teachers' details have been captured in order to facilitate teachers' performance appraisal and development system (TPAD). However, data uploading is normally done in a commercial cyber café for most schools.

5.5 Recommendations of the Study

The following recommendations were made based on the findings and conclusions made. In order to improve ICT integration in public primary school management, TSC should make ICT literacy and book keeping competence as some of the requirements for one to become a head teacher. In so doing, a critical mass of head teachers who are not technophobia will be attained and with the appropriate infrastructure they would ensure ICT integration in all management areas.

MOE should organize frequent compulsory in service training to equip all head teachers with the appropriate skills and knowledge in ICT. The major hindrance to ICT integration in school management has been identified as lack of infrastructure such as electric power source, internet connectivity and both hard ware and software. Therefore, the government should plan to install solar panels as a constant source of power.

Having installed power in every school, the government through the TSC should make it mandatory for all schools to digitalize their financial management and human resource data management. It follows that all payments to the school should be made via various ICT channels such as pay bill, thus, improving accountability and transparency. Additionally, management of teachers, pupils and subordinate staff would be more efficient.

5.6 Suggestions for Further Studies

The following areas have been suggested for further research:

(i) An audit to establish the available ICT infrastructure in all public primary in Tinderet Sub County should be made with a view of inviting cooperate bodies, NGOs and other stakeholders to supplement the government's effort of digitalizing all functions in schools

(ii) A study should be carried out to assess the head teachers' attitude towards ICT integration in the school management with a view of enlightening them more on its importance

(iii) A similar study should be made national wide by MOE in order to offer appropriate guidance to the government in regard to the level of ICT integration and the various challenges encountered.

REFERENCES

Afshari, M. (2012). Transformational leadership role of principals in implementing information communication technology in schools. *Life Science Journal, 9*(1), 24-35

Afshari, M., Baker, K. A., Luan, W. S., Fool, F. S., & Samah, B. A. (2010). Computer use by secondary school principals. *The Turkish Online Journal of Educational Technology*, 9(3), 8-25.

Afzaal, H. S. (2012). A preliminary study of school administrators' use of information and communication technologies: Bruneian perspective. *International Journal of Education and Development using Information and Communication Technology* (IJEDICT), 8(1), 29-45.

Akturk, O. A., Izci, K., Caliskan, G., & Sahin, I. (2015). Analyzing preservice teachers' attitudes towards technology. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering 9*, (12), 4279-4282. Retrieved from http://files.eric.ed.gov/fulltext/ED563253.pdf

Alexander, A. (2012). *The impact of ICT on educational performance and its efficiency in selected EU and OECD Countries: A non-parametric analysis.* University of Ljubtjana, Storenia. Retrieved from http://www.tojetnet/articles/viii3/11314.pdf

Babbie, E. (2014). *The basics of social research* (6th ed.). Belmont, CA: Wadsworth, Cengage Learning

Bada T, Adewole A, & Olalekan, O. (2009). Uses of computer and its relevance to teaching and learning in Nigerian Educational System. *Educational Research Review,* 4(10), 443-447. Retrieved from http://academicjournals.org/err/PDF/Pdf%202009/Oct/Bada%20et%20al.pdf

Best, J. W., & Khan, V. K. (2006). *Research in education.* New Delhi: Prentice Hall of India.

Bhattacherjee, P. (2012). *Social sciences research principles, methods and practices.* University of South Florida: Scholar Commons.

Bryman, A. (2004). *Social research methods* (2nd ed.). New York: Oxford University Press.

Business Dictionary (2011). *Electronic business dictionary.* Retrieved from http://www.businessdictionary.com

Chile, P. (2012). *Some of the disadvantages of using the diffusion theory*. Retrieved from http://www.ehow.com/info_8633492_disadvantages-using-diffusion-theory.html

Creswell, J. W. (2012). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (4th ed.), Upper Saddle River. NJ: Merrill

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage

Dunham, C. (2012). Principals roles and responsibilities in technology integration in rural Georgia. *Electronic Theses and Dissertations*. 786. Retrieved from https://digitalcommons.georgiasouthern.edu/etd/786

Ekua, T. A., & Asare, Y. (2016). A survey of information communication technology literacy among lecturers. *Information and Knowledge Management,* 6(8), 1-6.

Fraenkel, J., Wallen, N., & Hyun, H. H. (2012). *How to design and evaluate research in education (8th ed.).* Boston: McGraw Hill.

Gay, L. R., Mills, G. E., & Airasian, P. (2010). *Educational research: competencies for analysis and applications (10th ed*.). New Jersey: Pearson Education.

Ghasemi, M., Shafeiepour, V., Aslani, M., & Barvayeh, E. (2011). The impact of Information Technology (IT) on modern accounting systems. *Procedia - Social and Behavioral Sciences,* 28, 112 – 116.

Ghavifekr, S., Afshari, M., Siraj, S., & Seger, K. (2013). ICT application for administration and management: A conceptual review. *Procedia-Social and Behavioral Sciences,* 103, 1344-1351. Retrieved from www.sciencedirect.com

Green, R. J. (2009). *The four dimensions of principal leadership: A framework for leading 21st century schools.* Boston: M. A. Allyn & Bacon Publishing.

Idolor, J. E. (2010). Financial management practices of micro finance banks: Evidences from Benin City, Nigeria. *European Journal of Social Sciences,* 18(1), 7-17

Ivankovic, A., Spiranec, S., & Miljko, D. (2013). *Procedia-Social and Behavioral Sciences*, 93, 684-688. Retrieved from www.sciencedirect.com

Jan, S. (2018). Investigating the relationship between students' digital literacy and their attitude towards using ICT. *International Journal of Educational Technology,* 5(2), 26-34.

Joubert, R., & Bray, E. (2007). *Public school governance in South Africa*. Pretoria: Interuniversity Centre for Education Law and Education policy (CELP).

Kaminski, J. (2011). *Diffusion of innovation theory. Canadian Journal of Nursing Informatics.* Retrieved from http://cjni.ca/journal/?p=1444

Kenney, A. J. (2006). The final hurdle? A new test may finally bring information literacy the recognition it deserves. *School library journal.* Retrieved from from http://www.schoollibraryjournal.com/article

Klomsri, T., & Tedre, M. (2016). Poor information literacy skills and practices as barriers to academic performance: A mixed methods study of the University of Dar es Salaam. *Reference & User Services Quarterly*, 55(4), 293-305. Retrieved from https://journals.ala.org/index.php/rusq/article/view/6004

Kiptalam, G. K. (2010). *Challenges facing ICT integration in Kenyan schools*. Accesses on 15 January 2013 from http://omoso-cima.blogspot.com/2011/11/challenges-facing-ict-integration-in.html

Kisirkoi, F. K. (2015). Integration of ICT in education in a secondary school in Kenya: A Case Study. *Literacy Information and Computer Education Journal* (LICEJ), 6(2), 1904-1909.

Koehler, M. (2011). *Pedagogical content knowledge*. Retrieved from http://mkoehler.educ.msu.edu/tpack/cate gory/core/

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

Koperlainen, E. (2011). *Theories of ICT implementation and adoption – a critical review.* Retrieved from http://lib.tkk.fi/science_technology/2011/isbn9789526041506.pdf

Kothari, C. R. (2014). *Research methodology: Methods and techniques (3rd ed.)*. New Delhi: Wiley Publications.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30,* 60-61.

Lee, S., Kim, J., & Lee, W.(2015). Analysis of elementary students' ICT literacy and their self-evaluation according to their residential environments. *Indian Journal of Science and Technology, 8(*1), 81-88. doi: 10.17485/ijst/2015/v8iS1/57595

Marylin, K. S., & Goes, J. (2013). Dissertation and scholarly research: Recipes for success. *Intervention in school and clinic,* 41(4), 218-227.

McHenry, R. (1993) (ed.). *The history of technology. In The New Encyclopedia Britannica Inc* (15th ed.), *vol.28.* London: Encyclopaedia Britannica

Meryo D. K., & Boit J.M. (2012). *The challenges of using Information Communication Technology in school administration in Kenya*. Moi University.

Ministry of Planning and National Development (2007). *Kenya Vision 2030*. Nairobi: Government Printer

Ministry of Education (2017). *Nandi County schools census report of 2017*. MOE

Morales, S. R. (2013). *ICT literacy survey*. Retrieved from
https://www.quia.com/sv/359509.html

Motsamai, J. M., Jacobs, L., & Corene, W. (2011). Financial management in schools in
the Mafeteng District of Lesotho. *Journal of Social Sciences 26(2):* 105-116.

Motshegwe, M. M., & Batane, T. (2015). Factors influencing instructors' attitudes toward
technology integration. *Journal of Educational Technology Development and
Exchange (JETDE)*, 8(1), 1-15. doi: 10.18785/jetde.0801.01

Muchiri, G. M. (2014). *Factors influencing school principals' integration of ICT in
administration of public secondary schools in Githunguri Sub County, Kiambu
County, Kenya* (Unpublished M. Ed Thesis). University of Nairobi.

Muema, F. (2015). Integrating ICT in school financial management: A case of a secondary
school in Tanzania: *International Journal of Economics and Finance 4(7), 1-22.*

Mutisya, A. M., & Mwania, J. M. (2017). The extent of ICT integration in the management
of public secondary schools in Kitui County, Kenya. *International Journal of
Education and Research, 5(11), 193-204.*

Mutwiri, L. M., Kafwa, V. N., & Kyalo, M. M. (2017). The role of principals in Information
and Communications Technology (ICT) policy formulation in public secondary
schools in Kenya. *Kabarak Journal of Research & Innovation*, 5(1), 118-128.

Ngugi, P. (2012). *An Investigation into the extent of use of ICT in education management
in public secondary schools in Naivasha District* (Unpublished M. Ed Thesis).
Kenyatta University.

Nzwili, K. M. (2018). *Primary schools' preparedness for effective Integration of
information, communication and Technology in curriculum instruction: A case of
Kitui County, Kenya* (Unpublished, Doctoral Thesis). Moi University

Oboegbulem, A., & Ugwu, R N. (2013). The place of ICT in the administration of
secondary schools in south Eastern States of Nigeria. *US-China Education Review,
3*(4), 231-238.

Ogula, A. P. (1998). *A handbook on educational research*. Nairobi: New Kemit Publishers.

Ogundele, M. O., & Etejere, P. A. O. (2013). Computer literacy and secondary school
teachers' job effectiveness in Kwara State, Nigeria. *African Journal of Teacher
Education, 3(1),* 1-9.

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.

Ojera, D. A. (2016). Impact of financial management in Migori county public primary Schools on pupils' academic achievement in Kenya Certificate of Primary Education. *World Journal of Educational Research*, 3(8), 1-19. Retrieved from www.wjer.org

Oluwatayo, J. A. (2012). Assessment of computer literacy of secondary school teachers in Ekiti State, Nigeria. *Educational Research and Reviews,* 8(2), 1-8. Retrieved www.journals.cluteonline.com/ index.php/JIER/article/download/…/6904.

Omotayo, A. O. (2015). An assessment of level of computer literacy and phobia among private secondary school's principals in Kaduna North Local Government Area of Kaduna State, Nigeria. *Journal of Biology, Agriculture and Healthcare, 6, 18-27.*

Orodho, A. (2012). *Techniques of writing research proposals and reports*. Nairobi: Kanezja H P Enterprises.

Oso, W. Y., & Onen, D. (2009). *A general guide to writing research and report.* Nairobi: The Jomo Kenyatta Foundation

Osunwusi, A. O., & Abifarin, M. S. (2013). A comparative assessment of computer literacy of private and public secondary school students in Lagos State, Nigeria. *Educational Research and Reviews,* 8(12), 881-889. DOI:10.5897/ERR2013.1440

Oulo, I. O. (2013). *Preparedness of the headteachers in the use of information communication technology in public primary schools in Bondo District, Kenya* (Unpublished M. Ed Thesis). University of Nairobi.

Oyier, C. R., Odundo, P. A., Ganira, L. K., & Kahiga, R. W. (2015). Effects of ICT integration in management of private secondary schools in Nairobi County, Kenya: Policy options and practices. *World Journal of Education,* 5(6), 14-22. Retrieved from http://wje.sciedupress.com

Perez, J., & Coffin Murray, M. (2010). Generativity: The new frontier for information and communication technology literacy. *Interdisciplinary Journal of Information, Knowledge and Management*, 5.

Polizzi, G. (2011). Measuring school principals' support for ICT integration in Palermo, Italy. *The National Association for Media Literacy Education's Journal of Media Literacy Education,* 3(2), 113 – 122.

Roberts, R., & Sikes, J. (2011). How IT is managing new demands: Mckinsey Global Survey Results. *Mckinsey on Business Technology, 22*(Spring), 24-33.

Roblyer, M., & Doering, A. (2014). *Integrating educational technology into teaching*. Harlow: Pearson.

Rogers, E. (1995). *Diffusion of innovations theory*. Retrieved from http://www.stanford.edu/class/

Sergiovanni, T. J. (2009). *Rethinking leadership: A collection of articles.* Thousand Oaks, CA: Corwin Press.

Simon, M. K. (2011). *Dissertation and scholarly research: Recipes for success.* Seattle, WA: Dissertation Success, LLC.

Singh, T. K. R., & Muniandi, K. (2012). Factors affecting school administrators' choice in adapting ICT tools in school. *The case of Malaysian schools. International Educational Studies, 5*(4), 21-30.

Sivin-Kachala, J., & Bialo, E. R. (2009). Using information and communication technology. *International Journal of Education and Development, 7(1),* 68-85.

Stangor, C. (2011). *Research methods for the behavioral sciences* (4th ed.). Mountain View, CA: Cengage.

Tanui, M. (2013). *Principals' role in promoting use and integration of information and communication technology in public secondary schools in Wareng Sub-County, Kenya* (Unpublished M. Ed Thesis). Catholic University of Eastern Africa

Thannimalai, R., & Raman, A. (2018). The influence of principals' technology leadership and professional development on teachers' technology integration in secondary schools. *Malaysian Journal of Learning and Instruction, 15*(1), 203-228.

UNESCO (2016). *Global education monitoring report*. Retrieved from http://unesdoc.unesco.org/images/0024/002459/245918E.pdf

Wagithunu, M N., Muthee, J., & Thinguri R. (2014). A critical analysis of school principals' competence in financial management in Kenya: Accountability in educational planning and management. *Journal of Education and Practice, 5*(25), 103-107.

Wijaya, S. W., & Surendro, K. (2007). *ICT literacy as an indicator of e-government readiness.* Paper presented to the school of electrical and informatics Engineering. Banding Institute of Technology. Retrieved from http://www.usd.ac.ld/06/publidosen/wisnu-ti/ict.pdf

APPENDICES

APPENDIX 1: LETTER OF TRANSMITTAL

Dear Respondent,

I am a Post-Graduate Student in the Africa Nazarene University, pursuing a master's degree in Education. I am currently carrying out a research thesis titled: **RELATIONSHIP BETWEEN HEAD TEACHERS' LEVEL OF ICT LITERACY AND ICT INTEGRATION IN MANAGEMENT OF PUBLIC PRIMARY SCHOOLS IN TINDERET SUB-COUNTY, NANDI COUNTY, KENYA,** as part of the course requirement**.** For this reason, therefore, your school has been sampled for the study and you have been selected as a respondent.

Kindly answer the questions as candidly as possible. There is no right or wrong answer. Do not write your name on the questionnaire. The results of this study will be used for academic purposes only.

Yours Faithfully,

PAUL KIPKEMBOI CHOGE

Cell Phone: 0724910764

APEENDIX II: HEAD TEACHERS' QUESTIONNAIRE

I am grateful for your participation and assistance in answering this questionnaire. I would like to know something about your Information Communication Technology (ICT) experience, knowledge and skills. I would also like to know the level of ICT integration in certain school management areas in your school. Your response will be treated in strict confidence. Individual teachers/schools will not be identified in any report or publication. Please answer all questions as accurately as you can. For each question, please mark your response with a tick ($\sqrt{}$) unless otherwise indicated. For 'Other' responses, provide a brief response.

SECTION A: DEMOGRAPHIC FACTORS

1. Gender: Male   [   ]   Female [   ]

2. Age: Under 30 [   ] 31-40years [   ]   41-50 years [   ]   Over 50yrs [   ]

3. How would you rate your use of computer skills level?

      Beginner   [   ]

      Moderate   [   ]

      Competent   [   ]

4. Highest Professional Qualification in Education

      P1 Certificate   [   ]

      Diploma in Education   [   ]

      B. Ed   [   ]

      M. Ed   [   ]

      PhD in Education   [   ]

5. Do you use a computer in your office?

      Yes   [   ]   No   [   ]

6. Does your secretary use a computer to accomplish various tasks in the school?

      Yes   [   ]   No   [   ]

SECTION B: ICT LITERACY SURVEY

7. Please rate your level of ICT literacy by considering the skills and knowledge you possess in regard to computer use. NB. Try to be as honest as possible.

Level: 1 – **None:** The person has no understanding of technology and appropriate training is required to for developing technology competency

Level: 2 – **Little:** The person has a basic understanding of the technology, but cannot perform the task successfully without assistance-more training may be required

Level: 3 – Average: The person can perform the technology task, but struggles in some areas. Advance training for developing technology competency will improve performance

Level: 4 – **Above Average:** The person can perform the technology task repeatedly with great success, but has not mastered all the elements.

Level: 5 – Master: The person has mastered the technology and can perform the task without any problems. The person can mentor others.

General Skills	None (1)	Little (2)	Average (3)	Above Average (4)	Master (5)
Familiar with basic computer system parts and concepts (e.g. hard drive, RAM, etc.)					
Able to use Help menus to find answers to my questions					
Understand file extensions and differences between file types (e.g. .doc, .gif. .html, .ppt. etc.)					
Able to shut down a computer appropriately					
Able to perform a safe reboot of the operating system with keystrokes					
Understand the difference between closing/minimizing/hiding windows and quitting a program					
Able to use the mouse right-click menu functions					
File Management Skills	**1**	**2**	**3**	**4**	**5**

Able to navigate through files and directories (e.g. using Windows Explorer)					
Able to organize, copy and paste files in directories					
Able to move unwanted files into my recycle bin and delete them permanently from my hard drive					
Word Processing Skills	**1**	**2**	**3**	**4**	**5**
Able to edit, copy, cut and paste a block of text or selected objects					
Able to use undo/redo functions					
Able to save, print and preview documents					
Able to select and change fonts sizes and types, styles (e.g. boldface, italics, underlining, etc.)					
Able to create itemized lists (e.g. bullets, numbered lists)					
Printing Skills	**1**	**2**	**3**	**4**	**5**
Able to change printer parameters like page numbers, paper orientation, margins and proportions, etc.					
Able to change printing options from grayscale, normal, fastdraft or best					
Online Communication. Browser and Navigation Skills Online	**1**	**2**	**3**	**4**	**5**
I am able to use the browser basic commands to surf the Internet					
I am able to request, activate my ODU email account					
I am able to compose, send, receive, reply to and forward email messages					
I am able to attach/detach documents to/from email messages					
I am able to use search engines to locate desired information					
I am able to understand the difference between Search Engines (e.g. Google) and Directories (e.g. Yahoo)					
I am able to understand that some copyright restrictions apply to computer software and Internet documents					
I am able to understand how I can use gathered information from the Internet without violating copyright laws					

	Never	To a small extent	To a moderate extent	To a large extent	To a very large extent
I am able to demonstrate an understanding of what constitutes plagiarism					
I am able to know basic steps to ensure your online privacy and computer security					

8. NB: In the following sections C to F, you are requested to rate the extent to which you personally accomplish the various management functions as specified.

SECTION C: Management of Electronic Communication

Statement	Never	To a small extent	To a moderate extent	To a large extent	To a very large extent
I have an email account					
My school has an email account					
I use e-mail to communicate to teachers					
I use e-mail to communicate to BOM					
I use e-mail to communicate to PTA members					
I use email to communicate to TSC, MOE					
I pass important academic articles to teachers through e-mail					
We communicate with members of school alumni residing outside the country through skype					
We share school development ideas through an online blog					
I share important documents such as school policies and national educational policies through google drive					
I sometimes prepare and use power point as a part of my communication during the staff meeting and other fora					

SECTION D: Management of Teaching and Learning

Statement	Never	To a small extent	To a moderate extent	To a large extent	To a very large extent
Computers and projectors are used in teaching and learning in my school					
I personally use projector and audio visual materials to enhance my teaching					
Teachers use information from internet to supplement information from the recommended text books					
We have syllabi and schemes of work in soft copy					
We have automated school academic time table					
Our examination time table is normally in both soft and hard copy					
We use ICT in processing exam results/students report forms					
We make use of the vast teaching aids from internet such as charts and pictures to enhance teaching in especially science and other subjects					
We sometimes teach using audio visual aids such videos					

SECTION E: Financial Management

ICT Application	Never	To a small extent	To a moderate extent	To a large extent	To a very large extent
We have digitalized the management of books of accounts					
Payment of school levies is digitalized					
School Management Committee (SMC) workers payroll has been automated					
We have digitalized Budget preparation and forecasting					
I Present the school budget to SMC in a soft copy					
I can access any pupil financial details through a computerized system					
Daily balancing off of the cash book, preparation of the monthly trial balance and income expenditure accounts at the end of the year was also generated through the computerized system					

SECTION F: Management of the School Human Resource Data

Statement	Never	To a small extent	To a moderate extent	To a large extent	To a very large extent
Each student has a file in soft copy apart from the hard copy					
I can access pupils' information such as age, parent name, occupation, last visit and contact through my computer.					
I monitor individual pupils academic progress through my computer					
I can tell each student's talents and offer appropriate motivation through my computer					
I can manage teachers' allocation of work, attendance, and leave, and performance appraisal, through my computer					
I have a track record of teachers professional development in soft copy					
I can easily access various inventory balances, lots item information, minimum stock, outward and inward transaction details					
By a click of a button, I can display the value of the school fixed assets and liabilities					

Thank you for your information

APPENDIX III: SENIOR TEACHERS' INTERVIEW SCHEDULE

1. How would you rate your head teacher proficiency in computer?

2. To what extent does the head teacher apply modern technology in communicating to teachers and other school stake holders?

3. How does the head teacher store the teacher appraisal information details and other teachers' information? Is the head teacher able to retrieve and adjust the information as changes arise?

4. To what extent has your school financial records been digitalized? Does your head teacher able to peruse the financial details of your school through his computer without the assistance of the school accounts clerk?

5. To what extent has your school digitalized pupils' personal records and academic progress?

6. Does the head teacher make use of these records while advising a parent on her/his child progress in academic and co-curriculum activities?

7. As a senior teacher does the head teacher share some students' information through Google drive?

APPENDIX IV: TINDERET SUB COUNTY PUBLIC PRIMARY SCHOOLS

S/NO	SCHOOL	S/NO	SCHOOL	S/N0	SCHOOL
1.	A.I.C. CHEPKEMEL	44.	KAPKULUMBEN	87	SETEK
2.	A.I.C. LELGOTET	45.	KAPLELACH	88	SETEK GAA
3.	AIC METEITEI	46.	KAPLOLON	89	SIMOTWET
4.	AIC SENETWO	47.	KAPRURET	90	SOBA RIVER
5.	AIC TINDERET	48.	KAPSASUR COM.	91	SOKOSIK
6.	AIC TUIYOBEI	49.	KAPSIGILAI	92	SOSIOT
7.	AINAPNGETUNY	50.	KAPSOEN	93	USWET
8.	BUGON	51.	KAPSOITO	94	USON
9.	CHEBONGU	52.	KAPSOKIO	95	TUIYOBEI
10.	CHELAMBUT	53.	KAPTEBENGWO	96	TULWOMOI
11.	CHEMALAL	54.	KAPTELDON	97	UNDERIT
12.	CHEMALAL VIEW	55.	KIBONGWA	98	SIGOWET
13.	CHEMAMUL	56.	KIBUGAT	99	SIGORIA
14.	CHEMASE BOARD.	57.	KIBUKWO	100	SENETWO
15.	CHEMURSOI	58.	KIGUSGONG	101	TINDERET TEA
16.	CHEMUTIA	59.	KIMATKEI	102	TERENO
17.	CHEPKAROI	60	KIMUGUL	103	TAUNET
18.	CHEPKECHIR	61	KIMWANI	104	SEIYOT
19.	CHEPKUCHURU	62	KIMWOGI	105	SDA REVIVAL
20.	CHEPSANGOR	63.	KIPKURES	106	TAMOO DAYSTAR
21.	CHEPSWERTA	64.	KIPLELGUT	107	TAMBUL
22.	CHEROBON	65.	KIPNGELEL	108	TACHASIS
23.	CHERONDO	66.	KIPSIELEI	109	SDA LABUIYWO
24.	CHERUNGUT	67.	KIPSISIN	110	SAMUTETARWAT
25.	EMIT	68.	KIPTEBES	111	OLOMOTIT
26.	GOT NE LEL	69.	KIPTEGAT	112	NGATIPKONG
27.	GREAT HIGHLANDS	70.	KIPTIONGIN	113	KIBINGEI
28.	IBOI SDA	71.	KIPYAOR	114	CHEMAMUL
29.	KABIRER	72.	KIRORO	115	KAPLAMIYWO
30.	KABOLEBO	73.	KISOGA	116	MUTUMON
31.	KABUNYERIA	74.	KITECHGAA	117	MOMBWO
32.	KABUTIEI	75.	KITOROCH	118	ST. PETER'S
33.	KALYET POTOPOTO	76.	KOIBEIYO	119	ST. PAUL'S
34.	KAMEINJEIWA	77.	KOIMOI	120	ST. MATHEW'S
35.	KAMELIL	78.	KOISEGEM	121	ST. MARTIN
36.	KAMELILO	79.	KOIYET	122	METEITEI
37.	KAMUNY	80.	KOLELACH	123	MBOGO VALE
38.	KAPCHANGA	81.	KOROSIOT	124	MATAMBACH
39.	KAPCHEPLANGET	82.	KOSABEI		
40.	KAPKERI	83.	LAMAIYWO		
41.	KAPKOROS	84.	LENGON		
42	LUTHER KING	85.	SOYSITET		
43	MAGOI	86.	ST. BARNABAS		

APPENDIX V: INTRODUCTION LETTER FROM AFRICA NAZARENE UNIVERSITY

AFRICA NAZARENE
UNIVERSITY

10th May 2019

RE: TO WHOM IT MAY CONCERN

Paul Kipkemboi Choge (13M06CMED019) is a bonafide student at Africa Nazarene University. He has finished his course work and has defended his thesis proposal entitled: – *"Relationship between Head Teachers' Level of ICT Literacy and ICT Integration in Management of Public Primary Schools in Tinderet Sub-County, Nandi County, Kenya"*.

Any assistance accorded to him to facilitate data collection and finish his thesis is highly welcomed.

Prof. Rodney Reed.
DVC Academic Affairs.

P.O Box 53067 - 00200 Nairobi, Kenya ● Tel: 020 252 7170/1 - 5 ● Fax: 020 201 2233 ● Cell: 0733 876 111● Email: registrar@anu.ac.ke ● www.anu.ac.ke

APPENDIX VI: RESEARCH AUTHORIZATION LETTER FROM NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/19/18685/30501**

Date: **29th May, 2019.**

Paul Kipkemboi Choge
Africa Nazarene University
P.O. Box 53067-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Relationship between head teachers' level of ICT Literacy and ICT Integration in management of Public Primary Schools in Tinderet Sub-County, Nandi County, Kenya."* I am pleased to inform you that you have been authorized to undertake research in **Nandi County** for the period ending **27th May, 2020.**

You are advised to report to **the County Commissioner and the County Director of Education, Nandi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:
The County Commissioner
Nandi County.

The County Director of Education
Nandi County.

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified

APPENDIX VII: RESEARCH PERMIT FROM NACOSTI

THIS IS TO CERTIFY THAT:
MR. PAUL KIPKEMBOI CHOGE
of **AFRICA NAZARENE UNIVERSITY,**
183-40110 SONGHOR, has been
permitted to conduct research in *Nandi*
County

on the topic: **RELATIONSHIP BETWEEN**
HEAD TEACHERS' LEVEL OF ICT
LITERACY AND ICT INTEGRATION IN
MANAGEMENT OF PUBLIC PRIMARY
SCHOOLS IN TINDERET SUB-COUNTY,
NANDI COUNTY, KENYA

for the period ending:
27th May, 2020

Permit No : NACOSTI/P/19/18685/30501
Date Of Issue : 29th May, 2019
Fee Recieved : Ksh 1000

....
Applicant's
Signature

....
Director General
National Commission for Science,
Technology & Innovation

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science,
Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

National Commission for Science, Technology and innovation
P.O. Box 30623 - 00100, Nairobi, Kenya
TEL: 020 400 7000, 0713 788787, 0735 404245
Email: dg@nacosti.go.ke, registry@nacosti.go.ke
Website: www.nacosti.go.ke

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH LICENSE

Serial No.A 25046

CONDITIONS: see back page

APPENDIX VIII: RESEARCH AUTHORIZATION LETTER FROM NANDI

COUNTY DIRECTOR OF EDUCATION

REPUBLIC OF KENYA

MINISTRY OF EDUCATION
STATE DEPARTMENT FOR EARLY LEARNING AND BASIC EDUCATION

Email: cdenandicounty@yahoo.com
When replying please quote

Ref:NDI/CDE/RESEARCH/1/VOL.II/182

COUNTY DIRECTOR OF EDUCATION,
NANDI
P.O BOX 36 – 30300,
KAPSABET.

17th June 2019

Paul Kipkemboi Choge
Africa Nazarene University
P.O Box 53067 - 00200
**NAIROBI.**

RE: RESEARCH AUTHORIZATION

Reference is made to the National Commission for Science, Technology and Innovation's letter Ref:
No. NACOSTI/P/19/18685/30501 dated **29th May, 2019.**

The above named person has been granted permission by the County Director of Education to carry out research on *"Relationship between head teachers' level of ICT Literacy and ICT Integration in management of Public Primary Schools in Tinderet Sub County,'* in Nandi County, Kenya for the period ending **27th May, 2020**

Kindly provide him all necessary support he requires.

For: **County Director of Education NANDI COUNTY**

Clare E. Kusa
For: County Director of Education,
NANDI COUNTY.
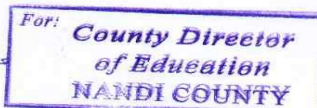
APPENDIX IX: RESEARCH AUTHORIZATION LETTER FROM NANDI

COUNTY COMMISSIONER

THE PRESIDENCY

MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Tel: 053 5252621, 5252003, Kapsabet
Fax No. 053 – 5252503
E-mail:
nandicountycommissioner@gmail.com
When replying, please quote

Ref: No. NC.EDU/4/1/VOL.V(269)

County Commissioner's Office,
Nandi County
P.O. Box 30,
KAPSABET.

17th June, 2019

Paul Kipkemboi Choge
African Nazarene University,
P.O. Box 53067 - 00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

This is in reference to letter No. NACOSTI/P/19/18685/30501 dated 29th May, 2019 from the Director General/CEO, National Commission for Science, Technology and Innovation on the above subject matter.

You are hereby authorized to conduct a research on **"Relationship between head teachers' level of ICT Literacy and ICT Integration in management of Public Primary Schools in Tinderet Sub County"** for the period ending **27th May, 2020.**

Wishing you all the best.

THE COUNTY
COMMISSIONER
NANDI.

G.O. MATUNDURA
For: COUNTY COMMISSIONER
NANDI.

APPENDIX X: MAP OF KENYA SHOWING NANDI COUNTY
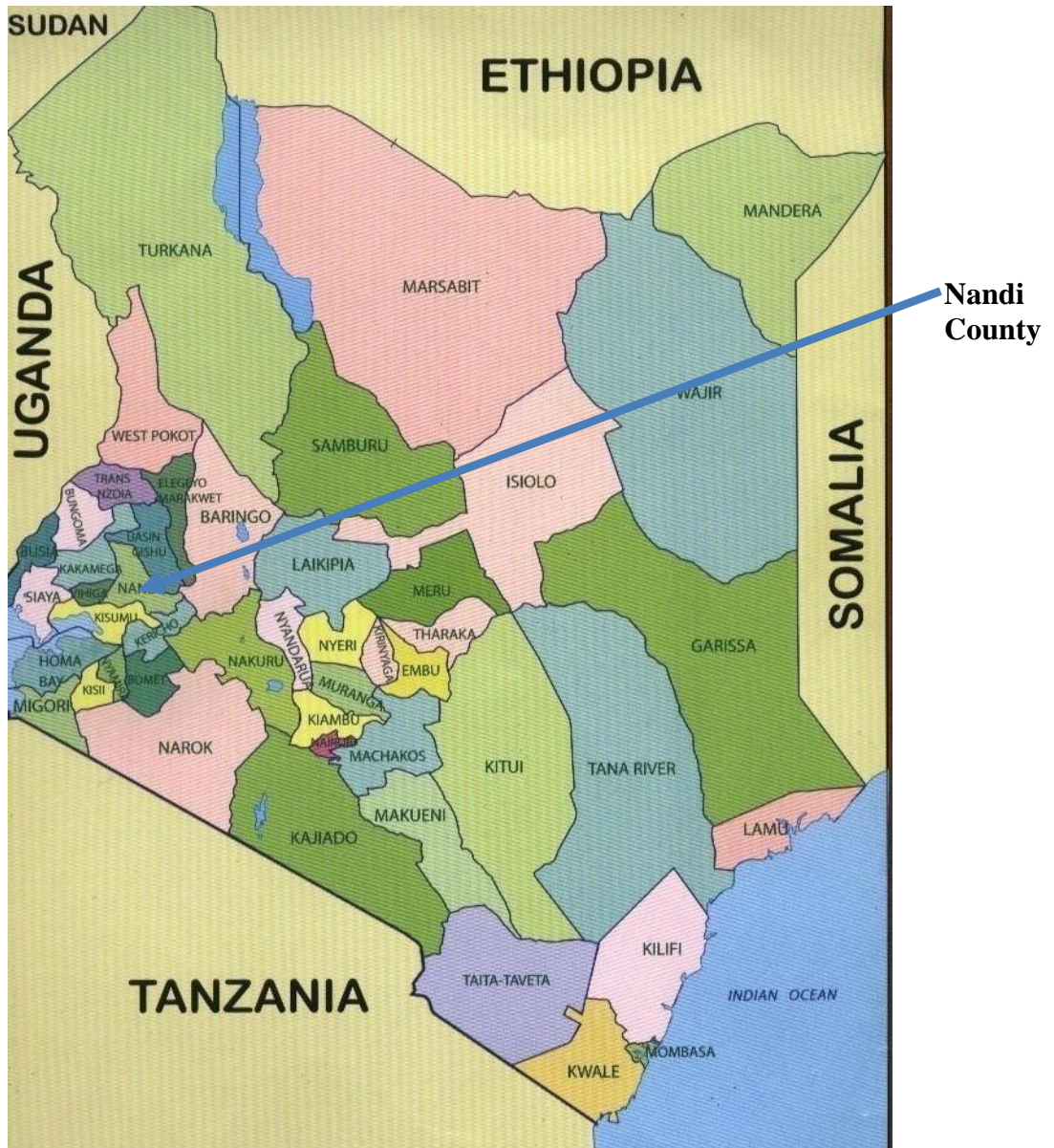
APPENDIX XI: MAP OF NANDI COUNTY SHOWING TINDERET SUB COUNTY

TINDERET SUB COUNTY