FACTORS INFLUENCING PUBLIC PRIMARY SCHOOLS' IMPLEMENTATION OF DIGITAL LITERACY PROGRAM: A CASE OF NAKURU NORTH SUB COUNTY, NAKURU COUNTY- KENYA.

BY

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DECLARATION

This research project is my original work and has not been presented for the award of a degree or any other award in any other University.

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L50/88709/2016

This research project has been submitted for examination with my approval as the University supervisor.

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DEDICATION

This research project is dedicated to my mum, Priscilla Mahinda, my sister Leah Mumbi, my husband Martin Muthui, my son Israel Mwangi and my daughter Martha Mbuki who recognized that the time devoted and missing from them was worthwhile.

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ABBREVIATIONS AND ACRONYMS

GOK	Government of Kenya
BOM	Board of Management
KIE	Kenya Institute of Education
ICT	Information and Communication Technologies.
NI3C	National ICT Integration and Innovation Centre
OECD	Organization for Economic Co-operation and Development
MKO	More Knowledgeable Other
ZPD	Zone of Proximal Development
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immune Deficiency Syndrome
MoE	Ministry of Education
KICD	Kenya Institute of Curriculum Development
MS	Microsoft
KLB	Kenya Literature Bureau
JKUAT	Jomo Kenyatta University of Agriculture and Technology
LAN	Local Area Network
3D	Three Dimensional representation of geometric data

ABSTRACT

The purpose of this study was to evaluate the factors that influence public primary schools' implementation of digital literacy program in Nakuru North Sub County, Nakuru County, Kenya. Chapter one of the study gave a comprehensive background of European countries (Canada, US, Denmark, Finland, Portugal, Sweden, Australia and Ireland) as countries that have integrated information and communication technologies into schools and have increased practice-based teaching in schools. The study also cited major impediment to using ICT in Africa to enhance teaching and learning. These include lack of qualified teachers, poverty, lack of funding for teachers' salaries, the exponential rise in student population in the last two decades and increasing numbers of teachers becoming afflicted by HIV/AIDS. A background on East African countries was presented with a focus on Tanzania where a curriculum for the teaching of ICT as a discrete subject in primary schools exists unlike in Kenya and Uganda. Implementation of ICT policies in schools was cited as a cause for concern. The chapter also gave a detailed statement of the problem with respect to objectives of the study which were school policy on ICT use, school leadership, teachers' competence and infrastructure that were identified. It also outlined the research questions the study sought to answer. The significance of the study to the school managers, the government officials in ministry of Education and donors regarding ICT was highlighted. Basic assumptions of the study were stated. Limitations of the study under survey research design were examined. The scope of the study was examined under delimitations of the study. Chapter two gave a review of related literature based on themes developed from objectives and that captured factual information on adoption and use of digital technologies. The theory used in the study was the Social Development Theory (1962) by Lev Vygotsky. The chapter reviewed a knowledge gap which the research study sought to fill. The chapter ended with a summary of literature review. Chapter three was concerned with the methodology that was used in the study. This chapter described a target population of 88 respondents in Nakuru North Sub County, Nakuru County. A sample size of 20 schools was sampled from a target population of 44 public primary schools in Nakuru North Sub County. Stratified random sampling was used to categorize schools in zones in Nakuru North Sub County. Simple random sampling was used to select schools from each stratum hence 10 public primary schools were selected from Bahati zone, 6 schools from Dundori zone and 4 schools were selected from Solai zone respectively. A total of 40 respondents were sampled. Data was collected by use of interview schedules directed to School Head teachers and questionnaires to ICT/curriculum teachers. Validity of the questionnaires was ensured through judgment of experts, asking a series of questions, and looking for the answers in the research of others. Validity was also ascertained by ensuring the sampling techniques were free from bias by giving each subject an equal opportunity to score, comprehensive questionnaires that covered all the variables being measured and comparison between the conceptual frame work (researcher's variables) and theoretical framework (what has been said by others). Reliability was established through test and re-tests method during pilot study. Data analysis used both inferential and descriptive statistical techniques. The data in the filled up questionnaires was checked for errors, coded and analyzed using descriptive statistical techniques. Statistical Package for Social Sciences (SPSS) for Windows was used for data analysis. The results were presented in tables supported by some discussions. Research findings on use of school policy on ICT use included written statements, regular discussions with teachers and programs to promote cooperation and collaboration among teachers and students. School leaders believed that computers should be used by students to do exercises and to develop their thinking skills. Schools were not adequately equipped with infrastructure. They lacked connectivity to networks. Many Conclusions, recommendations and suggestions for further research have been made.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Fast development and variances in technology in the twenty first century has ushered remarkable changes in daily life as well as in the education system. This has necessitated the need to teach students the skills they require in this century. Academic institutions have hence been challenged to restructure their curriculum so as to close the technology gap in teaching and learning.

During 1980s and 1990s, European countries such as U.S.A and Canada pioneered the concept of shared computer access in public regions with an aim of making technology affordable and accessible to the local communities. These tele centers began globally and were funded by development agencies (Fillip & Foote, 2007). Tele centers were started in public schools, libraries and hospitals in the rural areas. They housed few computers with an internet link and skilled persons who trained people on how to use computers. This public accessibility to computers and the internet was to ensure that local communities could not only afford technology but also access it. According to OECD (2016), Denmark, Portugal, Finland and Sweden are examples of countries that have adopted and integrated digital technologies in schools, have increased practice-based teaching and are using mobile-based technologies such as portable devices in their classes. These include collaborative devices that are electronic which are becoming more popular. Thus computer laboratories are being abandoned. Hennessy, Harrison & Wamakote (2010).

A survey of eighteen schools in Hong Kong conducted by Yuen, Law & Chan in 2003 showed that for high levels of integration of digital technologies in schools, the school principal is the key agent of change. He or she should lead by vision and involve and develop staff. Effective adoption and integration of ICT is influenced by various levels of leadership such as technology leadership, managerial leadership and principal. (Anderson & Dexter, 2005).

Peralta & Costa (2007) carried out a survey investigation in Italy on confidence as well as competence relating to teachers concerning implementation of technology in learning. In their view, tutors who are technically competent are more confident to use computers effectively.

Many countries in Africa have made it a priority to first develop ICT policies. Nevertheless, different countries have different abilities to implement. (Farrell & Isaacs 2007). Farrell & Isaacs 2007 report that among the countries that are stabilizing in their economies are Ghana, Botswana, Cameroon and Mauritius. These countries are prioritizing applications of ICT. However, many countries in Africa continue to face a great hindrance to exploiting technology. One of the major reasons being the lack of qualified personnel. This is further worsened by

increase in poverty levels, inadequate incentives given to teachers, the rapid growth in the number of learners in the previous twenty years and the growing data of teachers who are infected by HIV/AIDS. According to Afe, 2002 and Olakulehin, 2007, addressing the dire requirement for additional competent educators is one of the greatest challenges that face the education system in Africa and in particular, the incorporation of technologies. It is required that accessible technologies are inexpensive to learning institutions so that they can be incorporated. Nationally, elevated costs associated with installing infrastructure limit accessibility, This is further associated with poverty issues At the individual or organizational level, expensive hardware and software as well as high costs of communication and services restrict access to ICT. Most schools in Africa do not have the means to purchase expensive computers and hardware, and provide training for their staff.

Ryckeghem (1995) highlighted the need of appreciating the native culture in selecting suitable technology mainly where many Africans prefer to look up to contemporaries or allies instead of visiting a library to search for information. Social factors such as religious belief, ethnicity, level of education, physical movement and social customs remain possible obstructions to access and utilize technologies. Furthermore, these factors are reflected in African countries in Sub Sahara by Mutula (2004) and in other perspectives by many scholars of the digital gap (such as Becta 2001and Kozma et al. 2004). In a conversation on accessing technology in the Africa, Osborn (2006) introduced aspect of language. The prevailing technology language is English and those without understanding of it are sidelined.

Tella, Tella, Toyobo, Adika & Adeyinka (2007) studied secondary schools in Nigeria on uses of technologies by teachers' and inferences for more progress of technology use in schools. The findings showed that majority of the teachers had a perception that technology is not only useful but also enhances learning. A recommendation was suggested that competence policies should support teaching models that are incorporated using technology, particularly those that encourage collaboration amongst learners and tutors during learning. In addition, it is important to focus on the pedagogy that influences technology use for teaching and learning.

Assimilating technology in learning institutions in East Africa is a process that has been slow over the years (Liverpool, 2002). However, the condition has improved recently. Learning institutions are progressively being provided with computers for learning and management tasks. Networking is getting better and students are full of enthusiasm to use computers to aid learning, in spite of inadequate infrastructure. Investigations have illustrated that even though policies on how technologies are used are certainly broad, written statements of purpose, their execution remain a reason for worry.

In East Africa, Tanzania is the only country that teaches technology as a separate subject in public primary schools. Aspects that influence assimilation of technology in this country is

available software which is in Kiswahili. At present, the subject taught in a few schools that are situated at district headquarters with technology facilities. In contrast, technology is a discrete subject taught in Kenya and Uganda secondary schools and is tested.

Since learners in schools select different subject of their choice, their access levels vary with regards to subjects chosen. For instance, in Kenya and Uganda, learners who take computer studies as a subject access computers to a great extent. Institutions with virtual learning environments also enjoy accessing computers to a great extent. This is inclusive of those learning institutions which have computer clubs and science clubs (Ndidde, Lubega, Babikwa & Baguma, 2009). Hence, schools together with students differently access technology facilities. This was confirmed in a research study done by Ndidde et al. (2009) who revealed that learners differed in their uses of technology due to varying computer access, regulations of an institution and different competence in technological skills. Influenced by schools, training given by teachers, grade of learner, whether or not the learner was part of a computer club, different learners used computers differently. These determine how successful technology is assimilated in the curriculum.

Implementation of ICT in public primary schools in Kenya is a modern occurrence, done in small magnitudes and investigational. Nevertheless, it has been commonly recognized that application of technology in schools has advanced in a closely similar manner, ranging from developing policies, achieving elementary computer expertise, teaching and learning using computer, exchanging information and enquiry, to application in each subject. The GOK acknowledges that if technology is integrated in primary schools, then knowledge will be constructed, information will be shared and communicated across school communities. This opinion originates from claims in several studies on the significance of technology in schools (Manduku, Kosgey, &sang, 2012,). The GOK through sessional study no. 1 of 2005 observed that technology has a straightforward part to play in schools and if put into proper use, it can advantage schools as well as communities. It was also observes that technology will offer novel innovations for learning by enabling communication and collaboration between teachers and learners. (GOK, 2005). Since then, the GOK developed a nationwide policy on technology in education in the year 2006 whose vision was “A prosperous ICT-driven Kenya society” and whose mission was “To improve the livelihood of Kenyans by ensuring the availability of efficient, accessible, reliable and affordable ICT services” (GOK, 2007). Highlights in the policy were that the GOK will inspire schools to assimilate and apply technology so as to enhance the quality of learning.

Most schools have not yet applied school policies on usage of technology mainly due to inadequate infrastructure, have school leaders and teachers’ who lack technology know how in as much as the modern worldwide technology puts emphasis on digitizing learning institutions. In

spite of obvious paybacks of using technology in schools, studies have shown that many schools have not yet implemented it, thereby preventing the school community and the learners from exploiting technology possibilities (Manduku et al, 2012).Thus, following this context, the title is conceived.

1.2 Statement of the problem

Slow adoption of technologies in public primary schools was as a result of absence of creativity by institution leaders and teachers Foray & Raffo (2012). Creativity enables an institution to be flexible to changes (Damanpour and Gopalakrishnan, 1998; Hargadon and Sutton, 2000). However, only persons acquainted with expertise are able to create new ideas in society. Nonetheless, teachers were insufficiently skilled to use ICT hence could not use technology to complement their teaching OECD (2016). Technically, teachers were unable to discovering quality digital learning resources and software. Unclear goals in learning and inadequately preparing themselves on how to incorporate digital technology meaningfully into teaching made it hard to construct and spread knowledge. Consequently, teachers were not eager to integrate computers in teaching such as preparing lessons on the computer. This was further worsened by many reasons such as lack of teaching experience with ICT, lack of on-site support when managing learners at the time they are putting computers into use and inadequate teachers of technology to empower learners with skills on using computers. Computers were also not provided to teachers and pupils to put them into use for their own tasks. Likewise, teachers' lacked a period to positively assimilate computers in the syllabus. These slowed down adoption and use of digital literacy.

Many strategies and concepts on invention have, by large, concentrated with commercial area (Lekhi, 2007). This was due to the fact that industries have to introduce new products and/or services to keep up with competition to ensure their subsistence. However, communal public facilities such as those that impart knowledge to learners do not function with competition in markets and do not have similar reasons of inventing as industries do (Lekhi, 2007). Hence there was little focus on innovation of school policies.

School heads did not confirm the security of infrastructures, official policies were implemented and that duties were carried out by skilled staff in technology, teachers' and learners. School heads did not frequently evaluate and monitor school policies on ICT use so as to respond to any significant changes on usage of technologies. The effectiveness of school policies was influenced by good leadership of school heads. However, this leadership was often not demonstrated by school managers.

Schools are led by a school manager or principal. However, school principals failed to adapt to new practices and cultures that would promote implementation of digital literacy. School Principals as official managers have a vital role to execute to assist educational revolution

(Schiller, 2003; Gronow, 2007 and Tondeur et al. 2007). A number of surveys exposed that the growth of ICT skills and knowledge among school principals was slow and this might have described the slow assimilation of technologies in learning institutions. This result was unsurprising since numerous studies such as Keiyoro (2011); Afshari et al. (2008) and Bass et al. (2003) reported related findings. School heads did not exhibit technology leadership. Schools were inadequately equipped with infrastructure. School heads lacked expansive application of a variety of aspects of uses of technologies in schools'. Technical aspects of ICT in schools' include infrastructure and user friendly software in providing e-learning, a learning management system, pedagogic tools such as maps and e-labs. Curriculum aspects of ICT use in education include new syllabus and digital learning resources. Managerial aspects comprise of keeping records, handling admissions systems and other formalities and new pedagogies such as personalizing of learning. Accounting aspects of technology use in education include bookkeeping and financial analysis. Interactive aspects include online communication with teachers, parents, education authorities and learners. Few studies had researched the impact of school ICT infrastructure that could influence adopting technology in classrooms Vanderlinde R. (2011) hence the need for more academic research on the influence of infrastructure in digital literacy.

1.3 Purpose of the study

This study sought to investigate factors that influenced preparedness of public primary schools' in implementing digital literacy in Nakuru North District, Nakuru County, Kenya. Reason as to why the study was conducted was because research had repeatedly reported disappointing results when it came to how schools took up and integrated digital technologies. Schools were unique, possessed context-bound challenges that required locally developed practical solutions.

1.4 Research objectives

The study was guided by the following objectives;

1. To determine the extent to which school policy on use of Information and Communication Technology influenced implementation of digital literacy.
2. To assess the influence of school leadership in implementation of digital literacy.
3. To establish how teachers' competence influenced implementation of digital literacy.
4. To examine how infrastructure influenced implementation of digital literacy.

1.5 Research questions

The study sought to answer the following research questions;

1. To what extent did school policy on use of Information and Communication Technology influence implementation of digital literacy?
2. What influence did school leadership have on implementation of digital literacy?
3. What level of teachers' competence influenced implementation of digital literacy?
4. How did infrastructure influence implementation of digital literacy?

Hypotheses

H0: School policy on use of Information and Communication technology has no influence on implementation of digital literacy.

HI: School leadership has influence on implementation of digital literacy.

H2: Teachers' competence has influence on implementation of digital literacy.

H3: Infrastructure has influence on implementation of digital literacy.

1.6 Significance of the study

The findings of the study were expected to provide an outline and procedure which were to help school leaders to implement digital literacy in schools. The policy makers in the MoE will use the findings to formulate policies that would help GOK to be a technology- conforming nation by year 2030, through adequate distribution of resources. These findings will be helpful to investors (Ministry of Education, British Council, Microsoft, Kenya Institute of Curriculum Development, Intel, Kenya Literature Bureau, Technology Partners, Jomo Kenyatta University of Agriculture and Technology and UNESCO) in identifying the critical areas concerning technologies. The findings of the study were anticipated to expose extra studies to researchers in academic field, public and private universities and generally, the community would profit from an information-based society. This study is also significant since it contributes to the body of knowledge as it will be used by other researchers for reference on findings.

1.7 Limitations of the study

The quality of information that was secured under survey research approach in this study was greatly determined by the support of respondents. Nevertheless, respondents in this study were issued with a comprehensive introductory letter. This letter clarified to the respondents to give information to be utilized for the purpose of the research.

Research instruments used for data collection were questionnaires and interview schedules which were personally administered to the respondents. The information that was given by the respondents was verified by records from offices of MoE within the region of study. This was to ensure the researcher was not misled.

The study employed a case study of Nakuru North District in Nakuru County, the results presented limited generalizations to make inferences to all public primary schools' in Kenya due to different population features. However, in-depth data was obtained by use of questionnaires and interview schedules that enabled a broad description of the phenomenon under the research study.

1.8 Delimitations of the study

The study focused on investigating factors that influenced public primary schools' preparedness in implementing digital literacy in Nakuru North District, Nakuru County. The choice and justification of Nakuru North Sub County was due to the fact that not much had been researched regarding the researcher's variables in relation to implementation of digital literacy. These variables were school policy, school leadership, teachers' competence and infrastructure. The research was concerned with opinions of school heads, and a teacher in charge of technology. The results of the research anticipated toward reproducing what was happening in all Public Primary Schools' in Kenya as they operate within the same guidelines laid down by Ministry of Education.

1.9 Basic Assumptions of the study

An assumption was that respondents would openly answer questions and honest manner, and that respondents would have an interest digital literacy hence would answer the research questions which were confirmed from response rate. Implementation of digital literacy was assumed to mean adoption and integration of digital technologies in teaching and learning. Pilot study ensured the questionnaires were pre tested so that the questions were phrased well, were well arranged, understood and adequate instructions placed alongside the questions so that respondents respond appropriately to questions in the questionnaire.

1.10 Definitions of significant terms as used in the study

School Policy on ICT use :Existing strategy regarding use of ICT in school

School leadership :Support given to teachers by school principals

Teachers' Competence :Teachers' knowledge, expertise and other teacher characteristics such as attitudes and beliefs

Infrastructure	:Computer hardware and software, internet access, open source software and broadband connections
Digital literacy	:Knowledge, skills and confidence to use digital technology
Digital Learning Resources	:Graphics/images, audio and video materials used for learning
East Africa	:Kenya, Tanzania and Uganda
Digital literacy	:Teaching and learning using computers
Digital technologies	:Electronic devices that process and store binary bits such as personal computers, calculators, cellular phones
Innovation	:Improvement of ideas, knowledge and practices on a process, product, or organization
Public Schools'	:State-funded schools
School Profile	: Structure and culture of a school.
Telecentre	: A public place where people can develop digital skills and access digital technologies for information gathering and communication

1.11 Organization of the study

Chapter one of this study is composed of background of the study, statement of the problem, purpose of the study, objectives of the study and research questions which guided the study. This chapter further highlights the importance of the study, shortcomings of the study and its scope, basic assumptions of the study and definition of significant terms as used in the study. Chapter two presents a thematic review of literature from objectives that capture facts on adoption of technologies in schools'. This chapter also discusses findings of other researchers and knowledge gaps the study aimed to fill. Chapter two terminates with a theoretical and conceptual framework. Chapter three describes the methodology that was used in the survey. It captures the research design, target population, sampling techniques, and methods of collecting data including their administration, validity and reliability. This chapter ends with ethical considerations during the study. Chapter four focuses on data presentation, analysis, interpretation and discussion. Data collected from the field was presented, analyzed, interpreted and discussed according to the research objectives. Chapter five summarizes findings, concludes, and gives recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter contains review of related literature based on themes developed from objectives that captured facts on adoption of technologies in schools' in association with school policy on ICT use, school leadership, teachers' competence, and infrastructure.

2.2 Adoption of technologies in schools' in association with school policy on ICT

At first, educational policies for digital literacy focused on the development of Information, Communication and Technology (ICT) infrastructure but lessened the need to train and motivate teachers into effectively putting their skills with digital technologies into use while teaching and learning. However, at the end of the twentieth century, digital technologies were being utilized in most of the European countries including America for teaching and learning, assessment, management and communication in schools (UNESCO 2011)

It was not until the twenty first century that differences between ideas and beliefs on the possible value of digital technologies in schools emerged Tondeur, van Braak and Valcke's (2007). In an observational research of elementary school teachers that was conducted in Flanders (Belgium) by Tondeur et al, findings of the study showed that teachers did not integrate their digital skills during teaching and learning but rather presented a great interest in their personal technical development skills. This presented a difference between a proposed curriculum for digital technologies and an implemented curriculum for digital technologies.

Many authors have suggested ways to close this gap. First, Tondeur et al. suggested a school based curriculum intended for technologies to be part of the general school policy. This school based curriculum would convert the national curriculum into a plan for technologies in schools. Secondly, based on an interview schedule, Schibeci, MacCallum, Cumming-Potvin, Durrant, Kissane and Miller (2008) suggest that practices and policies on integration of digital technologies in schools should take into account the social, cultural and historical points of view of learning especially when teachers attempt to acquaint themselves with skills on digital technologies for the purpose of teaching. Thus teachers need to be provided with pre-packaged educational content and trained so as to acquire skills that will enable them to create locally relevant content since different cultures have different needs for digital literacy.

Finally, Sutherland, Armstrong, Barnes, Brawn, Breeze, Gall, Matthewman, Olivero, Taylor, Triggs, Wishart and John (2004) based their research study on video and interview data and proposed another way to close the gap. They suggest teachers and policy makers in education

should treat digital technologies not as inventions free of troubles that 'replace' former technologies but should treat them as inventions that complement former and current technologies. Thus policy makers should regularly monitor school practices so as to improve digital literacy in schools and narrow the digital divide.

2.3 Adoption of technologies in schools' in association with school leadership.

There was need for school principals to recognize the developments they wanted alongside with the infrastructure and processes to be utilized. A research conducted by Tondeur, Devos, van Houtte, van Braak and Valcke (2009) highlighted adoption of technologies in elementary schools'. Numerical data by Tondeur et al. disclosed the way that adoption of technologies had a positive association to a school profile that had a flatter structure Findings drawn were that school profile served to generally motivate amendments in education, and particularly digital technologies. In a similar manner, when framing the adoption of technologies with a perspective to manage change in schools, and developing large scale survey data, Wong and Li (2008) stated that student learning towards knowledge construction were pedagogically and organizationally intervened.

Tondeur, Valcke and van Braak (2009) conducted a survey study and argued that both teacher and school features was of help in developing the process of adoption of digital technologies. According to Tondeur et al., school related actions were critical. They claimed that such actions were related to school features which then affected practices. For example, the development of vision and mission statements, school-based in-service training and questions on computer access in classrooms. Vanderlinde and van Braak (2010) referred to this as the e-capability of a school which is understood as the ability of a school to build and enhance viable situations at school and teacher levels so as to bring about effective change through digital technologies. Tearle (2004) conducted a case study whose outcomes stressed that change offered opportunities for positive learning. She claims that though this consumes time, it also creates demands on people. Such demands include collaboration and frequent reassessments of work practices. This in turn helps the school as an organization to remain open to change opportunities with respect to adopting technologies. Similarly, Van Merrienboer and Brand-Gruwel (2005) claimed that digital technologies structured differently tasks and contents of learning. In an explorative study of school leaders and leadership by Williams (2008), he stressed the role of school leaders especially at a time of rapid growth of ICT technologies and argued that intensively using digital technologies often created a difference between the institutional culture of schools and a digitally supported youth culture Williams made the point that school leaders play an important role in closing this gap and that this change would be one of the greatest challenges facing today's school leaders. The informal use of digital technologies widened this gap

Hayes (2006) conducted case study of adoption of digital technologies in public schools in

Australia, over a period of time particularly focusing on school heads and their difficulties when guiding methods of adopting technologies. She drew two major conclusions. First, that it was of utmost importance of school heads to build on skills of a new knowledge worker. Two main conclusions were drawn, the first being that school leaders needed to improve the skills of a so-called new knowledge worker. Secondly, she concluded that naturally, schools are heterogeneous hence factors should be considered that take into account their exceptional contexts in delivering particular solutions.

Finally, societal expectations challenge school heads regarding how technology should be used. In a qualitative survey by McGarr and Kearney (2009), an investigation into the outcome of ICT technology on the role of school heads described discouragement amongst school heads, many who were not able to attain expected amount of ICT technology usage in their schools. Regarding the researchers, this was due to deficiency in current resources, poor provision of support in technology and insufficient time to provide resources.

2.4 Adoption of technologies in schools' in association with teachers' competence.

Tutors have a key role in how digital technologies are adopted and used. Teachers' motives, beliefs, confidence and competence influence adoption and integration of digital technologies. These further relate to teachers' use of digital technologies in specific school subjects, as well as in the development of academic abilities, philosophies, visions and opinions that influence the adoption and use of digital technologies in schools.

Many studies indicate that teachers' have a major responsibility in the manner of adopting technologies and in creating innovative customs extended by ICT technologies. In a qualitative study done by Ferdig (2006), he concluded that teachers could advance their teaching standard by using ICT technologies in subject. This differs with the opinion that ICT technology on its own can assure good learning effects. Sipilä (2010) also argues that adopting ICT technology in school was enabled by attitude, confidence and competence of teachers' alongside infrastructure and school environments. Sipila found that if teachers were given portable devices at work and at home, their technology use would be enriched. In a research study by Ward & Parr (2010) they argued that teachers' with an understanding of using technology were enthusiastic to experiment modern teaching practices (Herrington, Hoban, and Reid, 2009; Haydn & Barton, 2008).

Schibeci, MacCallum, Cumming-Potvin, Durrant, Kissane and Miller (2008) established in a qualitative study the essence of partnerships with fellow tutors and learners to make them conversant with ICT technology.

A quantitative study by Hermans, Tondeur, van Braak and Valcke in 2008, findings revealed that opinions of teachers explain the reason as to why they either resisted or accepted to use technology into use in their classrooms. Bennison and Goos' (2010) conducted a quantitative

study in Australia on integration of ICT technology in arithmetic but reported disappointing results. Loveless (2006) illustrated that teachers did not have enough time to integrate ICT technologies in subjects and lacked access to technology. Haydn and Barton (2008) further illustrated using a descriptive study that lack of time and inadequate infrastructure prevented teachers' competence. Lin (2008) focused on digital technologies as a discreet subject and questioned the way learners were to be taught computer skills and the trainer of these skills. She infers that a teacher who integrates technology in his/her subject should not teach ICT technologies as a discreet subject, rather there ought to be a separate teacher for ICT as a discreet subject

O'Bannon and Judge (2004) argued that there was limited use of computers in learning institutions. They argue that tutors should be motivated, supported and assessed to enhance their competence.

Hammond, Crosson, Fragkouli, Ingram, Johnston-Wilder, Johnston-Wilder, Kingston, Pope and Wray (2009) explain why some trainers excelled in using ICT technologies with respect to regularity in usage, diversity in usage and the attainment of learning goals.

2.5 Adoption of technologies in schools' with reference to infrastructure

Computer systems are ways for learners to implement technologies and this was a way to enhance lively learning (Duin, 1994, p. 89)

Tablets are devices in teaching and learning in classroom contexts hat have an influence. Montrieux H, Vanderlinde R, Schellens T, De Marez (2015). The transition from traditional classroom practices to a formal one makes a learner shift from being viewed as a passive user of information to an active producer of knowledge in a knowledge-based society where teamwork is a feature Figueiredo AD, Afonso AP (2005) and Pelgrum W. Developers of infrastructure have developed new technical tools such as tablets which bring educational reform and which are commonly referred to as iPads and Windows or Android devices, (Falloon G. 2013; Melhuish K. 2010). Clark W, Luckin R. 2013 refers to these devices as small, cellular, portable personal computers with touch screens and supported-up by diverse applications

According to (Linn MC. 1998; Sandholtz JH, Ringstaff C, Dwyer DC. 1997), they claimed that using ICT technology during teaching in classes provides a constructivist style. However, this did not ascertain a rapid change of transformation (Stoddart T, Niederhauser DS. 1993; Van Dusen LM, Worthen BR. 1995). According to Yelland (2006) learning with technology was more than digitizing learning. It was about constructing learning environments that integrate ICT technologies for realistic learning and knowledge construction and dissemination of ideas. In addition, research findings suggested that using tablets appeared to impact on student motivation and supported significant learning experiences. The broad range of

applications, connectedness to the internet and the fast need of communication facilitated teachers' to discover alternate actions such as 3D, multimodal, virtual tours, etc. Additionally, teachers' reported more potentials to distinguish learning more easily and information sharing (Pelgrum W. 2001; Hattie J. 2013; Cumming, Strnadova, & Singh 2014). Cumming, Strnadova, & Singh 2014 claimed that teachers pointed to the possibility of 'real teaching' which encorages students' participation. Heinrich P. (2012) findings concerned teachers' beliefs on tablet use, including use of tablets to take presence registrations and scheduling classes. They also felt that tablets promote differentiated learning. Power is required to run technological devices. However, approximately 70% of countries in Sub Saharan Africa lack reliable, available and affordable access to electric power.

2.6 Advantages of employing digital technologies in schools

Digital technologies impact positively on learning in schools. According to Peeraer & Petergem (2011) digital technologies benefited schools in various ways. For instance, they enhanced learning, improved school management (for example, registering pupils' presence, making timetables, storing records, planning for classes and clerical jobs such as entering minutes of staff meetings, typing exams and writing mails). Digital technologies also improved accountability, efficiency and effectiveness in school activities. Digital technologies enabled presentations to be made and connecting to a global network of computers. Hennessey (2010) warned that installing ICT infrastructure in schools' cannot build learning environment but this was concerned with transforming the culture of classroom teaching in schools'.

2.7 Theoretical Framework

This research was based on the Social-cultural theory of human learning. The proponent of the theory was Lev Vygotsky (1896-1934). The theory was printed in 1962 and is a base for constructivism. This theory states that each task in the child's cultural development appears two times; first, on the societal level, and later, on the personal level. Major philosophies of the theory are the More Knowledgeable Other (MKO) and the Zone of Proximal Development (ZPD). The More Knowledgeable Other is one with additional know-how than the learner in a certain task. The More Knowledgeable Other can be a teacher, an older adult, or peer. However, the More Knowledgeable Other is not required to be a person at all. The More Knowledgeable Other must possess or be programmed with added information on the topic being learned as compared to the learner. This research study sought to answer the research questions by examining preparedness of the more knowledgeable other in influencing implementation of digital literacy. In this case, effective school policies on ICT use, skilled Head teachers and teachers and experienced pupils are the More Knowledgeable Other who determined implementation of digital literacy. The Zone

of Proximal development is the area within the brain where most help or sensitive lessons is issued by the More Knowledgeable Other letting a child to progress skills they would then use by themselves hence increasing advanced mental capabilities. It is within the zone of proximal development that skills of pupils' are developed when the teacher employs collaborative learning.

Lev Vygotsky's Social Development theory has got limitations. First, it is difficult to measure a child's zone of proximal development has this zone has no associated metrics. Secondly, a wide or narrow zone of proximal development can either be desirable or undesirable depending on the context. This theory also generalizes children's zone of proximal development but does not take into consideration the inequalities that are found to exist amongst children. Children come from different cultural backgrounds, have different abilities, are of different ages, are different in gender and religion.

However, this theory is suitable for the study since it emphasizes the role of society in "constructing meaning." Vygotsky stresses that social and cultural background of any individual influences the development of a person and which then influences integration of digital technologies. Personal growth can best be appreciated by referring to the society's cultures within which they are surrounded. Advanced intellectual practices have their origin in societies. Different cultures, races, gender and religions thus are found to reason in different ways.

2.8 Conceptual Framework

The study conceptualized factors that influenced public primary schools' implementation of digital literacy program. These were school policy on ICT use, teachers' competence, school leadership and infrastructure as shown below.

CONCEPTUAL FRAMEWORK

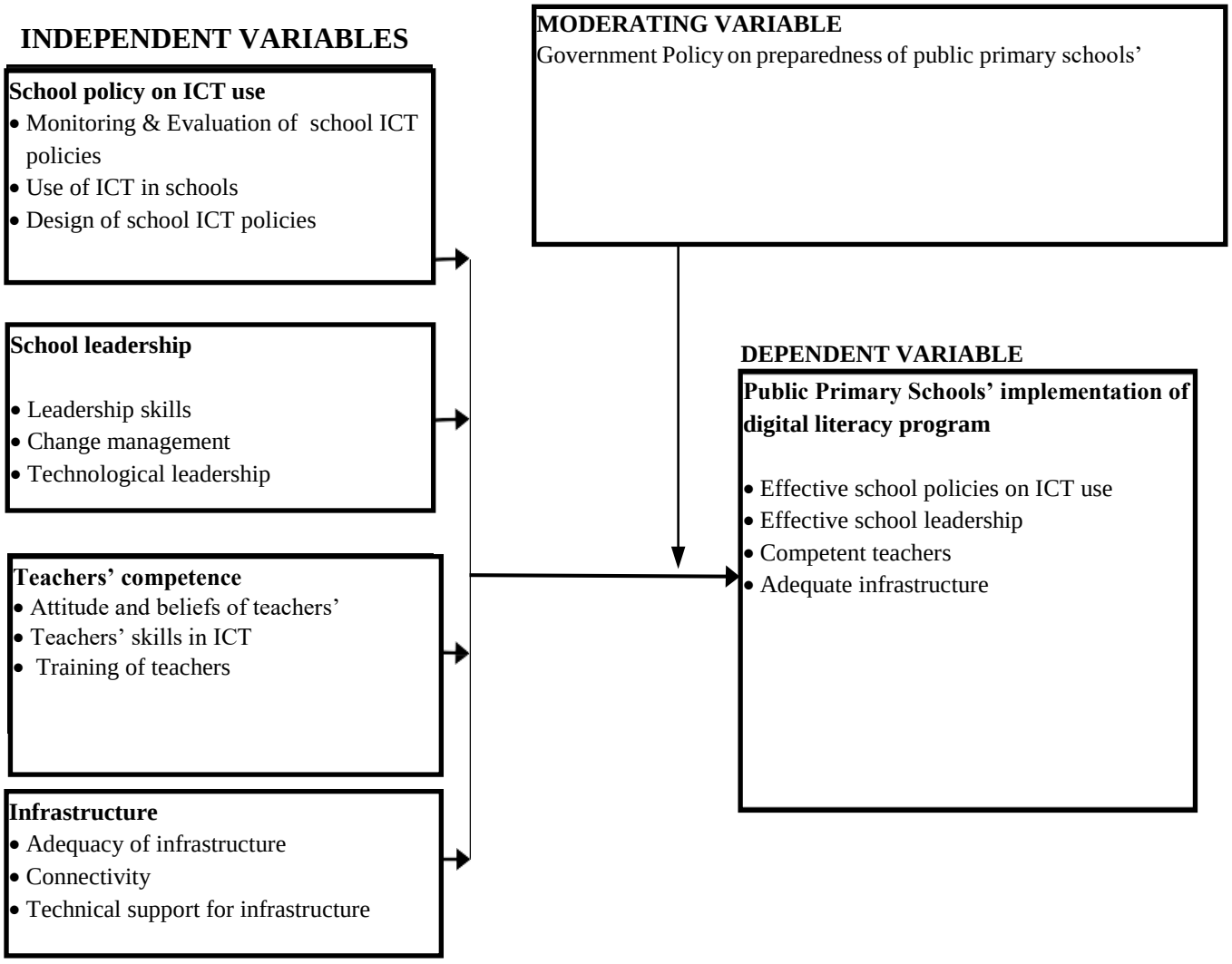

Fig 2.1: Conceptual Framework

Fig 2.1 is a conceptual framework of factors which influence pubic primary schools' implementation of digital literacy program namely: school policy on ICT use, school leadership, teachers' competence and infrastructure that could influence implementation of digital literacy program either positively or negatively.

2.9 Knowledge Gap

The following were the knowledge gaps in the literature review of the study in investigating factors that influenced public primary schools' implementation of digital literacy program.

Heads of schools were viewed as institutional managers. Their main role was to facilitate change in education (Schiller, 2003; Gronow, 2007 and Tondeur et al. 2007). This was especially true in today's decade when Information and Communication Technologies are increasingly being used to learn. Rather than being a study item, presently ICT is a tool to learn. School policies on ICT use need to be well written, refined and reviewed in collaboration with teachers and students for effectiveness. Policies should be clearly written in plain language for easy understanding. Policies should consider wellbeing of students and acceptable use of technology. Issues to be included in the policy are safety of ICT equipment, ICT strategies in schools', systems to monitor and evaluate effectiveness of existing ICT strategies, support for staff to not only build but also expand their knowledge of ICT so as to enhance progress of learner and developing lesson plans which integrate ICT across the curriculum. The policies developed should also include racial, collective and past experiences of learning.

School leadership was important in harmonizing ICT implementation of ICT in school. As strategic leaders of changes in schools, school heads could support the idea of implementing ICT in their school. To achieve this, school leaders need to appreciate that, the idea to implement ICT is not only about ICT use, but is about revolutionizing learning and school management (Laaria, 2012). School heads are seen to be classic examples when it comes to integrating technologies. Thus they are expected to champion implementation of technologies by being zealous and full of enthusiasm (Laaria, 2012). Their concern , supervision about training of teachers and collaborating with other teachers' in making decisions, allocating duties and responsibilities while upholding clear vision of the school is of importance. Nevertheless, they often exhibit little dedication hence obstructing process to implement technology. Laaria, (2012) claimed that school heads acquired required infrastructure but failed to significantly utilize them with their learners thereby lacking vision and understanding to transform schools using technology. School heads were afraid of infrastructure being damaged whilst learning hence this fear reduced possibilities of innovation by teachers' and pupils. Teachers' proficiency in technologies and their training determine employment of technologies in schools. (Hennessy, 2010). If technology met the needs of teachers then it was probable they would apply it in schools. In Africa, teachers are inadequately trained thus impeding process of integrating technology (Dzidonu, 2010)

Several studies have recommended more research to be carried out regarding infrastructure in schools. Infrastructure influences implementation of digital learning in classrooms. (Vanderlinde

R., 2011)

2.10 Summary of Literature Reviewed

This chapter has reviewed literature studies on adoption and use of digital technologies regarding ICT policies in schools, school leadership, teachers' competence and infrastructure. From the review of the literature studies, it has been acknowledged that schools are distinct and face challenges that depend on their environments. These necessitate local solutions when formulating school ICT policies. Intentions of teachers', their opinions and capability influence hands-on use of digital technologies in learning. When technologies are not tied to a certain time or space, teachers' get extra time to evaluate the capabilities of technologies. Consequently, the application of technologies in classes increase. Emphasis has been made to provide laptops to teachers during their spare time to improve their usage of technologies'. Emphasis is further made for policy-makers and school administrators to attend to the culture of schools and their background. School principals should develop statements about the possibility of accessing computers in the classroom. They should frequently monitor and evaluate school policies on ICT use and should develop mission and vision statements that are in line with implementation of digital literacy program. Local ICT-related school conditions such as ICT support and ICT infrastructure are needed. There are various benefits of using technologies in schools. These include making timetables, storing records, clerical work like typing staff meeting minutes, examinations and letters. A knowledge gap has been presented that includes need for the school principal to facilitate educational change since he or she should champion implementation of digital literacy. There is need for collaborative efforts between teachers and students in drafting school policy, and need for teachers to narrow the digital divide between the students.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

The focus of this chapter is on the approach that was applied in the research. A description of target population, procedures for sampling and instruments used to collect data is given. The chapter also discusses piloting of the research study, validity and reliability of research instruments, procedures for collecting data, techniques used to analyze and ethical considerations during the study.

3.2 Research Design

This study took on a descriptive survey research design that was used to evaluate factors that influenced public primary schools' preparedness in implementing digital literacy in Nakuru North Sub County, Nakuru County. Descriptive case studies describes a phenomenon in its normal ambit, the goal being to answer 'how', 'who', 'what', 'when' and 'where 'questions, (Yin, 2003). Descriptive research was used to acquire information by testing hypothesis or answering questions that concern the present state of occurrences and to describe "what exists" with regards to a situation. Nonetheless, descriptive research could not convincingly ascertain answers as to why. This design was therefore suitable for the study since it sought to evaluate factors that influence public primary schools' preparedness in implementation of digital literacy. The choice of the study was established on limitations of resources. A case study carries out an investigation of current occurrence and where there exists little knowledge on a phenomena.

3.3 Target Population

Orodho (2008) stated that specifying a population to address an enquiry affects a researcher's decisions on resources and samples. The target audience entailed all public primary schools in Nakuru North Sub-County, Nakuru County. The County had forty four (44) public primary schools. In these schools there were forty four Head teachers and forty four ICT/curriculum teachers, who made a target audience of eighty eight (88).

3.4 Sample size and Sample Selection

Mugenda (2003) made an observation that researchers' chose a representation of a population due to different limitations that prevent investigating the entire population. First, stratified random sampling method was used to select schools from each sub group (zone). Simple random sampling method was then used to select schools from various strata (zone). One head teacher and one ICT curriculum teacher were sampled in each school. A total of 40 respondents were sampled using the formula:

$$School\ sample\ size = \frac{Number\ of\ schools\ in\ the\ County \times 30}{100}$$

Respondents Number = sample size× 2

= 20 × 2

= 40

Public primary schools in Nakuru North Sub County are categorized in 3 zones namely Bahati, Dundori and Solai zones each having 21, 14 and 8 public primary schools respectively. Thus from each zone the numbers of public primary schools selected were 10, 6 and 4 respectively using the formula:

Bahati zone= (21/44)*20= 10 schools

Dundori zone= (14/44)*20= 6 schools

Solai zone = (8/44)*20= 4 schools

3.5 Research Instruments

Questionnaires consisting of closed and open ended questions were used to collect primary data from ICT/curriculum teachers and Head teachers'. Open ended questions provided comprehensive information of a phenomenon while closed ended questions provided structured responses which were tabulated and analyzed. Observations were made by the researcher during lesson activities. The researcher personally delivered the research instrument to the respondents and picked them as soon as they were filled. This method of administration ensured 100% response rate hence considered appropriate for the study. The study instruments were written in English and translated to Kiswahili where necessary. Pretesting of questionnaires was done in a pilot study using a representative small of research respondents before they were used in the actual study.

3.5.1 Piloting of the study

Pretesting of research instruments was done in a trial study to test the research instruments. 4 public primary schools in Nakuru West Sub County were used to pilot the study instruments and were excluded from the main study. The researcher randomly administered questionnaires to 8 respondents and immediately picked the filled up questionnaires to ensure 100% questionnaire return rate. Piloting of the study instruments ensured that the study instruments were capable of giving expected results and test whether the study instruments are faulty. The results of pilot study helped to identify necessary changes such as reframing ambiguous question that improved the instruments prior to their administration. The questionnaires were comprehensive to cover all the concepts being measured. Corrections were made and were not recurred in the main study.

3.5.2 Validity of the study instruments

This is the extent to which an instrument weighs what it is expected to weigh (Mugenda, 2003). Validity was ensured through judgment of experts. According to Orodho (2008), researchers generally determine validity by asking a series of queries, and often look for the solutions in the study of other researchers. Each subject was given an equal chance to answer questions to ensure validity. Validity was also ensured by using stratified random sampling and simple random sampling techniques that were not biased. Questionnaires were complete with the concepts being measured.

3.5.3 Reliability of the study instruments

Reliability is the extent to which a research instrument produces consistent results or data after repeated trials. Reliability of the research instrument was measured using a pilot study. A reliability coefficient was then calculated using Pearson Product Moment Correlation Coefficient formula using SPSS in order to indicate the strength and direction of relationships between the independent and dependent variables. Two variables are correlated if a variation in one variable produces a variation in another variable. The scores obtained by similar persons on the two administrations of the same test were correlated. The coefficient value could range between $-1.00 \leq r \leq +1.00$. A zero coefficient value indicated no correlation between the variables and hence no reliability. Fraenkel & Wallen (2000) claim that the instrument will be considered reliable if the results produced a reliability coefficient >=0.7

3.6 Data Collection Procedure

A research permit and a letter of authorization was issued by National Commission for Science, Technology and Innovation (NACOSTI) to collect data from respondents in Nakuru North Sub County. The permit was submitted to the County Commissioner Nakuru County and County Director of Education (Nakuru County).The researcher personally delivered questionnaires and immediately picked the filled up questionnaires to ensure 100% return rate. Confidentiality was guaranteed.

3.7 Data Analysis Techniques

Data analysis is the way accumulated data is processed, edited and reduced to a convenient size so as to summarize information, look for patterns and apply statistical techniques (Cooper and Schindler, 2007). Data collected was analyzed using quantitative measurements. Excel software was used to transform the variables into a format suitable for analysis. Data statistical package for social sciences (SPSS) analyzed the data. Percentages and frequencies were attained. Information was tabulated and discussed.

3.8 Operationalization of Variables

This is the reduction of research constructs into observable behavior or traits so as to measure them. (Sekaran, 2000). This involved defining variables in terms of measurable indicators with associated measures and measurement scale.

Table 3.1: Operationalization of Variables

Objectives	Independent Variables	Indicator	Measurement	Measurement Scale
To determine to what extent school policy on use of Information and Communication Technology influences implementation of digital literacy.	School policy on ICT use	• Monitoring & Evaluation of school policies	• Time to monitor and evaluate policy.	-Interval scale
		• Official policy on innovation of teaching methods	• Existence of a standard policy about innovation of teaching methods	-Nominal scale
		• Design of school ICT policies	• Collaboration amongst teachers and students in formulating school policies	-Nominal scale
To assess the influence of school leadership in implementation of digital literacy.	School leadership	• Leadership skills • Visionary leadership • Collaboration among teachers and students	• Presence of an ICT coordinator • Presence of ICT Vision & mission statements	-Nominal scale -
To establish the influence of teachers' competence in implementation of digital literacy.	Teachers' competence	• Attitude and beliefs of teachers' • Teachers' competence in ICT • Training of ICT to teachers	• Teaching practices in classrooms • Teacher skills in ICT	-Ratio scale
To determine the extent to which infrastructure influences implementation of digital literacy.	Infrastructure	• Adequacy of infrastructure • Connectivity of infrastructure • Maintenance of infrastructure	• Adequacy of devices in learning • Presence of a school website • Presence of a LAN	Ratio scale
	Dependent Variable			
To assess factors influencing public primary schools' implementation of digital literacy.	Public primary schools' preparedness in implementation of digital	- Adoption and integration of ICT in every subject --Digital competence of pupils		

3.9 Ethical Considerations

Data collection and procedures to be used were preceded by a letter of authorization that was obtained from the University of Nairobi. The respondents were assured that the data given would be treated with utmost confidentiality confidential and would just be used for the research No incentives were issued to respondents. All respondents were treated with respect and courtesy. Participants were not revealed throughout or after the study.

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter comprises of data analysis, presentation and interpretation of the findings in the study relating to factors influencing public primary schools' implementation of digital literacy program: a case of Nakuru North Sub County, Nakuru County- Kenya. It also offers the interpretation of the results obtained from the findings as presented. The findings and interpretation looked at the extent to which school policy on ICT use, school leadership, teachers' competence and infrastructure influence implementation of digital literacy in Nakuru North Sub County, Nakuru County

4.2 Response Rate

The response rate of respondents was 100% since the researcher personally delivered the research instruments to respondents and immediately picked them after they were duly filled. A total of 20 questionnaires and 20 interview schedules conducted were duly filled and returned since all the 40 respondents participated fully in the interviews.

4.3 Demographics of the Respondents

This section presents the findings with common characteristics among the respondents. This includes age, gender, subjects taught, number of years in teaching and how ICT is taught in classes.

4.3.1 Distribution of respondents by Age

The researcher wished to establish the age of respondent. This is important in that it gives the details of the respondents' experience and hence the understanding of the ICT in education. The results were as per the Table 4.1.

Table 4.1: Age of Respondents

Age in years	Frequency	Percent	Cumulative Percentage
Less than 30	2	10	10
30 – 39	14	70	80
40 – 49	4	20	100
Above 50	0	0	100

The finding reveals that 14 respondents (70%) were the majority of the respondents and were aged between 30-39 years which means they had adequate experience with educations sector. This was followed by 4 respondents (20%) who were aged between 40-49 years. 2 of the respondents (10%) were below 30 years of age and none was above the age of 50 years. This implies that on average the respondents had good experience in education issue and implementation factors of digital literacy.

4.3.2 Distribution of respondents by Gender

The findings of the study showed that 14 of the respondents (70%) were males while 6 respondents (30%) were females. Thus this indicates that in education sector there are more male teachers than females as presented by Table 4.2.

Table 4.2: Gender of Respondents

Gender	Frequency	Percent
Male	14	70%
Female	6	30%
Total	**20**	**100%**

4.3.3 Distribution of respondents by subjects taught

The research sought to find out the subjects that the respondents taught in their respective schools. The aim was to find out whether there were those trained to specialize in ICT subject in the schools. The results are as indicated by Table 4.3.

Table 4.3: Subjects taught by respondents

Subjects taught by respondents	Frequency	Percent
Mathematic	4	20
English	6	30
Science	6	30
Social/Religious Studies	2	10
Kiswahili	2	10
Other	0	0

The findings of the study as presented by Table 4.3 show that there is no specific subject for the ICT teachers. Majority of the respondents taught English and Sciences as indicated by 30% for each subject. This was also followed by 20% teaching mathematics, 10% taught Kiswahili. 10% also taught social and religious studies.

4.3.4 Distribution of respondents by number of years taught

This question was significant because it helped to investigate the level of experience that the respondents had in their subject areas. The results were as indicated in Table 4.4 which shows the number of years taught by the respondents.

Table 4.4: Number of years taught by respondents

Years taught	Frequency	Percent
Less than 1	0	0
1-3	0	0
4-10	10	50
11-20	10	50
21-30	0	0
More than 30	0	0
Total	**20**	**100**

The findings presented by Table 4.4 show that 10 respondents (50%) have been teaching for 4-10 years and 11-20 years respectively. This is important for this study because it implies that the respondents had adequate experience with regard to education matters hence could provide relevant information that could help this study on its findings.

4.4 School policy on ICT use and implementation of digital literacy

The first objective of the study was to determine the extent to which school policy on use of Information Communication and Technology influences implementation of digital literacy. Respondents were asked about the existing strategies in their schools regarding use of ICT in teaching and learning. The findings are as indicated in Table 4.5.

Table 4.5 Existing strategy in schools

Existing strategy in school	Yes	No	Total
A school's own written statement on use of ICT	8	12	20
A policy/action to use ICT for teaching and learning in specific subjects	11	9	20
Regular discussions with teachers about use of ICT for pedagogical purposes	12	8	20
A specific policy/program to prepare students for responsible internet behaviour	13	7	20
A policy to promote cooperation and collaboration among teachers' and students	8	12	20
Scheduled time for teachers' to meet to share, monitor and evaluate or develop instructional materials and approaches	17	3`	20
An official policy statement about innovation within the school in teaching and learning methods	11	9	20

The results indicated that 8 schools had their own written statement about the use of ICT in their schools while 12 schools had none. This finding is important since a school's own written statement on how ICT should be used implies that the national curriculum for ICT is converted into a school-based curriculum which is necessary for implementation of digital literacy program. 11 schools had a policy to use ICT for teaching and learning in specific subjects while 9 schools had no such a policy. 12 schools had regular discussion with teaching staff about ICT use for pedagogical purposes. This is important since ICT has a rapid dynamic nature and this enables teachers to be updated in recent technologies and how to integrate them in teaching and learning.13 schools had programs and policies to prepare students for responsible internet behavior. This preparation is important since without responsible internet behavior, students are likely to get into disruptive websites which will hinder their concentration during implementation of digital literacy program. 8 schools indicated that they had policies that promoted corporation and collaboration among teachers

and students. This is necessary since implementation of the digital literacy program requires a constructivist approach which is boosted when teachers and students collaborate. This enables students to construct or make meaning in this digital era. 17 schools scheduled meetings to share, monitor and evaluate instructional material and approaches. This implies that 3 schools did not follow the monitoring and evaluation exercise as stipulated down by the Kenyan Ministry of Education. 11 schools had official policy statements about innovation in teaching and learning methods within the school. This official policy statement were guidelines laid down by the Ministry of Education in Sessional Paper No.1 of 2005.

4.5 School leadership and implementation of digital literacy

The respondents were asked questions regarding their opinions about the use of ICT in schools. The findings are as indicated in Table 4.6.

Table 4.6 Opinion about use of ICT for educational purposes

Opinion about ICT	Yes	No	Total
Computers and the internet should be used by students to do exercises and practice and to retrieve information.	20	0	20
ICT use in teaching and learning positively impacts on student motivation and develops students thinking skills.	20	0	20
ICT use in teaching and learning is essential to prepare students to live and work in the 21st century.	20	0	20
For ICT to be fully exploited for teaching and learning radical changes in schools are needed	20	0	20

All the respondents believed that computers should be used by the students to do exercises and practice and to retrieve information. The respondents were also asked about how ICT impacted on teaching and learning. Majority of the respondents said that ICT was used to motivate students to learn and to develop students' higher order thinking skills. They were also asked about the importance of ICT in the 21st century and majority cited that ICT was critical to prepare students for their work and life and also be self-reliant. The respondents were also asked about their plans to ensure that ICT is fully exploited in their schools and the majority cited the need for radical changes in schools. These changes include teaching of ICT as a discrete subject first so as to enable pupils acquire knowledge and skills on how to implement digital literacy, building more classrooms to avoid congestion of pupils, regular training for teachers to equip them with knowledge and skills of recent advancements in technology since ICT is rapidly changing. They also said that it was

necessary that teachers use laptops both at home and in school to enhance their skills and provide them with more time to learn on how they could effectively integrate digital technologies in teaching and learning.

School principals were also asked to what use they put computers into in their schools. This is important since school principals are expected to spearhead implementation of the digital literacy program hence their various computer uses is an indicator of their leadership. Table 4.7 illustrates computer use by school heads.

Table 4.7 Computer use by school principals

Use of computer	Yes	No	Total
School management related tasks (budgeting, timetabling,planning, etc)	12	8	20
Searching for information	14	6	20
Making presentation	18	2	20
Communicating online with parents or teachers via email	6	14	20
Communicating by emails with educational authorities	11	9	20
Other computer uses	0	0	0

Most of the respondents said that they used computers for school management related tasks such as budgeting, planning and timetabling. Other uses include searching for information, making presentations and communicating online with educational authorities.

The respondents were asked about who was responsible for procurement of infrastructure in the school. Table 4.8 presents the findings.

Table 4.8 Division of responsibilities regarding ICT decisions

Responsibility	Teachers	School head	Board of Management	Government
Procuring ICT infrastructure	0	0	2	18
Determining course content	4	0	0	16
Deciding about teacher training	0	2	0	18
Choosing learning resources	12	8	0	3

Majority of the respondents cited that the Kenyan government made decisions on procuring of ICT infrastructure. Majority of respondents cited that the decision to determine course content was made also by the government o Kenya. In addition, with regard to teachers' training, the decision was made by the government. Concerning the selection of learning materials, the head teachers and the teachers were all involved in making this decision as indicated by the findings. This implies that head teachers were seen to champion implementation of digital literacy program as indicated by their decisions about ICT.

The respondents were also asked the period in years they have worked as head teachers in their schools or any other school or have been in any other personal capacity in any school. The findings are as shown in Table 4.9.

Table 4.9 Professional Experience of Head teacher

Professional Capacity	Less than 3 years	3-5 years	6-10 years	11-20 years	21 years or more
Head teacher of this school			7		
Head teacher of any other school	2	4			
Any other professional capacity in any other school	2	2		3	

Majority said they had been head teachers of their schools between 6-10 years and 3-5 years.

However, few cited they had been head teachers of other schools for 3-5 years. Few cited they had been deputy head teachers in other schools. This means that the school heads possessed leadership skills which was necessary to implement the digital literacy program.

Finally the respondents were asked whether the schools were connected to any network. Table 4.10 presents the findings.

Table 4.10 Connectivity of schools

Type of connectivity	Yes	No
A school website or homepage	2	18
School email address for teachers	0	0
School email address for students	0	0
Local Area Network	4	16

This question aimed at finding out whether the school was connected to the internet.. The findings indicated that no school had a school email address for their teachers and students to use. 2 schools had their own website or homepage while majority of the schools (18) had none. School heads hence failed to exhibit technology leadership. However, 4 schools had set up a \local area network while 16 schools had no Local area Network.

4.6 Teachers' competence in implementation of digital literacy.

Teachers' use of computers in teaching and learning, their use of computers in the classrooms, equipment accessed during teaching and learning, how often they used computers and/or internet in teaching and learning, teachers' provision of laptops or any other digital equipment for their own use, support given to teachers in terms of training, source of material used in teaching and teachers ICT skills influence implementation of digital literacy.

4.6.1 Distribution of how ICT is taught in schools

This question sought to find out how ICT was taught in the schools. The importance of this is that the manner in which ICT is taught had an impact on preparedness of public primary schools in implementation of digital literacy. Table 4.5 presents the findings.

Table 4.11: Method of teaching ICT in schools

How ICT is taught in schools	Yes (%)	No (%)	Total
ICT is taught as a discreet subject	30.0	70.	100
I integrate ICT in my subject because I decide to do so	70.0	30.0	100
I integrate ICT in my subject because of syllabus requirements	80.0	20.0	100
ICT is integrated in several subjects	90.0	10.0	100

The results on Table 4.11 present the findings on how ICT was taught in schools. The finding that ICT is taught as a discreet subject was denied by 14 respondents (70%) while 6 respondents (30%) agreed that ICT was taught as a separate subject in their schools. This is an important finding which indicates that majority of the schools have not set ICT as a separate subject as an effort to promote digital literacy. Regarding the finding that ICT is integrated in my subject because I decide to do so, 14 respondents (70%) said yes while 6 respondents (30%) said no. This showed that many teachers in these schools chose to integrate ICT subject in their subjects while teaching hence had a positive attitude towards implementation of digital literacy. 16 respondents (80%) were majority of the respondents who said that ICT is integrated in my subjects because of syllabus requirements while only 4 respondents (20%) denied this statement. This is an indication that the curriculum requires that teachers integrate ICT in their subjects which may not be feasible for effective integration of digital literacy due to work burden. 18 respondents (90%) indicated that ICT was integrated in various subjects while only 2 respondents (10%) denied this claims. The research findings therefore imply that the method of teaching ICT in majority of the schools is through integration with other subjects.

4.6.2 Distribution on how computers and/or internet are used in the schools

This finding was important for the study because it showed how teachers utilized computers and/or internet in teaching and learning. The results are as indicated by Table 4.12.

Table 4.12: Computer use in schools

Use of computer	Yes	No	Total
Preparing lessons	70.0%	30.0%	100%
Class teaching in front of /with the pupils	90.0%	10.0%	100%

The findings presented by Table 4.12 indicated that 14 teachers (70%) were the majority of the respondents who accepted that they used computers and/or internet in preparing lessons. In addition, 16 teachers (90%) also accepted that they used computers in class teaching in front of /with the pupils. Therefore, the above finding indicated that computers and/or internet have significant use in the schools.

4.6.3 Frequency of computer use and/or internet are used in classes

This finding aimed at establishing the frequency of use of computers and/or internet in class by the respondents in their schools. The results are as indicated on the Table 4.13.

Table 4.13: Frequency of computer use in classes

How often computes are used in classes	**Frequency**	**Percentage**
Never	0	0
Rarely	2	10
Sometimes	10	50
Often	6	30
All the time	2	10
Total	**20**	**100**

The results on the table 4.13 indicates that the majority of the respondents 50% used the computers and internet in their classes sometimes while only 30% of the respondents used these ICT appliances often. In addition, 10% of the respondents indicated that they use the computers and internet in the class all the time while another 10% of the respondents rarely used them. This implies that the use of computers and internet in the majority of the class is as a result of varying levels of digital skills rather than a cause.

4.6.4 Provision of laptops or other equipment to teachers for their own use

The importance of this question was to determine whether the teachers were provided by laptops for their own use.by the school so as to enable them to integrate ICT in their classroom. Table 4.14 presents the finding.

Table 4.14: Provision of laptops to teachers for their own use

Response	Frequency	Percentages	Cumulative Percentage
Yes	6	30	30
No	14	70	100

The finding on Table 4.14 indicates that 14 respondents who were the majority of the respondents (70%) denied that teachers were provided with laptops and other digital equipment for their own use by the school. Only 6 respondents (30%) accepted that they were provided by laptops for their own use. This meant that teachers could not fully integrate ICT in their classrooms since the laptops were ted to specific time and place but implementation of digital literacy program requires that teachers are provided by laptops for their own use ad that this should not be tied to any time or place so that they can fully integrate digital technologies while teaching and learning.

4.6.5 Distribution on participation of ICT training for teachers

This question aimed at finding out whether the teachers were compelled to undertake ICT training by the school, which could equip them with skills and knowledge on how to handle ICT teaching in class. The result for this question is as indicated by Table 4.15.

Table 4.15 Participation of ICT training for teachers in schools.

Response	Frequency	Percentages	Cumulative Percentage
Yes	8	40	40
No	12	60	100

Table 4.15 indicates that the teachers in the schools were not compelled to undertake ICT training as indicated by the majority 60% of the respondents who said no as the training was not mandatory for the teachers as compared to 40% who said that it was mandatory for teachers to undergo ICT training.

4.6.6 Person or entity responsible with providing ICT support in schools

This question aimed at finding out who was responsible in providing ICT support for the schools. The results are as indicated by Table 4.16.

Table 4.16: Person or entity responsible with providing ICT support in schools

Support	Frequency	Percentage
A teacher with more experience	12	60%
School technical assistant	6	30%
Other school workers	6	30%
External experts	6	30%
Online helpdesk	0	0%

Table 4.16 indicates that the more experienced teachers were responsible with providing ICT support for the schools. This is indicated by the 60% of the respondents who showed that a more experienced teacher was responsible with providing this support. In other schools as showed by the respondents on the findings is that schools' technical assistant, other workers and experts from outside the school also provided this support as shown by 30% of the respondents for each.

4.6.7 Type of material used in teaching class

This question aimed at finding out type of materials that the teachers used in class when teaching ICT. The results are as indicated by Table 4.17.

Table 4.17: Type of information used in teaching class using a computer or internet

Type of information	Yes	No
Internet researched material	90.0%	10.0%
Existing online information from a reputable source	90.0%	10.0%

The finding on Table 4.17 indicated that the internet researched information and the existing online information from established educational sources were used when teaching ICT in class. This is indicated by the respondents agreeing with 90% for each of them.

4.6.8 Teachers' level of confidence

This aimed at establishing the level of confidence of teachers in using computers. The findings are as shown on Table 4.18.

Table 4.18 Teachers' confidence on use of computers

Computer use	None	A little	Somewhat	A lot
Produce text using word processing program	0.0%	0.0%	10.0%	90.0%
Use emails to communicate with others	0.0%	10.0%	20.0%	70.0%
Create data base	0.0%	0.0%	50.0%	50.0%
Email a file to someone	10.0%	10.0%	10.0%	70.0%
Organize computer file/folder	0.0%	0.0%	20.0%	80.0%
Use spread sheets	0.0%	0.0%	10.0%	90.0%
Create presentation with simple animation	0.0%	10.0%	20.0%	70.0%
Create presentation with video or audio clips	0.0%	30.0%	10.0%	60.0%
Download or upload syllabus resources to websites or learning platforms for students use	0.0%	10.0%	30.0%	60.0%

Table 4.18 indicates that teachers were highly skilled in producing text using the word processing program as shown with 90% of the respondents who indicate a lot. On the use of email to communicate with others, 70% of the respondents said they were confident in using emails. 50 % of the respondents said they were confident in creating database. 80% of the respondents were confident in organizing file or folders in the computers. 10% of the respondents were somewhat

confident in using spreadsheets while 90% were very confident in using the software. 70% of the respondents were confident in creating presentation with simple animation. 60% of the respondents were confident in creating presentations with video or audio clips. 60% of the respondents were confident in downloading/uploading curriculum resources from/to learning platforms for students use.

4.7 Infrastructure and implementation of digital literacy

Due to the overwhelming number of pupils admitted in public primary schools, tablets provided by the government are not enough hence both teachers' and students are not equipped with computers. In an interview schedule held with the school principals, majority said they lacked a local area network in their schools, had no internet, lacked a school website and did not provide email address for teachers in schools. Schools thus lacked infrastructure that could connect them to internet.

4.7.1 Distribution of ICT equipment such as computer or internet during teaching in front of the class

This distribution sought to find out the type of equipment available in the schools when teaching ICT in the lass. The results for this were as an indicated in Table 4.19.

Table 4.19 Availability of ICT equipment during teaching in front of the class

Person equipped with computer	Never	Rarely	Sometimes	Often	All the time
Students are equipped with computers	0.0%	0.0%	70.0%	20.0%	10.0%
Only teachers uses a computer	0.0%	20.0%	30.0%	30.0%	10.0%
Both teachers and students use computers	0.0%	0.0%	50.0%	20.0%	10.0%

The findings show that that majority of the respondents showed that students were sometimes equipped with computers and internet while teaching in front of the class as indicated by 70% of the respondents. Only 20% of the respondents had students often equipped with computers and internet while 10% had this equipment all the time.

On the other hand, the findings indicate that sometimes and often, only the teachers use a computer and internet while teaching ICT in front of the class. This is indicated by the 30% of respondents who indicated sometimes, 30% often, and 20% argued it was rare while 10% indicated that teachers used computers and internet all the time. This implied that ICT classes in most of the schools did not have all the students and the teachers adequately equipped with the computer and internet while teaching in front of the class.

4.8 Correlation Analysis

Pearson Correlation analysis was conducted to determine the nature of the relationship between the dependent implementation of digital literacy and independent variables (school policy, school leadership, teachers' development and infrastructure). This was with the view of answering the research objectives. The correlation analysis was conducted at 95% confidence level and was two-tailed as these factors could affect implementation of digital literacy negatively or positively.

Results in Table 4.20 shows that there was some correlation between the dependent and independent variables. School policy had a good positive linear correlation with implementation of digital literacy with an R-value of 0.656 significant at 95% confidence level (p =0.000). School leadership had a correlation value of 0.775 (p = 0.000). This shows that there is a good linear relationship between school leadership and implementation of digital literacy. Teachers' competence had a correlation value of 0.751 with implementation of digital literacy at 95% confidence level (p=0.000). This depicts that teachers' competence had a good linear relationship with implementation of digital literacy. Finally, infrastructure had a correlation value of 0.666 (p = 0.000). This implied that infrastructure had a significant positive relationship with implementation of digital literacy.

All the four variables were found to be significant at 5% level of significance as their p values were lower than 0.05. School leadership had the highest positive association with implementation of digital literacy, followed by teachers' development, then infrastructure and lastly school policy.

Table 4.20: Correlations

Correlation titles		SP	SL	TC	I	IDL
School policy	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	127				
School leadership	Pearson Correlation	.756**	1			
	Sig. (2-tailed)	.000				
	N	127	127			
Teachers' competence	Pearson Correlation	.603**	.811**	1		
	Sig. (2-tailed)	.000	.000			
	N	127	127	127		
Infrastructure	Pearson Correlation	.518**	.609**	.725**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	127	127	127	127	
Implementation of digital literacy	Pearson Correlation	.656**	.775**	.751**	.666**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	127	127	127	127	127

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

4.5.1 Regression Analysis

A multiple linear regression model was used to determine the relative effects of school policy, school leadership, teachers' competence and infrastructure on implementation of digital literacy. The regression model was as follows:

$Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \beta_4\chi_4 + \varepsilon$

Where β_0 is the constant or intercept, β_1 - β_4 are the regression coefficients (change in Y, given one unit change in χ). Y is the dependent variable (implementation of digital literacy), χ_1 is school leadership, χ_2 is teachers' competence, χ_3 is infrastructure and χ_4 is school policy while ε is the error term.

Table 4.21: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.824[a]	.679	.662	.41073

a. Predictors: (Constant), SP, SL, TD, I

The study used Table 4.21 to establish whether implementation of digital literacy had a linear dependence on the independent variables. The study established a correlation value of 0.824. This depicts a good linear dependence between the variables. An R-square value of 0.679 was established and adjusted to 0.662. The coefficient of determination depicts that school leadership , teachers' development, infrastructure and school policy explains about 67.9 per cent variations in implementation of digital literacy: 32.1 per cent of variations are brought about by factors not captured in the objectives.

CHAPTER FIVE:
SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Chapter five of the study presents the summary of key data findings, discussions drawn from the findings and recommendations made. The conclusions and recommendations focused on addressing the research problem and the objectives to which the study was based.

5.2 Summary of Findings

The study sought to establish factors that influence public primary schools' `implementation of digital literacy: a case of Nakuru North Sub County, Nakuru County- Kenya. Research focused on the influence of school policy on ICT use, school leadership, teachers' competence and infrastructure in implementation of digital literacy in Nakuru North Sub-County, Nakuru County, Kenya. From the findings of the study we could deduce that school polices were collaboratively made with teachers and pupils although some schools employed different strategies regarding their intentions of actions. Some schools had written statements regarding use of ICT while others had regular discussions with the teachers. However, regarding primary teachers, they were not adequately trained on the use of ICT in teaching and learning, basic technical skills and learner training was not adequate. It was established that the existing pedagogy, as well as existing information resources in schools, does not support use of ICT in teaching science subjects effectively. The investigation also found that where teachers have received some training, there was not enough time to implement the skills gained by teachers in the school program because of lack of time. However, it was reported that schools that had integrated ICT in teaching other subjects especially English and Science, learners experienced some problems accessing digital science content in the schools due to lack of good computer network and limited skills. Poor access to information from Internet was noted due to student's lack of ICT skills to do so, poor Internet connectivity and lack of Internet. While multimedia could be used effectively to enhance use of ICT education, most schools did not have the required equipment to use it. Although the cost of computer systems was not a feature of this study, it was observed to be a major factor in utilizing ICT in the schools programs.

5.3 Conclusions

Several conclusions can be drawn from this study. To begin with, the first aim of this study was to investigate the extent to which school policy on use of information and communication technology influenced implementation of digital literacy. The results of this investigation have shown that schools employed different policy strategies when implementing ICT in teaching and

learning in their schools. From the study findings, it was apparent that some schools used their own written statement, others used official policy statements regarding innovation within school in teaching and learning methods. There are those that used programs that promoted corporation and collaboration among the teachers and students. Others scheduled meeting for evaluation, shared and monitored the instructional material and approaches. There are those that had regular discussion with the teaching ICT staff and programs and policies that aimed at preparing the students for responsible internet behavior. The schools also used emails and used electronic registers as indicated by 50% of the respondents.

The second aim of this study was to assess the influence of school leadership in implementation of digital literacy. School leadership is important because it indicates the commitment of the management in the adoption and integration of ICT in teaching and learning in schools. The school heads played an important role in determination of the ICT implementation plan. As indicated using interview schedules with the head teachers in the research, school heads were responsible with determination of learning materials, determined the course content and the teachers training and they also made decision on procurement of infrastructure in the school. This implies that leadership in the school can influence the adoption and implementation of ICT teaching and learning in schools and when the heads of the schools are not ready or are reluctant to implement ICT learning, the students miss out on this important part of modern day education. School leaders need to exhibit visionary leadership by clearly stating mission and vision statements for their schools that are in line with digital literacy.

The third aim of this study was to establish how teachers' competence influenced implementation of digital literacy. Teachers' play an important role in regard to teaching and learning using ICT in school. Despite the fact that leadership also influenced their decision, the study found that teacher skills and knowledge in ICT is a central factor in determining implementation of digital literacy. The study findings indicated that there was significant teacher support by the administrations with regard to ICT in teaching and learning. This was indicated by 50% of the respondents who said that both the teachers and students had computers and/or internet while teaching ICT in front of the class. 60% of the respondents denied that teacher training was mandatory for teachers as compared to 40% who said that it was mandatory for teachers to undergo ICT training. The findings showed 60% of the respondents showed that a more experienced teacher was responsible with providing ICT support in schools. Teachers used the internet material and existing online material in teaching ICT in class. The findings are in agreement with report by Ministry of Education, (GOK, 2010), that majority of teachers trained during school holidays through in-service courses and given the short period they were exposed to the training, few developed the required ICT skills. To effectively implement ICT in schools, teachers need to be well trained on how to use ICT in the process of teaching and learning. However, where teachers

had received some training, there was not enough time to implement the skills gained by teachers in the school program because of lack of time and resources.

According to the findings many schools had tablets, laptops, computers and projectors for teaching and learning ICT. Majority of these equipment according to the findings were functional meaning they were usable. The maintenance of this equipment was done by teachers and other experts. From this study, it was apparent that infrastructure is scarce for many schools in the region, which is one factor that influenced negatively the adoption of ICT learning in the schools. Previous studies indicated that infrastructure plays a central role in the implementation of digital learning in schools hence poor infrastructure is likely to hinder the development or integration of ICT in the school curriculum. It was also apparent that infrastructure was one of the main obstacles towards exploitation of ICT in the schools. The school heads feared that laptops could be damaged when teachers' went with them at home for their own use reduced the innovation of teachers since they could not try out new ways of integrating digital technologies in teaching and learning. Many schools had one laboratory where tablets, laptops and projectors were accessed. However, this was inadequate since only one class at a time could access these digital equipment hence the need for more rooms to be constructed.

5.4 Recommendations

Policy direction is not only required to strategically incorporate ICT into teaching and learning but also to encourage teachers' use of new technologies in their classrooms at national level and especially in the rural areas of Kenya. Since teachers, schools and the entire country of Kenya stand to benefit from a national mission of integrating ICT in teaching and learning in schools, this could be realized through support from the government, along with financial policy support for the use of new technologies and strategic partnerships with industry, the private sector and non-govemmental organizations (NGOs). ICT is capital intensive hence public-private partnerships will increase the availability of human, technological and financial resources. Policy makers both at the national and local levels should develop implementation strategies that take into account cost-benefit analysis in terms of achieving a pay-off that is highest in both short term and long term. Policies should be monitored and evaluated so as to learn from past experience, improve service delivery, plan and allocate resources and demonstrate results as part of accountability to key stakeholders.

School heads play a critical role in transforming school organizations. They should create a digital culture in schools that will enable students to fully implement digital leadership. They should exhibit visionary leadership by evaluating the school's mission and vision statements that will enable a paradigm shift from instructivism to constructivism so that implementation of digital literacy can be realized. They should also exhibit technological leadership by providing adequate

technical support in schools so that teachers are not disrupted when teaching. They should ensure that Local Area networks and the internet are set up and fully operational in schools to enable accessing information with ease.

Teachers are the foundations behind the adoption and use of ICT in teaching and learning subjects. In order to enlist staff support and involvement, it is useful to integrate informal use of ICT support into the formal teacher-training system so that less experienced teacher trainers obtain timely assistance. In addition, multiple incentives needed to be provided such as workload reduction, recognition and reward in departmental evaluations, increased research allocations to encourage the use of ICT in teaching and compensation for those providing educational or technological assistance to teachers. The GOK should constantly train teachers so as to keep them abreast with recent technology and how to integrate this technology in their teaching. The GOK should fill vacant teaching posts with younger, more tech-savvy teachers.

Before using ICT, programs in teaching and learning need to be implemented. It is vital that primary schools focus on upgrading their ICT infrastructure (e.g., installing computer laboratories and Internet connectivity) and developing relevant ICT skills of their schools. This study has demonstrated that for ICT integration in teaching and learning to take place in schools a strong correlation should exist between ICT facilities and other information resources. Hence information resources should not be viewed in isolation, but holistically. Moreover, school librarians should be involved in ICT projects and trained in Internet information retrieval skills. This will enable them to guide learners with information retrieval and use library resources to augment their skills and knowledge in subjects. ICT teachers are important prerequisites to the integration of ICT in teaching and learning process. To avoid “dumping” of obsolete computers, a national policy on refurbished computers is required. There also must be standards of the type of computers donated to schools. The GOK should consider mobile equipment that is not only universal and affordable but also up-to-date utilizing wireless technologies. The GOK should partner with the ISPs so as to reduce cost of accessing internet by students. Suppliers of ICT goods and services should focus on technology and connectivity so as to realize the potential of digital technologies. Use of online labs should be encouraged since these are low cost, offer flexibility in terms of access and enable both teachers and students to increase experimental learning.

5.5 Suggestions for further research

1. A larger study should be conducted in several counties in Kenya so as to obtain a comprehensive understanding of factors influencing digital literacy in public primary schools.
2. This study has not looked at the influence of pupils’ socio-economic status in implementation of digital literacy. This includes aspects such as societal surroundings of the school, language spoken by the pupils’ at home and parents’ level of education.

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APPENDICES

Appendix I: Letter of transmittal

Glarace W. Mahinda

P.O Box 2187- 20100

Nakuru-Kenya.

22/03/2018

Dear respondent,

I am a Post graduate student at the University of Nairobi.

In order to fulfill the requirements for the award of Master degree in Project Planning and Management at the University of Nairobi, I am conducting a research study entitled: *Factors influencing public primary schools' implementation of digital literacy program in Nakuru North Sub-County, Nakuru County-Kenya.* You have been chosen to assist in providing the required information as your opinions are considered important in this study.

Therefore I kindly request you fill this questionnaire. Please note that the information you give will be treated with utmost confidentiality and will only be used for the purpose of this study.

Findings of the research study will be made available after the researcher produces a report that is a requirement for partial completion of an M.A Degree in Project Planning and Management at the University of Nairobi.

Thank you.

Yours faithfully,

Glarace Mahinda.

Appendix II: Questionnaire for teachers on the use of digital technologies

INTRODUCTION

I am a post graduate student at the University of Nairobi. I am conducting a research study on digital literacy which is a requirement for the award of a Master of Arts degree in Project Planning and Management. Findings of this study will be availed after the researcher produces a report that is a requirement for partial completion of the degree.

This questionnaire is about digital literacy and use of digital technologies by teachers in school. It requires you about 15 minutes to answer. All responses will be anonymized and treated in the strictest confidence. No individual or school will be identifiable in the published reports. Your input is important for this study. Thank you for participating.

Section A: Personal Background Information

This section gathers your personal background information. Please fill in your age, gender, subjects which you teach, how long you teach and how ICT is taught in classes in your school. Please fill in all the questions in this section and tick (√) as instructed in the question.

1. What is your age? **(Tick one box)**
   - ☐ Less than 30 years
   - ☐ From 30-39 years
   - ☐ From 40-49 years
   - ☐ 50 years or more
2. Are you male or female? **(Tick one box)**
   - ☐ Male
   - ☐ Female
3. Which subject(s) do you teach? **(Tick one or more boxes)**
   - ☐ Mathematics
   - ☐ English
   - ☐ Science
   - ☐ Social/ Religious studies
   - ☐ Kiswahili
   - ☐ Other
4. Including this year, how long have you been teaching? **(Tick one box)**
   - ☐ Less than 1 year
   - ☐ From 1-3 years
   - ☐ From 4-10 years
   - ☐ From 11-20 years
   - ☐ From 21-30 years
   - ☐ More than 30 years
5. How is ICT taught to classes in your school? **(Tick one box for each row)**

	Yes	**No**
ICT is taught as a separate subject	☐	☐
ICT is integrated in my subject because I chose to do	☐	☐
ICT is integrated in my subject because of curriculum requirements	☐	☐
ICT is integrated in several subjects	☐	☐

Section B: Experience in teaching with ICT

This section needs your information on your experience with ICT for teaching. Tick (√) one box for each row.

6. Do you use computers and/or the internet for the following activities?(Tick one box for each row)

	Yes	No
a) Preparing lessons	☐	☐
b)Class teaching in front of /with the pupils	☐	☐

7. How often do you use computers and/or the internet in your classes? **{Tick one box}**

☐ Never

☐ Rarely

☐ Sometimes

☐ Often

☐ All the time

Section C: ICT access for teaching

This section needs your information on which ICT equipment are accessed while teaching. Please answer all questions in this section. Tick (√) one box for each row.

8. When you use computers and/or internet during class teaching in front of the pupils', which equipment is available? **(Tick one box for each row)**

	Never	Rarely	Sometimes	Often	All the time
Student are equipped with computer and/or internet	☐	☐	☐	☐	☐
Only the teacher uses a computer and/or internet	☐	☐	☐	☐	☐
Both teacher and students use computers and/or internet	☐	☐	☐	☐	☐

9. Does the school provide teachers with laptops (or tablet PC, desktop computers, notebooks) for their own use? **(Tick one box)**

☐ **Yes**

☐ **No**

Section D: Support to teacher for ICT use

This section needs your information on type of support that is given to teachers to enable them teach with ICT at school. Please answer all questions in this section. Tick (√) as instructed in each question.

10. Is participation in ICT training compulsory for teachers in your school?**(Tick one box)**

Yes ☐

No ☐

11. Who provides the ICT support at your school? (Tick one or many boxes)

☐ A more experienced / knowledgeable teacher

☐ School ICT / technology coordinator

☐ Other school staff

☐ Experts from outside the school

☐ An online helpdesk, community or website

Section E: ICT based activities and material used for teaching

This section needs you to identify which activities (in and out of school) you conduct that are based on ICT, which type of materials you use when teaching and obstacles to the use of ICT in the school. Please answer all questions. Please tick (√) one box for each row

12. Which of the following types of materials have you used when teaching your classes with the aid of a computer and/or the Internet? **(Tick one box for each row)**

Type of material	**Yes**	**No**
Material that you've searched the Internet for	☐	☐
Existing online material from established educational sources	☐	☐

Section F: Teachers' skills

This section needs information on your ICT skills. Please answer all questions. Please tick (√) one box for each row.

13. To what extent are you confident in the following?

Skill	**None**	**A little**	**Somewhat**	**A lot**
Produce text using a word processing program	☐	☐	☐	☐
Use emails to communicate with others	☐	☐	☐	☐
Create a database	☐	☐	☐	☐
Email a file to someone	☐	☐	☐	☐
Organize computer file/folders				
Use a spreadsheet(e.g., Excel)	☐	☐	☐	☐

Create a presentation with simple animation	☐	☐	☐	☐
Create a presentation with video or audio clips	☐	☐	☐	☐
Download/upload curriculum resources from/to websites or learning platforms for students to use	☐	☐	☐	☐

Section G: ICT in school leadership

This section needs information on which information systems are used by school management. Please answer all questions. Please tick (√) one box for each row.

14. Does your school provide an email address to teachers and students?

Yes ☐

No ☐

15. Do you use any Electronic Register System in your school?

Yes ☐

No ☐

Thank you very much for your time and effort in completing this questionnaire.

Appendix III: interview schedule for school principal on ICT use

INTRODUCTION

I am a post graduate student at the University of Nairobi. I am conducting a research study on digital literacy which is a requirement for the award of a Master of Arts degree in Project Planning and Management. Findings of this study will be availed after the researcher produces a report that is a requirement for partial completion of the degree.

This interview schedule seeks information about school population, school's ICT infrastructure, support to teachers using ICT, obstacles to the use of ICT, school ICT strategy for teaching and learning, your views on how ICT should be used for educational purpose, your computer uses at school and some background information about you.

It should take no more than 10 minutes to complete the interview. All responses will be anonymized and treated in the strictest confidence; no individual or school will be identifiable in the published reports.

Thank you for agreeing to participate.

Section A: school population

How many teachers does your school have this academic school year
How many pupils does your school have this academic year

Section B: school ICT infrastructure

What types of ICT equipment do you use in teaching and learning in your school?
Approximately what portion of this equipment is working or operational?
Who provides maintenance to your ICT equipment?
Is your school connected to any type of network?

Section C: Support to teachers using ICT

In the past two year (2016 to 2017) how many of your teachers have undergone competence training in ICT?

Section D: Obstacles to the use of ICT in teaching and learning

What obstacles have you faced that prevent your ability to provide ICT teaching and learning in your school?

Section E: school policy on the use of ICT in teaching and learning

What are the strategies used by your school with regard to the use of ICT in teaching and learning?

Section F: Opinion about how ICT is used for educational purpose

How are computers and internet used in your school by the students?
How does ICT impact on teaching and learning?
What is the importance of ICT in the 21st century?
What plans does your school have to help fully exploit the ICT?

Section G: school head computer use at school

How do you use the computer and internet in your office?

Section H: Division of responsibilities in the school with regard to ICT decisions

Who is responsible for procuring of ICT infrastructure?
Who is responsible with the determination of the course content?
Who is responsible with the deciding about the teacher training?
Who chooses the teaching and learning resources?

Thank you very much for your time and effort in completing this interview schedule.

Appendix IV: Introduction letter from the University

UNIVERSITY OF NAIROBI
Open, Distance & e-Learning Campus
SCHOOL OF OPEN AND DISTANCE LEARNING
DEPARTMENT OF OPEN AND DISTANCE LEARNING
NAKURU LEARNING CENTRE

Tel 051 – 2210863
P. O Box 1120, Nakuru

Our Ref: *UoN/ODeL/NKRLC/1/12*
28th June 2018

To Whom It May Concern:

RE: GLARANCE WAKINYI MAHINDA – L50/88709/2016

The above named is a student of the University of Nairobi, Nakuru Learning Centre Pursuing a Masters degree in Project Planning Management.

Part of the course requirement is that students must undertake a research project during their course of study. She has now been released to undertake the same and has identified your institution for the purpose of data collection on **"Factors Influencing Public Primary Schools' Preparedness in Implementation of Digital Literacy: A Case of Nakuru North Sub County, Nakuru - Kenya."**

Any assistance accorded to her will be highly appreciated.

Yours Faithfully

UNIVERSITY OF NAIROBI COORDINATOR 28 JUN 2018 P. O. Box 1120 NAKURU NAKURU LEARNING CENTRE

DR. JOHN OURU NYAEGAH
COORDINATOR NAKURU LEARNING CENTRE

Appendix V: Letter from Sub County Director of Education (Nakuru North Sub County)

MINISTRY OF EDUCATION
SCIENCE AND TECHNOLOGY
State Department of Education

Telegrams: "LEARNING"
Telephone: 020-2103613
When replying please quote

DISTRICT EDUCATION OFFICE
NAKURU NORTH
P.O. BOX 50,
BAHATI

Ref. NKU.N/ED/55/100

28TH JUNE 2018

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION:GLARACE WAKANYI MAHINDA L50/88709/2016

Authority is hereby given to the above named person to carry out research on **"Factors influence public primary schools' preparedness implementation of digital literacy" in Nakuru North sub-country in Nakuru County.**

Kindly accord her the necessary assistance.

NAKURU NORTH SUB-COUNTY
DIRECTOR OF EDUCATION
BAHATI

ESTHER NJENGA
FOR: SUB-COUNTY DIRECTOR OF EDUCATION
NAKURU NORTH.

Appendix VI: NACOSTI Permit

THIS IS TO CERTIFY THAT:
MISS. GLARACE WAKANYI MAHINDA
of UNIVERSITY OF NAIROBI, 0-20100
Nakuru,has been permitted to conduct
research in *Nakuru County*

on the topic: *FACTORS INFLUENCING PUBLIC PRIMARY SCHOOLS' PREPAREDNESS IN IMPLEMENTATION OF DIGITAL LITERACY: A CASE OF NAKURU NORTH SUB COUNTY, NAKURU COUNTY-KENYA*

for the period ending:
17th July,2019

.....
Applicant's Signature

Permit No : NACOSTI/P/18/62939/23788
Date Of Issue : 17th July,2018
Fee Recieved :Ksh 1000

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

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No.A 19440

CONDITIONS: see back page

Appendix VII: Letter from County Commissioner (Nakuru County)

THE PRESIDENCY
MINISTRY OF INTERIOR AND
CO-ORDINATION OF NATIONAL GOVERNMENT

Telegrams:" DISTRICTER", Nakuru
Telephone: Nakuru 051-2212515
When replying please quote

COUNTY COMMISSIONER
NAKURU COUNTY
P.O. BOX 81
NAKURU

Ref. No. ***CC.SR.EDU 12/1/2 VOL.III/(136)***

7th August, 2018

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION – CLARACE WAKANYI MAHINDA

The above named student has been given permission to carry out research on "***Factors influencing public primary schools' preparedness in implementation of digital literacy: A case of Nakuru North Sub County" in*** Nakuru County for the period ending **17th July, 2019**.

Please accord her all the necessary support to facilitate the success of her research.

Patrick Omuse
For: COUNTY COMMISSIONER
NAKURU COUNTY

Appendix VIII Letter from County Director of Education (Nakuru North County)

MINISTRY OF EDUCATION
STATE DEPARTMENT OF BASIC EDUCATION

Telegrams: "EDUCATION",
Telephone: 051-2216917
When replying please quote

Ref.CDE/NKU/GEN/4/21/VOL.VI/69

COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
P. O. BOX 259,
NAKURU.

3rd August, 2018

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION –GLARACE WAKANYI MAHINDA
PERMIT NO. NACOSTI/P/18/62939/23788

Reference is made to letter NACOSTI/P/18/62939/23788
Dated 12th July, 2018.

Authority is hereby granted to the above named to carry out research on "***Factors influencing public primary schools' preparedness in implementation of digital literacy. A case of Nakuru North Sub-County, Nakuru County***" for a period ending 17th ***July, 2019.***

Kindly accord her the necessary assistance.

GEORGE M. ONTIRI
FOR: COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

Copy to:

University of Nairobi
P.O Box 30197-00100
NAIROBI