

**FACTORS INFLUENCING INTEGRATION OF ICT IN TEACHING AND
LEARNING IN PUBLIC SECONDARY SCHOOLS IN GITHUNGURI**

SUB-COUNTY, KIAMBU COUNTY, KENYA

BY


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DECLARATION


This Research Project Report is my original work and has not been presented for a degree in any other University.

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This Research Project Report has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This work is dedicated to my wife Doreen Kimani and our children Myk and Caleb for giving me encouragement and support when I was undertaking this research project.

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TABLE OF CONTENTS

DECLARATION.....	ii
DEDICATION.....	iii
ACKKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	ix
LIST OF FIGURES.....	xii
LIST OF ABBREVIATIONS AND ACRONYMS.....	xiii
ABSTRACT.....	xiv
CHAPTER ONE: INTRODUCTION	
1.1 Background of the study.....	1
1.2 Statement of the problem.....	4
1.3 Purpose of the Study.....	7
1.4 Objectives of the Study.....	7
1.5 Research Questions.....	7
1.6 Significance of the Study.....	8
1.7 Delimitation of the Study.....	8
1.8 Limitations of the Study.....	9
1.9 Assumptions of the Study.....	9
1.10 Definition of significant Terms used in the study.....	9
1.11 Organization of the Study.....	10
CHAPTER TWO: LITERATURE REVIEW	
2.1 Introduction.....	12
2.2 ICT Integration in Teaching and Learning.....	12
2.2.1 ICT Integration in teaching and learning globally.....	13
2.2.2 ICT integration in teaching and learning in Africa.....	15
2.2.3 ICT integration in teaching and learning in Kenya.....	17
2.3 Teacher Related factors and integration of ICT in teaching and learning.....	20

2.3.1 ICT competency and confidence and ICT integration in teaching and learning.....	20
2.3.2 Teachers' attitudes and ICT integration in teaching and learning.....	23
2.3.3 Teachers' workload and ICT integration in teaching and learning.....	25
2.4 School management and ICT integration in teaching and learning.....	26
2.5 ICT infrastructure and ICT integration in teaching and learning.....	29
2.6 Theoretical framework.....	30
2.7 Conceptual framework.....	31
2.8 Summary and research gaps.....	33
CHAPTER THREE: RESEARCH METHODOLOGY	
3.1 Introduction.....	34
3.2 Research Design.....	34
3.3 Target Population.....	35
3.4 Sample Size and Sampling Procedure.....	35
3.5 Research Instruments.....	36
3.6 Validity of Research Instruments.....	37
3.7 Reliability of Research Instruments.....	37
3.8 Data collection Methods.....	37
3.9 Data Analysis Techniques.....	38
3.10 Ethical Considerations.....	38
3.11 Operationalization of variables Table.....	39
CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION	
4.1 Introduction.....	40
4.2 Questionnaire Return Rate.....	40
4.3 Demographic Characteristics of the Respondents.....	41
4.3.1 Distribution of Respondents by age.....	41
4.3.2 Distribution of Respondents by gender.....	43
4.3.3 Academic Qualifications of the Respondents.....	43
4.4 Influence of Teacher Related Factors on Integration of ICT.....	45
4.4.1 Influence of Teachers' attitude on ICT integration.....	45

4.4.2 Teachers use of ICT in Teaching.....	45
4.4.3 Ways in which Teachers use ICT.....	46
4.4.4 Confidence in the Use of ICT in Classroom.....	47
4.4.5 Negative Aspects of Using ICT in Teaching and Learning.....	48
4.4.6 Views on Changing Teachers’ Attitude towards ICT Integration.....	49
4.4.7 ICT Competency and Confidence influence on ICT integration.....	50
4.4.8 ICT Training of teachers.....	50
4.4.9 Levels of ICT Training of Teachers.....	51
4.4.10 Challenges Faced by Teachers in ICT Integration.....	53
4.4.11 Influence of Competency and Confidence on ICT Integration.....	53
4.4.12 Teaching Workload of Teachers.....	55
4.4.13 Teachers’ Views on Influence of workload on Integration of ICT.....	56
4.4.14 High Teachers Workload Influence on ICT Integration.....	57
4.4.15 Views on dealing with High Teachers’ Workload.....	58
4.5 Influence of School Management on ICT Integration.....	58
4.5.1 School Management Vitality in ICT Integration.....	59
4.5.2 Views on the Level of School Management Support on ICT Integration.....	59
4.5.3 Availability of Policy on ICT Integration at school.....	61
4.5.4 Availability of Functional Computer Laboratories in schools.....	62
4.5.5 Willingness of School Managers to Sponsor Teachers for ICT Training.....	63
4.5.6 Views on Support School Managers Should Give Teachers.....	64
4.6 Influence of ICT Infrastructure on ICT Integration.....	64
4.6.1 Teachers’ with Convenient Computer Access in School.....	64
4.6.2 Reliability of Internet Connectivity in Schools.....	65
4.6.3 Source of Energy to Run Computers.....	66
4.6.4 Availability of Alternative Source of Energy.....	67
4.6.5 Views on ICT Infrastructure Influence on ICT Integration.....	67
4.6.6 Main ICT Infrastructure Challenge Faced in School.....	68
4.6.7 Ways of improving ICT Infrastructure	69

**CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS
AND RECOMMENDATIONS**

5.1 Introduction.....	71
5.2 Summary of the findings.....	71
5.3 Discussions of the findings.....	72
5.4 Conclusion of the Study.....	78
5.5 Recommendations.....	80
5.6 Suggestions for further Research.....	81
REFERENCES.....	83
APPENDICES.....	91
APPENDIX I: LETTER OF INTRODUCTION.....	91
APPENDIX II: QUESTIONNAIRE FOR TEACHERS.....	92
APPENDIX III: QUESTIONNAIRES FOR HEAD TEACHERS.....	100

LIST OF TABLES

Table 3.1: Category of schools, population size and sample size of teachers.....	36
Table 3.2: Operationalization of Variables Table.....	39
Table 4.1: Questionnaire return rate.....	41
Table 4.2: Distribution of respondents by age.....	42
Table 4.3: Correlation between Age of respondents and ICT use in Teaching.....	42
Table 4.4: Distribution of respondents by gender.....	43
Table 4.5: Academic qualifications of the respondents.....	43
Table 4.6: Correlation between Academic qualification and ICT use in teaching.....	44
Table 4.7: Feeling of teachers about using ICT in teaching and learning.....	45
Table 4.8: Teachers use of ICT in their teaching.....	45
Table 4.9: Ways ICT is used for teaching and learning by teachers.....	46
Table 4.10: Confidence in the ability to use ICT in teaching and learning.....	47
Table 4.11: Correlation between confidence of the teacher in ability to use ICT and its use in Teaching.....	48
Table 4.12: Negative aspects of using ICT in teaching and learning.....	48
Table 4.13: Views on changing teachers' attitude towards ICT use.....	49
Table 4.14: ICT competency and confidence of the teacher influence on ICT integration....	50
Table 4.15: Teachers training on ICT.....	51
Table 4.16: Correlation between training of teachers on ICT use and its integration in teaching.	51
Table 4.17: Levels of ICT training among teachers.....	52

Table 4.18: Correlation between level of ICT training and ICT integration in teaching.....	52
Table 4.19: Challenges faced by teachers in efforts to integrate ICT in teaching.....	53
Table 4.20: Views on ICT competency and confidence and its influence on ICT integration... 54	
Table 4.21: Correlation between shyness of teachers in using ICT and ICT use in Teaching....	55
Table 4.22: Teachers teaching workload.....	55
Table 4.23: Correlation between teaching workload of a teacher and ICT use in teaching...	56
Table 4.24: Views on whether teachers' workload influence ICT integration.....	57
Table 4.25: Influence of high teacher's workload on ICT integration.....	57
Table 4.26: Views on dealing with the high teachers' workload.....	58
Table 4.27: School managers' role in ICT integration.....	59
Table 4.28: Teachers ratings on school management level of support on ICT integration.....	60
Table 4.29: Correlation between level of support from school managers and ICT integration in Teaching.....	60
Table 4.30: Availability of ICT policy in schools.....	61
Table 4.31: Correlation between school policy on ICT integration and ICT use in teaching...	61
Table 4.32: Availability of functional computer laboratories in school.....	62
Table 4.33: Correlation between availability of functional computer laboratory in school and ICT integration in teaching.....	62
Table 4.34: Teachers rating of the school manager's willingness to sponsor to teachers for ICT training.....	63
Table 4.35: Suggestions on support school managers should give to teachers.....	64
Table 4.36: Teachers with convenient access to computers at school.....	64

Table 4.37: Correlation between convenient access to computers at school and ICT integration in teaching.....	65
Table 4.38: Reliability of internet connectivity in school.....	65
Table 4.39: Correlation between reliability of internet connections and use of ICT in teaching..	66
Table 4.40: Source of energy to run computers.....	66
Table 4.41: Availability of alternative source of energy at school.....	67
Table 4.42: Teachers’ view on ICT infrastructure and its influence on ICT integration.....	68
Table 4.43: Main ICT infrastructure challenge faced at school.....	69
Table 4.44: Ways of improving ICT infrastructure at school.....	69

LIST OF FIGURES

Figure 1 Conceptual Framework.....	32
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LIST OF ABBREVIATION AND ACRONYMS

BOM	Board of management
DoE	Department of Education
ESP	Education Support Programme
GIS	Geographic Information Systems.
ICT	Information Communication Technology
KICD	Kenya Institute of Curriculum Development
KESSP	Kenya Education Sector Support Programme
MoE	Ministry of Education
NI3C	National ICT Innovation and Integration Centre
PTA	Parents Teachers Association
TSC	Teachers Service Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization

ABSTRACT

This research focuses on factors influencing integration of ICT in teaching and Learning in secondary schools in Githunguri Sub County, Kiambu County, Kenya. Research has not been exhaustive especially on the area of ICT integration in teaching and learning in secondary schools. In particular, not very much research has been conducted on levels of ICT integration in teaching and learning in secondary schools has been conducted in Githunguri Sub County. To fill this gap, this study focused on teachers and head teachers and carried out an in-depth study into the extent of their integration of ICT in teaching and learning process in Githunguri Sub County. The main purpose of the study was to establish factors influencing integration of ICT in teaching and learning in secondary schools in Githunguri Sub County. The study was guided by the following objectives; to establish the extent to which teacher related factors influence the integration of ICT in teaching and learning, the extent to which school management influence the integration of ICT in teaching and learning and the extent to which ICT infrastructure influences integration of ICT in teaching and learning. The sample comprised of head teachers and teachers in selected schools in Githunguri Sub County, Kiambu County. Data was collected by use of questionnaires. The independent variables of the study were factors influencing integration of ICT in teaching and learning in secondary schools while the dependent variable of the study was Integration of ICT in teaching and learning. Data analysis was done using statistical package for social sciences (SPSS) and presented in tables. Relevant interpretation, discussions and recommendations were drawn from the analyzed data. A major finding of the study is that training on ICT influences integration of ICT in teaching and learning because such trainings make teachers acquire more knowledge which makes them more confident and competent. A major recommendation of the study is the need to have regular in-service training on ICT as the findings revealed that not all teachers had acquired computer skills. Further, there is need to avail the required ICT infrastructure as lack of it negatively affected integration of ICT. The findings of the study may be adopted by administrators and stakeholders in the field of education to improve integration of ICT in teaching and learning process. Furthermore, the findings of the study may contribute to the deeper understanding on levels of ICT integration in teaching and learning with the aim of meeting vision 2030 in our education.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Information and communication technology (ICT) have become one of the fundamentals building blocks of modern society. More than ever before the advent of the knowledge economy and global economic competition compel governments to prioritize educational opportunities for all. Policy makers widely accept that access to information and communication technology (ICT) in education can help individuals to compete in a global economy by creating a skilled workforce and facilitating social mobility. They emphasize that ICT in education has a multiplier effect throughout the education system by enhancing learning and providing students with new set of skills. (Ndiritu, Mburu, Kimani 2013). However, beyond the rhetoric and of equal importance to policy makers are the basic questions related to the measurement of ICT in education, its usage and potential outcome including retention and learning achievement. Many countries now regard mastering of the basic skills and concepts of ICT as an inevitable part of the core of education. The importance of pedagogical integration of ICT in Kenya and globally cannot be overemphasized. It is becoming increasingly apparent that all aspects of people's lives including the way education is taught and delivered is greatly influenced by developments in Information and Communication Technologies (ICTs).

In an effort to keep up with these new developments, the Kenyan Government, through its key ministries of Education, Science and Technology and Information and Communication Technology, has developed several policy and strategy documents to guide the integration of ICT

in education (National ICT Policy, 2006; Sessional Paper No. 1 of 2005 and Kenya Education Sector Support Programme, 2005-2010). The Education Act (2012) in the sessional paper no 14 (2012) on reforming education and training sectors, in proposal for a new national educational plan and for an ICT for education (ICT4E), Directorate at the national ministry, and in further development of the National ICT innovation and integration Centre (NI3C). These efforts are also out of the realization that there are many initiatives being championed by various government agencies, private sector, non-government organizations and even individuals, that are not well coordinated, are disjointed, lack focus and sometimes duplicate each other. In the last decade, the Government of Kenya has invested numerous resources in ICT infrastructure including the digitization of educational materials through the Kenya Institute of Curriculum Development (KICD). The Government has also initiated programs to provide computers to schools. A case in point is the current ESP-ICT project that aims at equipping 1050 schools with ICT infrastructure and most importantly, capacity building of teachers in the area of ICT integration (Millennium Goals Status Report for Kenya, 2007).

The government recognizes that an ICT literate workforce is the foundation on which Kenya can acquire the status of a knowledge economy by the year 2030. It is against this background, the government shall make education the natural platform for equipping the nation with ICT skills in order to create dynamic and sustainable economic growth. ICT is a major vehicle for teaching and learning from the earliest years. ICT facilitates the opportunity for more student centered teaching, more self-learning and more peer teaching. It also provides greater opportunity for teacher to teacher, and student to student communication and collaboration and access to worldwide web and learning resources contained thereon. In order to consolidate the gains realized under ICT, the government needs to integrate ICT into curriculum at all levels. The

government needs to promote self-directed learning through ICT which will empower learners to choose what and how to learn. (Vision 2030)

The e-content being developed for schools at primary and secondary levels is expected to increase access and improve the quality of education in the country. Despite all these efforts the integration and application of ICT within the learning process in the education sector in Kenya is still in its infancy. The required penetration in schools both in breadth and depth is yet to be realized. New initiatives are still dominated by technical aspects. Proper integration of ICT in teaching and learning will require an integrated approach, corroboration with various institutions that have national mandates for capacity development with teachers and educational managers at different level. According to (Kenya ICT survey 2007), the integration of ICTs at all levels of education is still low. About 1300 Secondary schools out of more than 6000 schools have computers, while most schools with computers use less than 40% of the available infrastructure and very few, use ICT as an alternative method of delivering content to the learners. This is clear indication of the slow pace of ICT integration in teaching and learning.

The existing literature on ICT integration in education in Kenya appears to indicate limited knowledge on the quantity and quality of research in the area of pedagogical integration of ICT. Many scholars and practitioners have raised this as a major research need (Omwenga, 2003, Keiyoro, 2011; Gikonyo 2012). Studies done have attempted to fill this gap especially in the African context, which for a long time, was assumed to have insignificant adoption of ICTs in education. For example, Karsenti et al (2011) and Farrel and Issacs, (2007), report that African countries have the least integration of ICT in education relative to other countries globally.

The use of ICT in teaching is viewed as central to learner-centered learning of the curriculum being delivered. However, teaching is mostly being conducted using the same old techniques where the teacher is central to the learning process. According to (Unwin, 2009) ICT can be used in accelerating paradigm shift as ICT can be used to actively engage Students, make them more collaborate and reflect on their living and through simulation it can contextualize content. Thus it is important to research on the levels of ICT integration by institutions in their teaching and learning.

1.2 Statement of the problem

According to global information Technology (2008-2009) the ICT readiness survey of 134 economies ranked these countries as follows; Denmark, Sweden and United states as first, second and third respectively. Among the African countries Tunisia, Mauritius and South Africa were ranked 38, 51 and 52 in that order. Many North African countries have made excellent progress because of their resources and band width connectivity they enjoy with Europe. Other countries that are placing a high priority of ICT application include Cameroon, Ghana and Botswana. However, majority of African countries are yet to embrace ICT in educational institutions. Integration of ICT in teaching and learning is very important because it will enhance productivity among teacher and learners as well as improve the delivery of the content in the curriculum.

Research by Kidombo, Gakuo and Kindachu (2011) found out that integration of ICT in curriculum delivery in secondary schools in Kenya depended on Schools' leadership, professional training of the teachers in ICT, school manager's level of ICT skills competence and presence of school ICT policy. Kombo (2013) reported that despite the Kenya government's

effort and willingness to promote ICT as an instructional tool, progress on ICT font had fallen short of expectation. The report added that the Ministry of education strategic plan for 2008-2012, slow integration of ICT in operations and programmes was identified as an area of major weakness in the part of the ministry. The core problem is that Kenya lacks adequate connectivity and network infrastructure. Although a small number of schools have direct access to high-speed connectivity through an Internet service provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. Consequently, there is limited access to dedicated high-speed connectivity for e-mail and the Internet.

According to Marshall, Kinuthia and Taylor (2009) the challenge confronting education system in Kenya is how to transform the curriculum and teaching –learning process to provide students with skills to function effectively in this dynamic, information- rich and continuously changing environment. To meet these challenges, learning institutions must embrace the new technologies and appropriate ICT tools for learning and move towards the goal of transforming the traditional paradigm in teaching. In Kenya, ICT integration is still far from being achieved as many rural schools still grapple with the lack of electricity and high Cost of ICT equipment. Public schools have complained of the lack of government employed teachers. They are forced to hire teachers thus draining the scarce resources which could have been used for upgrading ICT facilities. (Commonwealth Secretariat, 2006)

Teaching and learning in secondary schools require diverse teaching strategies. Researchers have indicated that, computers have capabilities to improve student's knowledge and that computer based technology gives teachers access to a rich variety of textual materials and graphic

information. According to Woodson (1994) the use of computers provides new instructional strategies which teachers and students can employ. Despite all this very little has been done to integrate ICT in teaching and learning in our secondary schools. From (the Kenya ICT survey,2007) many teachers perceive that the integration of ICT in schools will render them jobless due to foreseen benefits such as e-learning and efficiency in the mode of delivery. Contrary to these, many researchers have seen ICT integration in education as a solution to the problem of high enrolment in our institutions of learning and even make the work of the teacher easier.

An examination of the National ICT policy (2006) and National ICT strategy for education and Training revealed that the government recognizes the role of ICT's in education and development. Kenya education sector support programme (KESPP) (2005-2010) focuses on challenges facing the education sector and gives solutions on how to overcome them. The education options paper discusses the ways in which ICT can support and improve delivery of quality education to Kenyans.

Studies have shown that there is very minimal integration of ICT in teaching and learning in Githunguri sub-county secondary schools. In schools where computers and ICT infrastructure are available, its use is limited to typing exams, analysis of exam results, accessing emails, preparing lesson plans but not for use in teaching to a greater extent. In schools where computer studies as a subject is taught, the focus is for the learners to acquire basic computer skills rather than using the computer as a tool to enhance learning.

Many factors have been identified that may have contributed to this limited integration of ICT in teaching and learning. A number of factors may be considered which may have led to the

aforesaid situation. The researcher selected three factors to establish how they have influenced the integration of ICT in teaching and learning. This study therefore sought to investigate how the selected factors influence integration of ICT in teaching and learning in secondary schools in Githunguri sub- County.

1.3 Purpose of the Study

The purpose of this study was to establish the factors influencing ICT integration in teaching and learning in secondary schools in Githunguri Sub- County.

1.4 Objectives of the Study

This study was guided by the following research objectives;

1. To establish the influence of teacher related factors on ICT integration in teaching and learning in public secondary schools in Githunguri Sub-County.
2. To determine the influence of school managers on integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County.
3. To establish the influence of ICT infrastructure on ICT integration in teaching and learning in public secondary schools in Githunguri Sub-County.

1.5 Research Questions

The study was guided by the following research questions;

1. How does the teacher related factors influence the integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County?

2. How does the school management influence the integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County?

3. How does ICT infrastructure influence the integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County?

1.6 Significance of the Study

Establishing the factors influencing the integration of ICT in teaching and learning in public secondary schools is important as it will provide education stakeholders with information on levels of ICT integration in secondary schools. This information may in turn be used to design and strategize on ways through which ICT may be integrated in teaching. The findings of the study may also help policy makers and stakeholders to identify challenges of ICT integration in institutions of learning. This information will be of great importance to curriculum developers (KICD) in coming up with content to be delivered through ICT tools and modalities on how to integrate ICT in teaching and learning in public secondary schools.

1.7 Delimitations of the study

Mitchell, Wirt and Marshall (1986) define delimitation of the study as those characteristics that limit the scope of inquiry. This study was restricted to public secondary school teachers and head teachers in sampled secondary schools in Githunguri Sub-County only. The study focuses on levels of ICT integration in teaching and learning although the study can be done on ICT integration in other areas besides teaching and learning.

Singleton et al (1996) states that the ideal setting for a research study is one that directly satisfies researcher's interests. In addition, he notes that the ideal setting for any study should be easily

accessible to the researcher and should be that which permits instant rapport with the informants. The location of the study was in Githunguri Sub-County in Kiambu County in the Republic of Kenya. Githunguri Sub- County is located to the North Eastern side of Kiambu town.

1.8 Limitations of the Study

Mitchell, Wirt and Marshall (1986) define limitations of the study as those characteristics of design or methodology that set parameters on the application or interpretation of the results of the study. Time and financial resources were the main limitations of this study. Hence the research was conducted in sampled public secondary schools in Githunguri Sub-County, Kiambu County, Kenya.

1.9 Assumptions of the Study

This study made the following assumptions;

1. Teachers and head teachers in the sampled schools will be willing to participate in this study.
2. ICT integration in teaching and learning will lead to more learner centered learning.

1.10 Definition of Significant Terms Used in the Study

Attitude: This is one's emotion, or action toward an object or person. In this study its teachers' emotions toward ICT integration in teaching and learning

Information and communication technologies (ICTs): These are different types of technology tools and resources used for creating, storing, managing and communicating information.

Integration of ICT in teaching and learning: This involves the use of computers, internet and emails in teaching and learning.

ICT infrastructure: This refers to the physical hardware and software used to interconnect computers and the users.

Teacher related factors: These are the traits possessed or issues directly touching on the teacher. They are attitude, competency and confidence and workload

ICT competency: This refers to having adequate knowledge on ICT tools.

Workload: The number of teaching lessons assigned to a teacher in a week.

School managers: These are the people responsible for controlling, planning and administering the school. Includes head teachers, BOM members and P.T.A.

1.11 Organization of the study

This study is organized into five chapters. Chapter One will lay emphasis on the basics of the study and will cover background of the study, statement of the problem, research objectives and research questions. It also covers the significance of the study, limitations of the study, delimitations of the study and definition of significant terms. Chapter Two contains the literature review. It focuses on global regional and local integration of ICT in teaching and learning. It also addresses the role of teacher related characteristics, role of school managers and availability of ICT infrastructure in the integration of ICT in teaching and learning. The chapter also contains the theoretical framework and conceptual framework. Chapter Three describes the research design and the methodology the researcher used to conduct the study. It also covers target

population, sample size and sampling procedure, research instruments, reliability and validity of the instruments, data collection procedure and data analysis. Chapter Four contains data analysis, presentation and interpretation. Chapter Five contains the summary of the findings, discussion, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter outlines literature from other studies that are directly or indirectly related to ICT integration in teaching and learning in secondary schools. The literature is reviewed under themes that are derived from the objectives as follows; teacher related factors and ICT integration, role of school managers and ICT integration in teaching and learning and ICT infrastructure and ICT integration in teaching and learning.

2.2 ICT Integration in Teaching and Learning

Information and communication technology ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form for example personal computers, laptops, mobile phones, email and robots (Scholten, velde &manen,2009). Okauru (2011) defines ICT as the digital processing and utilization of information by use of electronic computers. It comprises the storage, retrieval, conversion and transmission of information. Pisapia (1994) defines ICT integration as the use of ICT to introduce, reinforce, supplement and extend skills. Earle (2002) linked ICT integration with the concept of wholeness, when all elements of the system are connected together to become a whole. For example, content and pedagogy which are very important elements of teaching and learning must be brought together when technology is used in a lesson. So the more provision of ICT tool to the students by the teacher does not constitute ICT integration since pedagogical issues are not tackled.

Williams (2003) describes ICT integration as a means of using ICT tools (internet, e-learning technologies, CD Roms) to assist in teaching and learning. Gilberts (2000) Argues that, ICTs can now be an excuse and the means to move closer to educational goals that we have been unable to achieve for decades and to some new ones. With enough commitment of resources, thoughtful effort and patience, technology will help more than it hurts. ICT can be used as a lever to promote transformational, learning centered faculty development. It could be difficult because the teacher has to deal with the new technological challenges as well as the new learner centered-paradigm, but the technology is often a way into a specific department to start a conversation about good teaching and learning practice. (Buckley,2002).

Different researchers have identified several factors influencing ICT integration in teaching and learning. Balanskat, Blamire &Kefalla (2007) identified the factors as teacher-level, school-level and system level. Other researchers are of the view that ICT integration in teaching and learning is also influenced by organizational factors, attitude towards technology and other factors. (Chen, 2008; Lim &Chai, 2008; Clausen, 2007). Neyland, (2011) identified factors such as institutional support as well as micro factors such as teacher capability influencing the use of online learning in High schools in Sydney. Sherry &Gibson (2002), claim that the technological, individual, organizational and institutional factors should be considered when examining ICT integration.

2.2.1 ICT integration in teaching and learning globally

The integration of information and communication technology (ICTs) into the teaching and learning strategy can only be successful if it is carefully planned, managed and supported. Tony Bates (1997), emphasizes that "New technologies are likely to remain marginal despite high level

of capital investment and will merely add cost to the system, if we do not deal with structural changes in our institutions and especially how we organize teaching."

According to studies in Finish schools (Lakkala, Lallimo & Hakkarainen, 2005) the implementation of technology-supported collaborative inquiry practice assumes to design the educational setting as an integrated whole that provides students with relevant technological tools, directs them to collaborate effectively and promotes epistemologically high-level and creative working with the knowledge. According to Brandy and Kennedy (2003) Australian Governments have clearly taken up the challenge of transforming schools to meet the challenges of the information age. In 2002 the Queensland Government outlined its vision to integrate ICT into teaching and learning within Queensland state schools by launching a three-year ICT for learning strategy. These initiatives are a part of the Queensland Government's (2002) policy, Education and training Reforms for the future. (Bindloss, 2002)

The ICT for learning strategy played an important role in connecting teachers and students with new technologies, developing a sustainable technological infrastructure in schools and providing more funds for ICT's in Queensland schools, including teacher professional development. The ICT innovation trajectory is not unique to Queensland. All states in Australia and for that matter most countries in the world have developed similar initiatives and strategies. (Finger, 2003; Kommers, 2000; Finger & Trinidad, 2002)

The Malaysian education policy in relation to integration of ICT in teaching and learning (T&LICT) is aimed at addressing the need to create a knowledge society and a technology literate work force for the 21st century. Schools have a need to adopt an information-literacy curriculum and students have a need to develop their ICT and thinking skills and take

responsibility for their own learning. Such needs would be met within a technology-enabled teaching and learning environment that emphasizes student's self-direction and self-regulations. The smart school project is an example of a major educational change initiative to improve classroom teaching and learning practice within such an environment (Smart School Project Team, 1997). According to Bermama, (2005) it is expected that all schools in Malaysia will have assimilated the smart school practice by the year 2010. This has not been fully achieved this far. The Malaysian ministry of education aims to ensure active use of ICT by the students in teaching and learning in order that they can speedily master ICT skills, involve them in active learning, create a culture of productive ICT use and in the process challenge their minds. (Bahagian, Pendidikan, 2004)

2.2.2 Integration of ICT in Teaching and Learning in Africa

Africa has witnessed the development of ICTs in various sectors over the last decade including education. The change from teacher-centered education system to learner-centered education the world over in the past few years contributes to the use of ICTs in education. Attempts to measure or assess the utilization of ICT in Africa have been hampered by insufficient empirical data to indicate any impact of ICT on sector productivity and lack of cross-country evidence. In some cases, the evidence has been non-existent due to recent developments, rapid revolutions of ICTs and methodological challenges that include deficiency of assessment variables and models of causality. Most of the studies undertaken have focused on information infrastructure issues, while few have been undertaken to measure the extent of ICTs in Africa particularly in education. (Kenya SchoolNet 2003)

The use of ICT in education has potential to enhance the quality of teaching and learning, the research productivity of teachers and students, and the management and effectiveness of institutions (Kashorda et al. 2007). However, opportunities for realizing the benefits of using ICT in education face a number of challenges in the developing Countries. Access to ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 students against a ratio of 1:15 students in developed countries.

Recent studies in South African schools that have attempted to investigate the utilization of ICTs in the classroom present evidence that shows quality ICT usage is in small and insignificant patches which raises a lot of concern for a country that values quality and equity. Lundell et al (2000) in their study of use of computers in South African countries argue that, the problem on failure to use ICT is not always caused by lack of resources but how teachers use the available educational tools in teaching. The South African Department of education through its ICT in education policy, the white paper on e-education (DoE,2004) and the guidelines for teacher training and professional development in ICT(DoE,2007) has developed guidelines for the distribution and use of digital resources in schools such that equity and quality in education are achieved at the school level. Results from Pan African Research Agenda (2008-2011) reveal that the ICT policy is poorly implemented particularly by those the government is trying to rescue from economic and social discrimination.

Okebukola (2002) submitted that in 1988, the Nigerian government enacted a policy on computer education. In view of the author, the plan was to establish pilot schools and diffuse computer education, innovation first to all secondary schools and then primary schools; but unfortunately the project did not really take off beyond the distribution and installation of

personal computers. In the same vein, Aduwa and Iyamu (2005) stated that the computer is not a part of classroom technology in more than 90% of Nigerian public secondary schools; this implies that the chalkboard and textbook continue to dominate classroom activities in most Nigerian schools. Based on this findings, the researcher concluded that despite the roles ICTs play in education, secondary schools in Nigeria have yet to extensively adopt the for teaching and learning; and efforts geared towards integration of ICTs into secondary schools' curriculum have not really taken off beyond the distribution and installation of school computers. The research recommended that the government should ensure that ICT policy statements for secondary education are translated into reality.

2.2.3 Integration of ICT in teaching and learning in Kenya.

Schools worldwide are under increasing pressure to implement ICT in order to prepare students with skills and knowledge needed for emerging knowledge society. As early as 1980s a considerable education research and initiatives have been directed towards ICT implementation in schools. (Jimoyiannis &Komis, 2007). Different methods have been applied. Important among them include developing school technology infrastructure, developing skills to teachers and other professionals and then producing and integrating ICT-based tools for teaching and learning. A considerable amount of research has shown that implementation of ICT in schools can enhance students' understanding, motivation, promote active collaboration and lifelong learning, offer better access to information and shared working resources. (Laaria, 2013; Andoh 2012; (Jimoyiannis & Komis, 2007). In other words, implementation of ICT in schools appear to change the methods of teaching and learning traditionally practiced in schools. Due to the emerging technologies teaching could evolve from emphasis on teacher centered to student

centered methods which can result in a more interactive learning environment in schools which may enhance student performance.

Kenya has placed considerable emphasis on the importance of ICT in its schools as evidenced by the recent promulgation of the National ICT Strategy for education and Training and vision 2030 which placed ICT on the Centre of development. Use of computers can be traced as from early 1980s while usages become available in late 1990s (Laaria, 2013). By 2012, about 15.5% of population was accessing internet, mostly in private sector and government employees. Apart from accessing internet from mobile phones, there are over 5000 cyber cafes that continue to provide majority of the population with internet, however, the access is still limited especially in rural areas. (Kipsoi, et. al 2012)

The integration and implementation of ICT's in schools in developing countries remain very limited despite a decade of considerable large investments in technology. Like other developing countries, Kenya continues to struggle with high levels of poverty that has affected the implementation of the technology in schools (Nchunge et al, 2012). Initially the aim of implementing ICT was primarily to develop ICT skills to learners, the focus over time shifted to leverage ICT to address issues of quality and improve teaching and learning in schools. Access and availability of ICT in public schools in Kenya remains patchy. Kenya has approximately 7425 secondary schools with approximately 85% being located in rural areas. About 65% of them have electricity, with about 1300 having an average of 10 computers, though connectivity is limited. Makhonu (2010) found out that some schools had computers but this could be limited to one computer in the office of the school head. His conclusion was that very few schools had sufficient ICT tools for teaching and learning. In schools with computers, the study established

that the student-computer ratio was high and this was a challenge faced during integration of technology in teaching. This shows a very slow implementation pace which may lead to all benefits of ICT in schools not realized or un-equitably realized in the near future.

Research suggests that education sector is heavily investing in ICT but the technology adoption and integration in education has continued to lag behind compared to other sectors. A study by Manduku et al, (2012) reveal that while implementation of ICT has been achieved by many sectors including medical services, banking, communications and transportation, penetration in schools seems to lag behind. Several studies have assessed reason for under use of ICT in schools in Kenya (Manduku, et al, 2012; Laaria, 2013; Hennesy, 2010). The cost of ICT infrastructure including software and hardware, putting up telecommunications networks, transportation, maintenance and repairs of equipment is often unaffordable by many developing nations.

Hannesty (2010) observed that to reduce costs and enhance competition, privatization for acquiring facilities should be an option. Generally, like other African countries, Kenya has poor infrastructure including limited electricity supply and poor communication (Manduku et al, 2012). This complicates implementation and integration of ICT in schools as many cannot maintain internet connections. Implementation and integration of ICT in teaching and learning requires appropriate allocation of government funds, donor support and good governance. However, in many African Countries including Kenya corruption, poor ICT policy or lack of it and poor management of ICT implementation projects has led to duplication of efforts, ineffective implementation, waste of technology resources and use of different systems and standards. Many initiatives to implement ICT are often uncoordinated and therefore result in

competition rather than complementing each other. In many instances, schools have computers that are essential for ICT integration and implementation but they do not work as resources for the maintenance have been redirected or misused (Manduku et al, 2012)

It is in view of these perceived challenges that this study sought to establish factors influencing integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County. The focus was on teacher's attitude, competency on ICT, workload, institutional management support and ICT infrastructure.

2.3 Teacher related factors and integration of ICT in teaching and learning

In this study the teacher related factors that were discussed in the literature review include teachers' competency in ICT, attitudes and teacher's workload.

2.3.1 Teacher's ICT competency and confidence on ICT integration in teaching and learning

Computer competence is defined as being able to handle a wide range of varying computer applications for various purposes. (Tondeur, J. Valcke, M. & Van Braark, J; 2008). The success of educational innovations depends largely on the skills and knowledge of teachers. (Pelgrum; 2001) He also found that teacher's lack of knowledge and skills was the second most inhibiting obstacle to the use of computers in schools. Similarly, in the United States, Knezek and Christensen (2000) hypothesized that high levels of attitude and knowledge, and tools would produce higher levels of technology integration in the classroom. Their view was that educators with higher levels of skills, knowledge and tools would exhibit higher levels of technology integration in the classroom.

Evidences suggests that majority of teachers who reported negative or neutral attitude towards the integration of ICT in to teaching and learning processes lacked knowledge and skills that would allow them to make "informed decision"(Bordbar,2010).In a qualitative multiple case-study research on primary schools competency and confidence level regarding the use of ICT in teaching practice conducted in five European countries, Peralta &Costa (2007) found that technical competence influenced Italian teachers use of ICT in teaching. However, the teachers cited pedagogical and didactic competencies as significant factors if effective and efficient educational interventions are likely to be implemented. In Australian research, Newhouse (2002) found out that many teachers lacked knowledge and skills to use computers and were not enthusiastic about the changes and integration of supplementary learning associated with bringing computers into their teaching practice.

In Portugal, teachers reported different views regarding the most important competencies for teaching with ICT. The experienced and new teachers stressed the need for technical skills and attitude, the innovative teachers emphasized curricular and didactic competencies and the student teacher cited technical competence and pedagogical efficiency as significant to integrate ICT in teaching and learning process.

Jones (2004) reported that teachers' competence relates directly to confidence. Teachers confidence also relate to their perceptions of their ability to use computers in the classroom, particularly in relation to their children's perceived competence. Hence lack of teacher competence may be one of the strong barriers to integration of technologies into education. It may also be one of the factors involved in resistance to change. According to Peralta &Costa (2007), teachers with more experience with computers have greater confidence in their ability to

use them effectively. They conducted a study on 20 teachers' competences and confidence regarding use of ICT in classrooms. They revealed that in Italy, teachers' technical competence with technology is a factor of improving higher confidence in the use of ICT. In addition, teachers in Greece reported pedagogical and personal factors as those which mostly contribute to their confidence in ICT use. Innovative teachers in Portugal linked perception of confidence in using ICT with the loss of fear of damaging the computer and at the same time possessing absolute control over the computer. However, they reported plenty of available time to work and practice ICT, Support of experienced teachers and training as favorable conditions for gaining confidence in ICT usage. (Campor, 2008).

In a survey conducted by Becta, (2004), approximately 21% of the teachers who were surveyed, reported that lack of confidence influences their use of computers in their classrooms. Becta (2004) stated that, "many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of Children who perhaps know more than they do." The results of a study conducted by Chege, (2014) indicates that of all the sampled teachers, hold the opinion that computer skills (competency) influenced a teacher's readiness to use ICT in teaching. The results further indicated that training would make teachers acquire more knowledge on ICT and thus improve their confidence. Out of all the teachers sampled only 5% indicated having excellent computer skills while 50% indicated their computer skills were fair. This could be a major contributing factor to the slow pace of ICT integration in our secondary schools in Kenya.

Effective integration of ICT will depend to a large extent on trained and supported teachers (UNESCO, Bangkok, 2003). The greatest challenge of the schools therefore has been the

provision of adequate support to teachers in as far as acquisition of appropriate technical skills important for integrating computers in classroom instruction is concerned. While developed countries have reported up to 41% of integration of computers in instruction, the proportion remains substantially low in Africa. (National ICT strategy for Education, Training and Research, 2006). Examining the National ICT policy (2006) and the National ICT strategy for education and Training, it is clear that the government recognizes the role of ICT's in education development. Although the ICT syllabus in secondary schools and teacher colleges provide basic computer skills and knowledge, the focus is on using the computer as the object of study. This study sought to establish the extent to which computer competency of the teacher influence ICT integration in teaching and learning in public secondary schools in Githunguri Sub-County.

2.3.2 Teachers' attitude and Integration of ICT in teaching and learning

Attitude is a predisposition to respond favorably or unfavorably to an object, person or event. (Ajzen, 1988) To successfully initiate and implement educational technology in school's programs depends strongly on teachers' support and attitudes. According to Mulwa and Kyalo (2011), it is equally important to investigate the attitude that teachers themselves hold towards adoption of e-learning in their schools as teachers are expected to carry out the implementation process and unless they have a positive attitude, it will be a serious obstacle to the implementation. Accordingly, the attitude by implementers, towards e-learning is perceived as having some influence on readiness to adopt e-learning.

It is generally believed that if teachers perceived technology programs as neither fulfilling their needs nor their student's needs, it is likely that they will not integrate the technology into their teaching and learning. Among the factors that influence successful integration of ICT into

teaching are teacher's attitudes and beliefs towards technology. (Hew and Brush, 2007; Keengwe and Onchwari, 2008). Tella, (2007) found out that computer use was predicted by intentions to use and that perceived usefulness was also strongly linked to these intentions. If teachers' attitudes are positive towards the use of educational technology, then they can easily provide useful insights about the adoption and integration of ICT into teaching and learning processes.

Becta (2004) claims that one key area of teacher's attitudes towards the use of these technologies is their understanding of how these technologies will benefit their teaching and their students learning. Schoepp's study (2005) found out that, although teachers felt there was more than enough technology available they did not believe that they were being supported, guided or rewarded in the integration of technology into their teaching. According to Emprica (2006), teachers who are not using new technology such as computers in the classroom are of the opinion that the use of ICT has no benefits or unclear benefits. Demici (2009) conducted a study on teachers' attitudes toward the use of Geographic information systems (GIS) in Turkey. Data was collected from 79 Geography teachers teaching in 55 different high schools. The study revealed that although barriers such as lack of hardware and software existed, teachers' positive attitude towards GIS was an important determinant to the successful integration of GIS into geography lessons.

Lumumba (2007), in his study on the challenges facing e-learning in Kenyan public secondary schools, established that e-learning project faced many challenges. He singled out negative attitudes towards e-learning among students and teachers as key obstacle to the success of the e-learning project. According to him successful integration of ICT in the school's environment is

to a large extent influenced by attitude held by the implementers. Chege (2014) in his study on factors influencing readiness to use of ICT in Secondary schools in Gatundu North District, indicates that attitude of the teacher has a great influence on the successful integration of ICT in teaching and learning in secondary schools. He notes that teachers' attitude is a major predictor of the acceptance and actual utilization of computers in the classroom and management of their work.

Drent&Malissen et al (2007) conducted a study about factors that stimulate or limit the innovative use of ICT by teacher educators in the Netherlands. Their findings showed that several factors such as student oriented pedagogical approach, positive ICT attitudes, computer experience and personal entrepreneurship of the teacher have a direct positive influence on the innovative use of ICT by the teacher. A comparison between these factors in predicting computer use identified that attitude towards computer contributed more in explaining ICT use by teachers. This study therefore sought to establish the extent to which attitude influences the integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County.

2.3.3 Teachers' workload and ICT integration in teaching and learning

Several studies report that teachers' workload influence their acceptance of technology in classroom. Manduku et al (2012) after investigating factors related to use of computer in management of schools in Kasses Zone of Uasin Gishu County Kenya, reported that increased workload coupled with teaching with technology was critical to the participants of the study. The factors reported to contribute to increased workload were constant course upgrade, maintenance, student emails and continuous search of sustainable strategies and learning of new skills. Similar study by Papaioannon &Charambous, (2011) in Cyprus schools reported that teachers viewed

curriculum was already overcrowded and adding more was pushing them to the limit and in some cases beyond.

Kipsoi, et al (2012) reported that teachers were already overloaded; they could not cope with the pressure and more so pressure from ICT training. Laaria, (2013) found out that teachers are overloaded to learn, at the same time teaching and preparing for teaching and practice what they learn. According to Andoh, (2012) for teachers to realize the aims of educational system as well as implementing new initiatives, it is necessary to lessen their workload. This study therefore sought to establish the extent to which teachers' workload influence the integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County.

2.4 School management support and ICT integration in teaching and learning

Many studies have shown that school leadership plays an increasingly important role in leading change, providing vision and objectives, as well as professional development initiatives in using ICT to bring about pedagogical change ;(Schiller, 2002). While technology infrastructure is important ICT leadership is even more necessary for effective ICT implementation. While effective leadership is one of the key variables that determine the success of an educational institution, strategic leadership is needed for long term sustainability of school improvements (Davis, 2003)

According to Brannigan (2010) leadership is one of the several critical components in the successful integration of ICT's in education. The locus of leadership influences the degree to which ICT integration can become embedded in educational institutions as well as the role of leadership in championing ICT. The failure by educational institutions to integrate in education

and imprint it on the minds of the teachers has been attributed to lack of leadership capacity (Moyle, 2006). As a result, today's school principals must not only manage the day to day routine activities in the school but also focus on how students learn, performance standards, evidence based decision making and continuous improvement efforts. Ability to plan, implement and sustain changes, including ICT in a school, therefore, depends on the leadership qualities of the school manager.

In line with these idea Fullan,(2003),stated that administrators should understand the element and characteristics of long- range planning for the use of current emerging technology; use technology to communicate efficiently with staff, parents and community, understand how current and available technologies can be integrated effectively into all aspects of teaching and learning process; understand the legal and ethical issues related to technology licensing and usage; and use technology appropriately in leading and communicating about school programs and activities.

Although school heads generally support ICT use, they do not seem to have a particular vision and strategy of ICT integration in education.(Gakuu and Kidombo;2010).The role of school leadership is vital in ICT integration as it can hinder or facilitate schools adoption of ICT (Fullan,2003;Elmore,2010).When ICT integration task are given to one teacher or a small team of teachers who focus more on infrastructural management rather than technology innovation in teaching, staff development and ICT research are more likely to suffer. Yuen, et al (2003) also stresses the importance of relationships in an organization and emphasize the need for the school managers to build a team learning environment in which teachers can communicate with each

other on ICT experience and reinforce each other's effective practice thus paving the way for knowledge sharing.

As transformational leaders, school managers should show that they also live the values they advocate. This consistency between words and deeds is believed by transformational leaders to build their credibility. (Starcher, 2006). The principal as a learning leader, specifically, can impact multiple areas of the school setting such as ICT integration (Elmore, 2000). Nataraj-kirby et al (2001) findings suggested that effective and supportive leaders were most likely to both increase and deepen ICT implementation in a school. Principals are therefore, likely to make the dream of ICT integration in teaching and learning possible leading through modeling and taking an active role towards this effort.

A study conducted by Keiyoro et al (2010) shows that only 9.5% of teachers from NEPAD and cyber e-schools in Kenya indicated that the school principals were supportive of ICT integration and the support was linked to principals' belief in the usefulness of ICT. Forty percent (40%) indicated that the level of support ranged between 50% -70%. Forty-Seven percent (47%) indicated that the support was lukewarm while 2.4% felt that there was no support. Teachers felt that the integration of ICT in teaching and learning was still slow among the principals themselves evident in their failure to use internet. Other reasons given include administrative ignorance of the role of ICT in teaching and learning, lack of resources and principals' negative attitude towards ICT usage in teaching and learning science curriculum. A study conducted by Manduku et al, (2012) concluded that the experiences and perceptions of school leaders and teachers played an important role in the implementation and integration of ICT in Kenyan schools. This indicted that there was need to provide effective and efficient pre-service and in-

service courses that could enable teachers and administrators successfully use computers in the course of teaching. A further study by Kipsoi, et al (2012) suggested that the government should revise national plans to implement ICT as they also review both programs for teacher preparation and staff development. His study recommended incorporation of ICT curriculum and managerial skills to training of head teachers. This study therefore sought to establish to what extent the school managers influence the integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County.

2.5 ICT infrastructure and ICT integration in teaching and learning

Effective integration of ICT in teaching and learning in schools depends mainly on the availability and accessibility of ICT resources such as hardware and software. It is obvious that if teachers cannot access ICT resources, then they will not use them. Preston and Cox (1999) found out that teachers placed great importance on computer ownership and access to ICT for personal use as a factor that influenced integration of ICT in teaching.

Yildirim (2007) found out that access to technological resources is one of the effective ways to teachers' pedagogical use of ICT in teaching. According to Osborne & Hennessy (2003), the limitations on access to hardware and software resources influenced teachers' motivation to use ICT in classroom. Pelgrum (2001) explored practitioners' views from 26 countries on what were the main obstacles to the implementation of ICT in schools. He concluded that four of the top ten barriers were related to the accessibility of ICT. These barriers were insufficient number of computers, insufficient peripherals, insufficient number of software copies and insufficient simultaneous internet access. Toprakci (2006) found out that low number of computers, oldness or slowness of ICT systems and scarcity of educational software in the schools were barriers to

successful integration and implementation of ICT into science education in Turkish schools. Access to ICT infrastructure and resources in schools is a necessary condition to the integration of ICT in education. (Plomp, Anderson, Law&Quale, (2009)

According to Ojwang (2012) in his study on challenges facing e-learning in public secondary schools in Kisumu County, public secondary schools in Kenya lack adequate ICT infrastructure and connectivity to support effective e-learning delivery. Mbaabu and Sakwa (2012) in their study recommended an increased investment strategy for improving and equipping schools with ICT literacy training infrastructure and resources for both teachers and students in Kenya to address psychological and technical skills preparedness. This will leverage teachers' skills so as to reverse the slow rate of ICT adoption and improve the pace of diffusion in the secondary schools. Therefore, access to computers, updated software and hardware are key elements to successful integration of technology in teaching and learning.

Some studies have been conducted on factors influencing the integration of ICT in teaching and learning in Githunguri Sub-County. This study proposes to further assess the factors influencing the integration of ICT in teaching and learning in secondary schools in Githunguri sub County.

2.6 Theoretical framework

According to Mayer (1997) a generative theory of multimedia learning places the learner in the role of a knowledge constructor who selects and connects visual and verbal knowledge. By building connections between multiple representations of the same information, meaningful learning is more likely to occur. (Mayer 1997). He notes that meaningful learning takes place when a person selects the most important information, organizes it into logical mental pictures

and integrates new information with existing information. When applied to multimedia learning, generative theory presumes that mixed modes of delivery (text, graphics, audio, video and animation) affect the level at which learners employ cognitive process to acquire knowledge. Cognitive overload is often an impediment to retaining information and according to Mayer and Moreno (2003), it can be managed by using specific instructional design principles. These theories and principles are the theoretical basis for bringing video, audio and other multimedia presentation and technology in the classroom. This project was based on a generative theory of multimedia learning as proposed by Mayer (1997)

2.7 Conceptual framework

The conceptual framework shows that various factors (independent variables) determine ICT integration in teaching and learning in secondary schools. These variables include teacher related factors, School management support and ICT infrastructure. These factors are influenced by such variables like government policies and ICT policies in schools. The moderating variables are beyond the control of the schools. Intervening variables would include perceived benefits of integrating ICT. This information is summarized in figure 1.

**INDEPENDENT
VARIABLE**

DEPENDENT VARIABLE

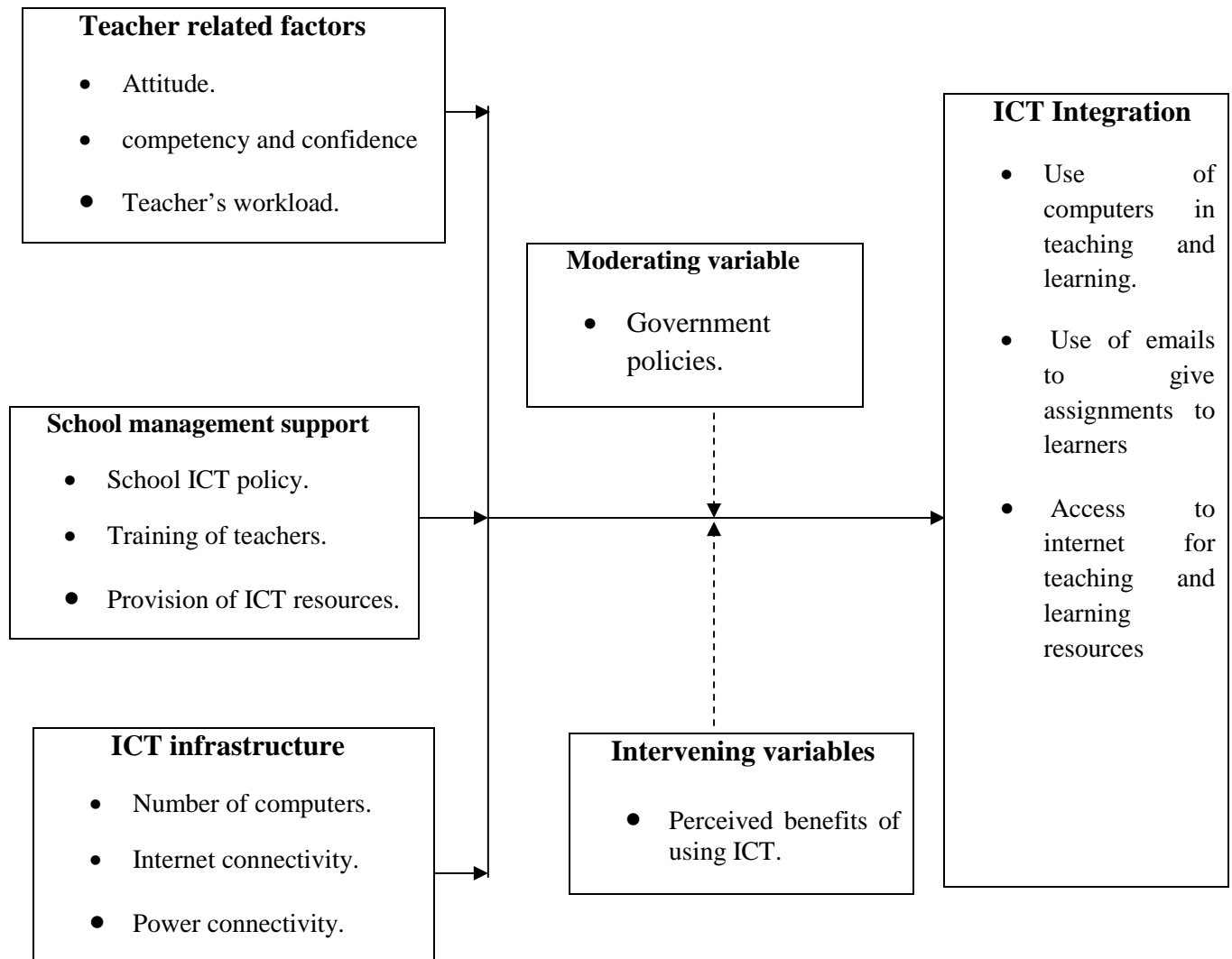


Figure 1: Conceptual framework

2.8 Summary and Research Gaps

Chapter two has looked into details on literature associated with ICT integration in teaching and learning. It started by outlining the use of ICT in teaching at the global level, Africa and in Kenya. Studies and literature reviewed suggest that personal characteristics of teachers, skills possessed by teachers, availability of relevant ICT infrastructure and the good will of the administrators to some extent influence the integration of ICT in teaching and learning in secondary schools. According to the literature reviewed, it is evident that all over the world teaching using ICT is being embraced. Developed Countries are way ahead in integrating ICT as a tool for teaching compared to the developing Countries. It has been noted that despite many nations commitment to integrate ICT in teaching and learning, there are issues that have made the integration process very slow. Kenya like many other nations has stakeholders who are ready to integrate ICT in teaching while others are yet to embrace it.

This study aimed to establish the levels of ICT integration in teaching and learning in secondary schools in Githunguri Sub-County. Little study has been conducted to establish the levels of ICT integration in teaching and learning in this area. In this study the focus was on factors influencing the integration of ICT in teaching and learning in secondary schools.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This study sought to establish the factors influencing ICT integration in teaching and learning in secondary schools in Githunguri Sub-County. This chapter presents the research design, target population, sample size and sampling procedure, research instruments, validity and reliability of instruments, data collection techniques, data analysis method and ethical considerations.

3.2 Research Design

Research design is the arrangement of conditions for collection and analysis of data. It is a conceptual structure within which research is conducted (Orodho, 2008). This study adopted a descriptive survey design to investigate the factors that influence the integration of ICT in teaching and learning in public secondary schools in Githunguri Sub-County. This design was quite appropriate for gathering information; summarizing, presenting and interpreting it for the purpose of clarification (Orodho, 2002). The descriptive survey design is one of the most commonly used methods of descriptive research in behavioral science. It enables the researcher to gather qualitative and quantitative data from a large number of cases at a particular time. Borg and Gall (1998) ascertains that descriptive survey research is intended to produce statistical information about aspects of education that interest policy makers and educationalists. The study used Questionnaires as data collection instrument which suited the descriptive design.

3.3 Target population

Target population constitutes all the items or people under consideration in any field of inquiry (Orodho, 2008). The target population for this study was teachers in the selected secondary schools in Githunguri sub-County. Statistics from Githunguri Sub-County education's office indicate that there are 40 Secondary schools out of which 5 are boys' boarding secondary schools, 5 girls' boarding secondary schools and the rest 30 are mixed secondary schools. Out of these 40 schools, 6 are county schools, 3 are sub-County boarding schools, while the rest are sub-county secondary day schools. The teachers' population in these schools is 527. Out of this population, 245 are male teachers while 282 are female teachers.

3.4 Sample size and sampling procedure

A sample is a smaller group obtained from the accessible population while sampling is the process of selecting a number of individuals in such a way that they represent the large group from which they were selected. (Mugenda & Mugenda, 2003). Gay (1998) proposes a minimum sample of 10% and 20% for a large and a small population respectively. The sample to be selected accounted for more than 20% of the total population which enhanced the study representation.

The researcher used random stratified sampling to include teachers in County schools, Sub-county boarding schools and Sub-County day schools. Since it was not possible to study all the teachers in secondary schools due to time and financial constraints, the study sample size comprised of 100 teachers. Gender composition was 46 male teachers and 54 female teachers

which was representative for each gender. The head teachers of the randomly selected 15 schools also took part in the study.

Table 3.1 Category of Schools, population size and sample size of teachers

Category of school	Population size of teachers	Sample size of teachers
County schools	189	36
Sub-County boarding	102	19
Sub-County Day Schools	236	45
Total	527	100

3.5 Research Instruments

The research instruments were questionnaires for both teachers and head teachers. Questionnaires offer the advantage of being easy and cost effective to administer to a large population (Borg, 1998). The questionnaires yielded both quantitative and qualitative data. The instrument had three sections covering the following areas: demographic information, extent to which personal characteristic of the teacher influence the integration of ICT in teaching and learning, extent to which school management support influence the integration of ICT in teaching and learning and the extent to which ICT infrastructure influences ICT integration. The questionnaires had both open-ended and closed questions which were used to collect data. Open ended questions allowed respondents to give an in-depth response to the subject of study. Closed questions restricted the respondents to YES or NO responses, matrix questions and contingency questions.

3.6 Validity of research instruments.

Validity refers to the degree to which the test/instrument represents the content that the test is designed to measure (Orodho, 2009). The researcher assessed the validity through the use of professionals and experts as advocated by Mugenda and Mugenda (1999). The researcher also sought the supervisor's advice on the validity of the instruments.

3.7 Reliability of Research Instruments.

According to Orodho (2008), reliability of an instrument is the consistency in producing a reliable result at different times. A measure is considered reliable if a person's score on the same test given twice is similar. The split-half technique as advocated by Babbie (2010) was used to test the reliability of the instruments. Responses were divided using odd numbers for one set and even numbers for the other set. The responses were then scored using Pearson's moment of product correlation coefficient formula:

Reliability of the overall test= $2 \times$ reliability for $1/2$ tests

$1 +$ reliability for $1/2$ tests

A correlation co-efficient of 0.8 was got and according to George and Malley (2003), a reliability co-efficient of 0.7 and above is acceptable thus the instrument was considered to be reliable.

3.8 Data collection Techniques

The researcher sought clearance to carry out research from the National Commission for science, Technology and Innovation after approval from University of Nairobi. Once the in the field,

further clearance was obtained from Githunguri Sub-County Director of Education office. In each school, permission was sought from the principals of the sampled school to carry out research in their respective schools. Informed consent was sought from all the subjects before the questionnaires were administered. The respondents later were given relevant instructions verbally and assurance of confidentiality on the information being sought before being given the questionnaires. The questionnaires were later collected by the researcher.

3.9 Data Analysis Technique

Data analysis involves sorting, coding, cleaning and processing and interpreting data (Kamindo, 2008). The purpose of data analysis is to find meaning in data (Burns, 2000). Descriptive statistics including frequency distribution and percentages were computed with the aid of computer software Statistical Package for Social Sciences (SPSS) Quantitative data was then presented in tables while qualitative data was analyzed using content analysis which involves a systematic, replicable technique for compressing many words of text into fewer content categories. Relevant interpretations were drawn from the analyzed data.

3.10 Ethical considerations

In conducting the research, the researcher did not require names and other means of identifying participants. This was to ensure anonymity and secure the privacy of the participants. This helped the participants to create trust in the researcher. The researcher also ensured he got informed consent from the respondents' before administering the questionnaires and using information only for the disclosed purpose. Participation in the research for the respondents was also voluntary.

3.11 Operationalization of variables Table

Operationalization table shows the various variables in the study which will be investigated. The variables were independent variables, 'factors influencing ICT integration in teaching and learning' and dependent variable, 'levels of ICT integration in teaching and learning'.

TABLE 3.2 Operationalization of variables Table

OBJECTIVE	INDEPENDENT VARIABLE	INDICATOR	MEASURE	MEASURING SCALE	TYPE OF ANALYSIS
To determine the extent to which personal characteristic of the teacher influence ICT integration in teaching and learning in secondary schools	Personal characteristics of the teacher	Competency in ICT	Level of training in use of ICT	Ordinal	Descriptive
		Attitudes	Frequency of ICT use for academic and non-academic purposes	ordinal	Descriptive
		Teacher's workload.	Number of lessons teachers have in a week	Ordinal	Descriptive
To assess to what extent school managers influences the integration of ICT in teaching and learning in secondary schools	School managers	Schools policy on ICT integration	Availability of a policy on ICT integration at the school	Nominal	Descriptive
		ICT skills possessed by the school principals	Level of training on ICT use	Ordinal	Descriptive
To investigate to what extent ICT infrastructure influences the integration of ICT in teaching and learning in secondary schools	ICT infrastructure	Presence of computer laboratories	Number of computer laboratories	ordinal	Descriptive
		ICT facilities present and those in use	Number of computer and printers.	Ordinal	Descriptive
			Internet connectivity	ordinal	Descriptive
OBJECTIVE	DEPENDENT VARIABLE	INDICATOR	MEASURE	MEASURING SCALE	TYPE OF ANALYSIS
To assess if ICT integration in teaching and learning is influenced by personal characteristics, school mangers	Level of ICT Integration	How often is ICT used in teaching	No. of teachers using computers in teaching	Ordinal	Descriptive

and ICT infrastructure		How often do teachers use emails in giving assignments	No. of teachers with e-mail address	Ordinal	Descriptive
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CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The purpose of this study was to establish the factors influencing the integration of ICT in teaching and learning in public secondary schools in Githunguri sub-County, Kiambu County, Kenya. This chapter presents the findings of the study that includes analysis, interpretation and discussions of the data gathered from the field. This chapter is divided into five areas under which findings are discussed. This includes the questionnaire return rate, demographic information of the respondents, the extent to which teacher related factors (attitude, competency and confidence and teachers' workload) influence the integration of ICT in teaching and learning, the extent to which school management influences integration of ICT in teaching and learning and the extent to which ICT infrastructure influences the integration of ICT in teaching and learning in public secondary schools.

4.2 Questionnaire return rate

The study targeted 100 teachers and 15 head teachers in collecting data with regard to factors influencing the integration of ICT in teaching and learning in secondary schools in Githunguri Sub-County, Kiambu County, Kenya. The questionnaire return rate was 82% for teachers and 73.3% for Head teachers. This information is summarized in Table 4.1

Table 4.1: Questionnaire Return Rate

Respondents	Questionnaires issued	Questionnaires returned	Return rate
Teachers	100	82	82.0%
Head teachers	15	11	73.3%
Total	115	93	80.7%

From the study 82 teachers and 11 head teachers filled in and returned the questionnaires making a response of 93. This response rate was considered very successful and the main reason may be because the respondents were well targeted and assured of confidentiality of the information.

4.3 Demographic characteristics of the respondents.

Demographic information in this chapter included the personal information of the teachers and head teachers. It consists of age, gender and academic qualification of the teachers and head teachers.

4.3.1 Distribution of respondents by age

The study was conducted to a cross section of respondents with a range of different ages. The study sought to establish the age of the respondents. Table 4.2 presents the age of the respondents.

Table 4.2: Age of the Respondents

Age in years	Teachers		Head teachers	
	Frequency	Percent	Frequency	Percent
Less than 25 years	2	2.4	-	-
26-35 years	45	54.9	1	9.1
36-50 years	35	42.7	8	72.7
51-60 years	-	-	2	18.2
Total	82	100.0	11	100.0

Majority of the respondents were between 26-50 years of age. This is a clear indication that most of the respondents are in their prime age and can be very dynamic and highly productive. A weak positive correlation of 0.205 was obtained in the relationship between the age of the respondents and their use of ICT in teaching and learning. This information is summarized in table 4.3

Table 4.3 Correlation between Age of respondents and use of ICT in Teaching

		Age	Use of ICT in Teaching
Age	Pearson Correlation	1	.205
	Sig. (2-tailed)		.449
	N	82	82
Use of ICT in Teaching	Pearson Correlation	.205	1
	Sig. (2-tailed)	.449	
	N	82	82

4.3.2 Distribution of respondents by gender

Questionnaires were administered by the researcher to both male and female teachers and head teachers. Therefore, the study sought to find out the gender of the respondents.

This was important in establishing and specifying the exact number of male and female respondents. The data is presented in Table 4.4

Table 4.4: Gender of the Respondents

Gender	Teachers		Head teachers	
	Frequency	Percent	Frequency	Percent
Male	38	46.3	5	45.5
Female	44	53.7	6	54.5
Total	82	100.0	11	100.0

According to the findings 46.3% of teachers were male while 53.7% were female. Head teachers had 45.5% male respondents and 54.5% female respondents. This is a clear indication that both genders are well represented and the results of the findings have not favored any gender.

4.3.3 Academic qualification of the respondents

The study was conducted to a cross section of respondents with different academic qualifications. This information is summarized in Table 4.5

Table 4.5: Academic Qualification of the Respondents

Level	Teachers		Head teachers	
	Frequency	Percent	Frequency	Percent
Diploma	2	2.4	-	-
Degree (B.Ed.)	62	75.6	10	90.9

BA/BSC with P.G.D.E	-	-	-	-
Masters	18	22.0	1	9.1
Total	82	100.0%	11	100.0%

According to the findings, Diploma graduates accounted for 2.4%, B.ED graduates 75.6%, and there were no respondents with BA/BSC with P.G.D.E. Those with Masters Degree accounted for 22.0%. Majority of the head teachers (90.9%) have a B.ED Degree, non with BA/BSC with P.G.D.E while those with masters accounted for 9.1%. From this table it is clear that most of the teachers and head teachers have at least the first degree. A correlation coefficient of -0.233 was obtained between the academic qualifications of the teachers and their use of ICT in teaching and learning. This information is shown in table 4.6

Table 4.6: Correlation between Academic qualification and the use of ICT in Teaching

		Use of ICT in Teaching	Highest Academic Qualification
Use of ICT in Teaching	Pearson Correlation	1	-.233*
	Sig. (2-tailed)		.035
	N	82	82
Highest Academic Qualification	Pearson Correlation	-.233*	1
	Sig. (2-tailed)	.035	
	N	82	82

4.4 Influence of teacher related factors on the integration of ICT in teaching and learning

The teachers' related factors that the study focused on were teachers' attitude, competency and confidence and workload.

4.4.1 Influence of teachers' attitude on ICT integration in teaching and learning

The researcher sought to establish the feeling of teachers about the integration of ICT in teaching and learning. This information is summarized in Table 4.7

Table 4.7: How teachers feel about using ICT in teaching and learning

	Frequency	Percentage
I like it	66	80.5
It's hard	16	19.5
I don't like it	-	-
Total	82	100.0

Table 4.7 shows that majority (80.5%) of the respondents indicated that they like using ICT, 19.5% indicated that it's hard and no respondent indicated that they don't like it.

4.4.2 Teachers' use of ICT in their teaching

The researcher also sought to establish whether teachers' use ICT tools in their teaching. This information is summarized in Table 4.8

Table 4.8: Teachers use of ICT in their Teaching

	Frequency	Percentage
Yes	24	29.3
No	58	70.7
Total	82	100.0

Table 4.8 indicates that majority of the teachers do not use ICT in their teaching (70.7 %) while 29.3% indicated that they do use ICT in their teaching. The main reason cited being that majority

of the teachers lacked training in ICT and attitude of change resistance. The teachers' attitude is a major determinant of acceptance and utilization of ICT tools in teaching and learning. Hence it's important for teachers to have a positive attitude towards ICT as it influences the integration of ICT in teaching and learning.

4.4.3 Ways in which teachers use ICT

Further the researcher sought to establish the ways in which ICT is utilized by teachers for teaching. This information is summarized in Table 4.9

Table 4.9 Ways in which ICT is used for teaching in the classroom

	Frequency	Percent
Giving Assignments to learners	2	8.3
Preparing Assignments for learners	10	41.7
Researching on topics to be taught	2	8.3
Making and storing teaching notes	7	29.2
Power point presentation in your lessons	3	12.5
Total	24	100.0

The respondents who indicated that they use ICT in their teaching process, 41.7% indicated that they use ICT in preparing assignments for the learners, 29.2% in making and storing teaching notes while 12.5% indicated as using it in power point presentations in their lessons. A further 8.3% indicated as using ICT in giving assignments to learners and also researching on the topics to be taught.

4.4.4: Confidence in ability to use ICT in the classroom

The researcher also sought to establish the level of confidence in their ability to use ICT in teaching and learning. This information is summarized in Table 4.10

Table 4.10: Confidence in the ability to use ICT in teaching and learning

	Teachers		Head Teachers	
	Frequency	Percent	Frequency	Percent
Very confident	15	18.3	0	0.0
Confident	25	30.5	3	27.3
Fairly confident	35	42.7	8	72.7
Least confident	7	8.5	0	0.0
Total	82	100.0	11	100.0

Table 4.10 Indicates that only 18.3% were very confident and 30.5% were confident about their ability to use ICT in teaching and learning. 42.7% are fairly confident while 8.5% are least confident. Majority of the head teachers (72.7%) rated the level of teachers' confidence in the use of ICT as fairly confident and only 27.7% rated them as confident. The implication of this is that attitude component and training would enhance ICT competency and its utilization in teaching and learning. A correlation coefficient of -3.54 was obtained between the level of teachers' confidence in the ability to use of ICT and its integration. This information is summarized in table 4.11

Table 4.11: Correlation between Confidence of the teacher in ability to use ICT and ICT use in Teaching

		Use of ICT in Teaching	Confidence in the ability to use ICT in Class
Use of ICT in Teaching	Pearson Correlation	1	-.354*
	Sig. (2-tailed)		.021
	N	82	82
Confidence in the ability to use ICT in class	Pearson Correlation	-.354*	1
	Sig. (2-tailed)	.021	
	N	82	82

4.4.5: Negative aspects of using ICT in teaching and learning

The researcher sought to establish some of the negative aspects of using ICT in teaching and learning. These suggestions are presented in Table 4.12

Table 4.12: Negative Aspects of using ICT in teaching and learning

	Frequency	Percent
It takes a lot of time to prepare	30	36.6
It entirely depends on electricity	15	18.3
Some internet sites are not authentic	24	29.3
High chances of losing work due to system crush	13	15.8
Total	82	100.0

Table 4.12 shows that some of the negative aspects of using ICT in teaching and learning included: It takes a lot of time to prepare (36.6%); it entirely depends on electricity (18.3%); Some internet sites are not authentic (29.3%) and very high chances of losing work in case of system crash (15.8%).

4.4.6: Views on changing teachers' attitude towards the use of ICT in teaching and learning

The researcher sought to establish what can be done to change teachers' attitudes towards the use of ICT in teaching and learning. The information is summarized in Table 4.13

Table 4.13: Teachers' views on changing teachers' attitudes towards use of ICT in teaching

	Frequency	Percent
In-service training of teachers	28	34.2
Expose teachers to technology	5	6.1
Make teachers aware of benefits of using ICT	18	21.9
Provide ICT assistants to teachers	12	14.6
Seminars and workshops	19	23.2
Total	82	100.0

Table 4.13 Shows that some (34.2%) of the respondents cited the need to provide in-service training for teachers in ICT, 23.2% Suggested the need for seminars and workshops on ICT, 14.6% indicated the need to have ICT assistants for teachers, 6.1% suggested the need to expose teachers to ICT technology and a further 21.9% cited the need to make teachers aware of the benefits of using ICT in teaching and learning.

4.4.7 Teachers' views on whether ICT competency and confidence influence ICT integration

The researcher sought to establish the views on whether ICT competency and confidence of the teacher influences ICT integration in teaching and Learning. This information is summarized in Table 4.14

Table 4.14: Views on whether ICT competency and confidence of the teacher influences ICT integration in teaching and learning

	Frequency	Percent
Yes	80	97.6
No	2	2.4
Total	82	100.0

Table 4.14 indicates that majority of the teachers (97.6%) believe that ICT competency and confidence of the teacher influences integration of ICT in teaching and learning while only (2.4%) hold the view that it does not influence ICT integration in teaching and learning.

4.4.8 Teachers training on ICT

The researcher sought to establish whether teachers have any training on ICT use as a tool for teaching and Learning. This information is summarized in Table 4.15

Table 4.15: Teachers training on ICT

	Frequency	Percent
Yes	55	67.1
No	27	32.9
Total	82	100.0

Some (67.1%) of the respondents indicated as having some training in ICT while (32.9%) indicated as having no any training on ICT as a tool for teaching and learning. However, much of this training was mainly on the basics introduction to computers. A correlation coefficient of +0.404 was obtained between teachers training in ICT and their use of ICT in teaching and learning process. This is a fair correlation implying that ICT training greatly influences the integration of ICT in teaching and learning. This information is summarized in Table 4.16

Table 4.16: Correlation between Training of the teacher on ICT use and The use of ICT in Teaching

		Use of ICT in Teaching	Training on ICT use
Use of ICT in Teaching	Pearson Correlation	1	.404**
	Sig. (2-tailed)		.006
	N	82	82
Training on ICT use	Pearson Correlation	.404**	1
	Sig. (2-tailed)	.006	
	N	82	82

4.4.9 Level of ICT training of the teachers

The researcher also sought to establish the level of ICT training among teachers. This information is summarized in Table 4.17

Table 4.17: Levels of ICT training among teachers

Level of ICT training	Frequency	Percent
Certificate	51	96.2
Diploma	2	3.8
Degree	-	-
Total	53	100.0

Table 4.17 shows that majority of the teachers who indicated as having ICT training, 96.2% indicated as having a certificate on ICT (introduction to computer studies), 3.8% indicated as having a diploma. No respondent indicated as having a degree on ICT training. A weak correlation coefficient of +0.273 was obtained between the level of ICT training of the teachers and its use in teaching and learning. This implies that the level of ICT had a minimal implication in the use of ICT in teaching and learning. This information is summarized in Table 4.18

Table 4.18: Correlation between Level of ICT Training and ICT Integration in Teaching

		Use of ICT in Teaching	Level of ICT Training
Use of ICT in Teaching	Pearson Correlation	1	.273
	Sig. (2-tailed)		.214
	N	82	53
Level of ICT Training	Pearson Correlation	.273	1
	Sig. (2-tailed)	.214	
	N	53	53

4.4.10 Challenges faced by teachers in their efforts to integrate ICT in teaching and learning

The researcher sought to establish the challenges encountered by teachers in their efforts to integrate ICT in their teaching. This information is summarized in Table 4.19

Table 4.19: Challenges faced by teachers in integrating ICT in teaching and learning

	Frequency	Percent
Lack of time to prepare for such lessons	18	21.9
Lack of computers to use	27	32.9
Lack of Digital content from KICD	12	14.7
Poor or lack of internet connectivity	25	30.5
Total	82	100.0

Some 32.9% of the respondents reported lack of enough computers, while 21.9% indicated lack of time to prepare for the lessons. A further 30.5% reported poor or lack of reliable internet connectivity while 14.7% indicated lack of Digital content as a challenge in their efforts to integrate ICT in teaching and learning.

4.4.11 Teachers' views on ICT competency and confidence and its influence on integration of ICT in teaching and learning

The researcher also sought to establish teachers' opinion on some statements related to ICT competency and confidence on integration of ICT on 5-point liker scale. This information is summarized in Table 4.20

Table 4.20: Teachers' views on ICT competency and confidence and its influence on ICT integration

STATEMENT	SD		D		SWA		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
ICT Competency depends on training	0	0	5	6.1	12	14.6	39	47.6	26	31.7	4.05
Teachers with ICT training are more confident in its use	0	0	1	1.2	4	4.9	36	43.9	41	50.0	4.43
Teachers without prior ICT training shy from using ICT in teaching	2	2.4	9	11	23	28	25	30.5	23	28.0	3.71
Teachers with ICT training frequently use it in their teaching	0	0	12	14.6	29	35.4	36	43.9	5	6.1	3.41
Teachers confidence in the use of ICT largely depend on competency	0	0	0	0	2	2.4	48	58.5	32	39.0	4.37

From the findings, it was clearly found out that teachers agreed with the views that; ICT competency depends on training, teachers with ICT training are more confident in its use, teachers without prior training on ICT shy from using it, teachers with ICT training frequently use it in their teaching and teachers' confidence in the use of ICT in teaching and learning largely depends on competency. A fair negative correlation coefficient of 0.503 was obtained between shyness of teachers in the use of ICT and the integration of ICT in teaching and learning. This is an indication that as the shyness of teachers to use ICT increases the integration of ICT in teaching and learning reduces. This information is summarized in Table 4.21

Table 4.21: Correlation between Shyness of Teachers in Using ICT and ICT use in Teaching

		Use of ICT in Teaching	Shyness of Teachers with no prior Training on ICT
Use of ICT in Teaching	Pearson	1	-.403**
	Correlation		
	Sig. (2-tailed)		.000
	N	82	82
Shyness of Teachers with no prior Training on ICT	Pearson	-.403**	1
	Correlation		
	Sig. (2-tailed)	.000	82
	N	82	

4.4.12: Teaching workload of the teachers

The researcher also sought to establish the number of lessons (workload) assigned to the respondents every week. This information is summarized in Table 4.22

Table 4.22: Teachers teaching workload

Workload	Teachers		Head Teachers	
	F	%	F	%
Below 15 lessons	2	2.4	-	-
Between 15 and 20 lessons	2	2.4	-	-
Between 21 and 25 lessons	56	68.3	8	72.7
Between 26 and 30 lessons	22	26.8	3	27.3
Above 30 lessons	-	-	-	-
Total	82	100.0	11	100.0

Majority of the respondents (68.3%) indicated as having a workload of between 21-25 lessons while 26.8% indicated as having between 26-30 lessons. Those with less than 15 lessons in a

week were only 2.4% similar to those who had between 15-20 lessons. Majority of the head teachers (72.7%) indicated that their teachers' workload was between 21-25 lessons while 27.7% indicated it to be between 26-30 lessons. A weak positive correlation coefficient of 0.216 was obtained between the teacher's workload and their use of ICT in teaching and learning. This is an implication that teachers' workload had a very minimal influence on ICT integration in the teaching and learning process. This information is summarized in Table 4.23

Table 4.23: Correlation between Teaching workload of a Teacher and ICT use in Teaching

		Use of ICT in Teaching	Teaching Workload
Use of ICT in Teaching	Pearson Correlation	1	.216
	Sig. (2-tailed)		.886
	N	82	82
Teaching Workload	Pearson Correlation	.216	1
	Sig. (2-tailed)	.886	
	N	82	82

4.4.13 Teachers view on the influence of workload on ICT integration in teaching and learning

The researcher sought to establish the views of the respondents to what extent they agree that a teacher's workload influence the integration of ICT in teaching and learning. This information is summarized in Table 4.24

Table 4.24: Teachers' views on whether teachers' workload influence ICT integration

	Frequency	Percent
Strongly Disagree	5	6.1
Disagree	0	0.0
Somewhat agree	8	9.8
Agree	54	65.9
Strongly Agree	15	18.3
Total	82	100.0

According to the findings, majority of the respondents (65.9%) agreed that a teacher's workload greatly influence the integration of ICT in teaching and learning.18.3% strongly agreed while only 5% disagreed.

4.4.14 How a high teachers' workload negatively influences integration of ICT in teaching and learning

The researcher sought to establish how a high teachers' workload negatively affects the integration of ICT in teaching and Learning. This information is summarized in Table 4.25

Table 4.25: Influence of a high teachers' workload on ICT integration

	Frequency	Percent
Lack of enough time to prepare for ICT lessons	38	46.4
Teachers lack time to attend further training	18	21.9
Teachers get very tired and may not carry further research	26	31.7
Total	82	100.0

Table 4.25 shows that some (46.4%) of the respondents cited lack of enough time to prepare for ICT lessons, 31.7% indicated that teachers lacked time to attend training on ICT and a further 21.9% indicated that due to a high teachers' workload, they were not able to carry further research since they were very tired.

4.4.15 Teachers views on what should be done regarding Teachers workload so as to enhance integration of ICT in teaching and learning

The researcher sought to establish what teachers view should be done to deal with the high teacher workload and thus enhance integration of ICT in teaching and learning. This information is summarized in Table 4.26

Table 4.26: Views on dealing with the problem of High teacher workload

	Frequency	Percent
Schools and TSC should employ more teachers	58	70.7
Schools to have ICT assistants to the teachers	24	29.3
Total	82	100.0

Majority of the respondents (70.7%) indicated the need of the school management and teachers service commission to employ more teachers while 29.3% suggested the need to have ICT assistant to teachers.

4.5. Influence of school management on the integration of ICT in teaching and learning

The researcher sought to establish the extent to which school management influences the integration of ICT in teaching and learning in secondary schools.

4.5.1 Whether school management is vital in ICT integration in teaching and learning

The researcher sought to establish whether school managers have an influence in the integration of ICT in teaching and learning. This information is summarized in Table 4.27

Table 4.27: Whether school managers are vital in integration of ICT in teaching and learning

	Teachers		Head teachers	
	Frequency	Percent	Frequency	Percent
Yes	82	100.0	11	100.0
No	0	0.0	0	0.0
Total	82	100.0	11	100.0

From the findings all the respondents (100.0%) agreed that the school management plays a vital role in the successful integration of ICT in teaching and learning.

4.5.2 Teachers' ratings on level of school management support in integration of ICT at the school

The researcher further sought to establish teachers' views on the level of school management support on ICT integration in teaching and learning in their schools. Teachers rated their school's management support as summarized in Table 4.28

Table 4.28: Teachers' ratings on school management support on ICT integration

	Frequency	Percent
Poor	6	7.3
Below average	17	20.7
Average	33	40.2
Above average	15	18.3
Good	11	13.4
Excellent	0	0.0
Total	82	100.0

The research findings indicate that most of the respondents (40.2%) feel the support of school managers is average, 20.7% rated them as below average while 18.3% and 13.4% rated them as above average and good respectively. A fair positive correlation coefficient of 0.560 was obtained between the level of school management support and the use of ICT in teaching and learning. This information is summarized in Table 4.29

Table 4.29: Correlation between Level of support from school managers and ICT use in Teaching and Learning

		Use of ICT in Teaching	Level of Support on ICT use from School managers
Use of ICT in Teaching	Pearson Correlation	1	.560**
	Sig. (2-tailed)		.001
	N	82	82
Level of support on ICT use from School managers	Pearson Correlation	.560**	1
	Sig. (2-tailed)	.001	
	N	82	82

4.5.3 Availability of a clear policy on ICT integration in teaching and learning in school

The researcher also sought to establish whether schools have a clear policy on ICT integration in teaching and learning. This information is summarized in Table 4.30

Table 4.30: Availability of a policy on ICT integration in school

	Teachers		Head Teachers	
	Frequency	Percent	Frequency	Percent
Yes	7	8.5	1	9.1
No	75	91.5	10	90.9
Total	82	100.0	11	100.0

Majority of the respondents (91.5%) indicated that there was no policy on integration of ICT in teaching in their schools while only 8.5% reported that their schools have a clear policy on integration of ICT in teaching. 90.9% of the head teachers cited that there was no policy on ICT integration in their school while only 9.1% indicated that there was a clear ICT policy in school. A correlation coefficient of positive 0.421 was obtained between schools' ICT policy and the integration of ICT in teaching and learning. This information is summarized in Table 4.31

Table 4.31: Correlation between school policy on ICT integration and ICT use in teaching

		Use of ICT in Teaching	School policy on ICT Integration
Use of ICT in Teaching	Pearson Correlation	1	.421**
	Sig. (2-tailed)		.003
	N	82	82
School Policy on ICT Integration	Pearson Correlation	.421**	1
	Sig. (2-tailed)	.003	
	N	82	82

4.5.4 Availability of functional computer laboratory in the school.

The researcher further sought to establish whether there were functional computer laboratories in the targeted schools. This information is summarized in Table 4.32

Table 4.32: Availability of functional computer laboratories in schools

	Frequency	Percent
Yes	22	26.8
No	60	73.2
Total	82	100.0

Table 4.32 Shows that some (73.2%) of the respondents indicated that there were no functional computer laboratories in their schools while only 26.8% indicated the presence of functional computer laboratories in their schools. A correlation coefficient of -0.318 was obtained between the presence of a functional computer laboratory in school and the use of ICT in teaching and learning. This information is summarized in Table 4.33

Table 4.33: Correlation between availability of functional computer laboratory in school and ICT integration in teaching

		Use of ICT in Teaching	Functional Computer Laboratory in School
Use of ICT in Teaching	Pearson Correlation	1	-.318
	Sig. (2-tailed)		.871
	N	82	82
Functional Computer Laboratory in School	Pearson Correlation	-.318	1
	Sig. (2-tailed)	.871	
	N	82	82

4.5.5: willingness of school managers to sponsor teachers for training on ICT

The researcher also sought to establish how teachers rate the willingness of the school managers to sponsor teachers in their schools for training on ICT. This information is summarized in Table 4.34

Table 4.34: Willingness of the school managers to sponsor teachers for training in ICT

Rating	Frequency	percent
Below average	39	47.6
Average	31	37.8
Good	12	14.6
Very good	0	0.0
Total	82	100.0

From the findings majority of the teachers, (47.6%) rated the willingness of the school managers to sponsor them for training on ICT as below average, 37.8% rated them as average with only 14.6% rating them as good.

4.5.6: Support that school managers should give to enhance ICT integration in teaching and learning

In addition, the researcher sought suggestions on what support the school managers should provide to enhance the integration of ICT in teaching and learning. This information is summarized in Table 4.35

Table 4.35: Suggestions on the support that school managers should provide to enhance ICT integration in teaching and learning

	Frequency	Percent
ICT training to teachers in the field of ICT	24	29.3
Provide adequate ICT hardware and software to teachers	28	34.2
Have an integrated ICT policy based on the school level	18	21.9
Purchasing the digital content to be used for teaching	12	14.6
Total	82	100.0

4.6 Influence of ICT infrastructure on Integration of ICT in teaching and learning

The researcher sought to establish to what extent ICT infrastructure influences the integration of ICT in teaching and learning in secondary schools.

4.6.1: Convenient access to computers at school

The researcher sought to establish whether teachers have convenient access to computers at school. This information is summarized in Table 4.36

Table 4.36: convenient Access to computer at school by teachers

	Frequency	Percent
Yes	45	54.9
No	37	45.1
Total	82	100.0

Majority (54.9%) of the respondents indicated that they had convenient access to computers at school with only 45.1% indicating having no convenient access to computers at school. A correlation coefficient of positive 0.522 was obtained between convenient access to computers at school and the use of ICT in teaching and learning. This information is summarized in Table 4.37

Table 4.37: Correlation between convenient access to computer at school and ICT use in teaching

		Use of ICT in Teaching	Convenient Access to Computer at School
Use of ICT in Teaching	Pearson Correlation	1	.522**
	Sig. (2-tailed)		.000
	N	82	82
Convenient Access to Computer at School	Pearson Correlation	.522**	1
	Sig. (2-tailed)	.000	
	N	82	82

4.6.2 Reliability of internet connections in the school

The researcher further sought to establish whether there is a reliable internet connection in the school. This information is summarized in Table 4.38

Table 4.38: Reliability of internet Connection at school.

	Teachers		Head teachers	
	Frequency	Percent	Frequency	Percent
Yes	36	43.9	3	27.3
No	46	56.1	8	72.7
Total	82	100.0	11	100.0

Most of the teacher respondents (56.1%) indicated as not having a reliable internet connection and 43.9% indicated that they had a reliable internet connection in their schools. 72.7% of the head teachers indicated as having no reliable internet connection while 27.3% cited that there was a reliable internet connection in their schools. A correlation coefficient of positive 0.537 was obtained between reliability of internet connectivity and the use of ICT in teaching and learning. This information is summarized in Table 4.39

Table 4.39: Correlation between reliability of internet connection and use of ICT in teaching

		Use of ICT in Teaching	Reliability of internet connections
Use of ICT in Teaching	Pearson Correlation	1	.537**
	Sig. (2-tailed)		.000
	N	82	82
Reliability of Internet Connections	Pearson Correlation	.537**	1
	Sig. (2-tailed)	.000	
	N	82	82

4.6.3 Source of energy to run computers at school

The researcher sought to establish the main source of energy utilized in schools to run computers at school. This information is summarized in Table 4.40

Table 4.40: Source of energy to run computers at school

	Frequency	Percent
Electricity	82	100.0
Solar panels	-	-
Generators	-	-
Total	82	100.0

The findings show that all the respondents (100.0%) indicated that electricity was the main source of energy used to run computers in their schools.

4.6.4: Availability of alternative source of energy when the main source is not available

The researcher further sought to establish whether there was an alternative source of energy to compliment the main source of energy when it is not available. This information is summarized in Table 4.41

Table 4.41: Availability of an alternative source energy used at the school

	Frequency	Percent
Yes	67	81.7
No	15	18.3
Total	82	100.0

The findings indicate that 81.7% cited that there is an alternative source of energy in the school and 18.3% indicated that their schools lacked alternative source of energy to run computers when the main source is not available.

4.6.5: Teachers’ views on ICT infrastructure and its influence on ICT integration in teaching and learning

The researcher further sought to establish teachers’ opinions on some statements related to ICT infrastructure on a 5-point liker scale. A mean score of below 3.0 was an indication of disagreeing with the statement while a score of above 3.0 was an indication of agreement. This information is summarized in Table 4.42

Table 4.42: Teachers' views on ICT infrastructure and its influence on ICT integration

STATEMENT	SD		D		SWA		A		SA		Weighted mean
	F	%	F	%	F	%	F	%	F	%	
Lack of internet connection limits ICT integration in teaching and learning	0	0	5	6.1	7	8.5	17	20.7	53	64.6	4.44
Lack of personal computers to teachers limits ICT integration in teaching and learning	0	0	6	7.3	6	7.3	36	43.9	34	41.5	4.20
Inability to consistently access computers affects ICT integration in teaching and learning	0	0	0	0	2	2.4	28	34.1	52	63.4	4.61

From the findings, it was found that teachers agreed (mean score above 4.0) with the views that; Lack of internet connection limits ICT integration in teaching and learning; Lack of personal computers among teachers limits ICT integration in teaching and learning and inability to consistently access computers affects ICT integration in teaching and learning.

4.6.6: Main ICT infrastructure challenge faced at school

The researcher sought to establish the main ICT infrastructure faced by teachers at school in their efforts to integrate ICT in teaching and learning. This information is summarized in Table 4.43

Table 4.43: Main ICT infrastructure Challenge faced at school

	Frequency	Percent
Poor internet connectivity	31	37.8
Frequent power failure	3	3.7
Lack of electricity connection	0	0.0
Lack of enough computers	48	58.5
Total	82	100.0

According to the findings, the main ICT infrastructure challenge that faces teachers at school included poor internet connectivity (37.8%), frequent power failure (3.7%) and lack of enough computers (58.5%)

4.6.7: How ICT infrastructure can be improved

The researcher also sought the suggestions on how ICT infrastructure can be improved to enhance ICT integration in teaching and learning. This information is summarized in Table 4.44

Table 4.44: How ICT infrastructure can be improved

	Frequency	Percent
Equipping schools with modern computers	49	59.7
Investing in a reliable internet connection	28	34.1
Electricity installation with standby generators	5	6.2
Total	82	100.0

The findings indicate that 59.7% cited equipping schools with modern computers, 34.1% indicated investing in a reliable internet connection and only 6.2% cited the need to have electricity installation with standby generators.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the research findings, discussions, conclusions, recommendations of the study and suggestions for further research.

5.2 Summary of key findings

From the study it was established that teacher related factors, school management and ICT infrastructure have some influence on ICT integration in teaching and learning. According to the study it was established that teachers' competency and confidence in ICT had some influence on integration of ICT in teaching and learning.

The findings indicate that 97.6% of the respondents were in agreement that ICT competency and confidence of the teacher in ICT determines ICT integration with 2.4% disagreeing. Those in agreement indicated that teachers who were competent in ICT preferred using it in teaching since they did not have the fear of failure or having to use it with learners who are far much ahead in terms of ICT knowledge. A correlation coefficient of -3.54 was obtained between the level of teachers' confidence in the ability to use of ICT and its integration. This implies that as the level of confidence goes down the use of ICT in teaching and learning also declines. However, those who disagreed indicated that attitude of the teacher was paramount since there were teachers with training on ICT but have never tried using ICT in their teaching and learning process.

According to the study it was established that teachers' attitude had some influence on integration of ICT in teaching and learning. Majority of the respondents (80.5%) indicated that they had a like to use ICT in their teaching. However, majority (70.7%) of them still indicated that they have not integrated ICT in their teaching and learning process with only a small number indicating limited use in preparing assignments for learners and to a very small extent in researching on the content to teach. Some of the negative aspects of using ICT in teaching and learning cited by the respondents included; some cites in the internet are not authentic, it takes a lot of time to prepare for such lessons and it entirely depends on electricity. Majority of the respondents cited the need to expose teachers to technology through sponsored training by the school management, while others suggested the need for seminars and workshops on ICT, some indicated the need to educate the teachers on the benefits of using ICT as a tool in teaching and learning.

Sampled teachers indicated that a teachers' workload had a great influence on integration of ICT in teaching and learning. Majority of the respondents (84.2%) agreed that a high teachers' workload limited teachers to integrate ICT in their teaching. A weak positive correlation coefficient of 0.216 was obtained between the teacher's workload and their use of ICT in teaching and learning. This is an implication that teachers' workload had a very minimal influence on ICT integration in the teaching and learning process. They cited challenges like lack of time to prepare for lessons, minimal time to research on the content to be taught and also lack of adequate time to have some training or practice on how to use it. Respondents indicated the need to employ more teachers so as to reduce the workload to manageable levels. Some cited the need to employ ICT assistants to help them and guide the on the use of ICT in their teaching.

The sampled teachers and head teachers indicated that the school management was very vital in their effort to integrate ICT in teaching and learning. Majority of the respondents (47.6%) rated the schools' management willingness to sponsor teachers for training in ICT as average and the level of support from the school management on ICT integration as below average. They also cited as having computer laboratories that were not very functional in their schools. Teachers suggested the need for the school management to provide the required ICT tools in good time and make them readily available; some suggested the need to sponsor teachers for training courses in ICT while others suggested that the school management need to employ ICT assistants to help teachers in preparation of ICT lessons. Majority of the respondents (91.5%) indicated that there lacked clear policy on ICT integration in their schools. A correlation coefficient of positive 0.421 was obtained between schools' ICT policy and the integration of ICT in teaching and learning. This is a fair correlation indicating that ICT policy in schools had a big role in integration of ICT in teaching and learning.

The sampled teachers indicated that ICT infrastructure had some influence on integration of ICT in teaching and learning. Majority of the respondents (54.9%) indicated that they were able to access computers at school though not to a satisfactory level. A correlation coefficient of positive 0.522 was obtained between convenient access to computers at school and the use of ICT in teaching and learning. All the respondents indicated that computers in their schools were electricity driven and that there was consistent power supply which was supplemented by standby generators. The major ICT infrastructure challenges highlighted by the majority of the respondents include; Lack of enough computers and unreliable internet connections at the school level.

5.3 Discussions of key findings

The findings discussed below include teacher related factors, the school management and ICT infrastructure and ICT integration in teaching and learning. The teacher related factors discussed here include competency and confidence, attitude and the workload of the teacher.

Computer competence is defined as the ability to handle a wide range of varying computer applications for various purposes (Tondeur et al 2004). According to Bordbar (2010), teacher's computer competence is a major predictor in integrating ICT in teaching and learning. Majority of the respondents indicated that computer training influenced integration of ICT in teaching and learning. A correlation coefficient of positive 0.404 was obtained between teachers training in ICT and their use of ICT in teaching and learning process. This is a fair correlation implying that ICT training greatly influences the integration of ICT in teaching and learning. The results of the study indicated that training would make teachers acquire knowledge on ICT and make more confident in the use of ICT. 67.1% of the respondents indicated as having training in ICT. 96.2% of this have a certificate in computers (introduction to computers), 3.8% indicated as being holders of a diploma in computers while 32.9% lacked any training in computers. These findings clearly indicate that majority of the teachers had prior training in computers and therefore conquer with the sentiments by Knezek and Christesen (2002) who noted that teachers' competence with computer technology is a key factor of effective use of ICT in teaching.

Ropp (2000) noted that while many teachers have positive attitudes to use educational technologies, they do not necessarily believe in their own ability to use technology in a classroom with students. He indicated that learning and readiness in computers is aided by high

levels of self- efficacy and a positive attitude. It is in view of this that the researcher sought to establish how teachers feel about using ICT in teaching and learning.

Majority (80.5%) of the respondents indicated that they like the use of ICT while 19.5% indicated that it was hard. In addition, however, majority of the respondents (70.7%) indicated that they do not integrate ICT in their teaching with only 29.3% indicating to be integrating ICT in their teaching. The main reason cited for this by the respondents is the fear of failure and lack of technical assistance in their efforts to use ICT in their teaching. A moderate correlation of negative 0.5 was obtained between the shying off of teachers with no ICT training and ICT integration in teaching and learning by teachers. This means that as the shying off of teachers to use ICT increases, the integration of ICT in teaching decreases. Some of the negative aspects of using ICT in teaching and learning cited by respondents include: It takes a lot of time to prepare, some internet sites are not authentic and that it entirely depends on electricity. Albirini, (2006) asserted that one of the factors that greatly influence achievement of meaningful use of computer technology is the teacher's attitude towards the technology in teaching and learning process. The teacher's attitude is a major predictor of the acceptance and actual utilization of computers in the classrooms and in the management of their work. It is therefore very important for teachers to develop a positive attitude towards ICT as their attitude influences its integration in the teaching and learning process. Further the researcher sought to establish the ways in which ICT can be used for teaching and learning in the classroom. Most of the respondents indicated as using ICT in preparing assignments for the learners and making and storing teaching notes. Very few indicated as using ICT in researching on topics to be taught and presenting their content to the learners through power point presentations. The findings indicated that teachers have a positive attitude towards the integration of ICT in teaching and learning. They suggested the need to

expose teachers to technology through sponsored ICT courses by the school management, the need for seminars and workshops on ICT and educating teachers on the benefits of ICT in teaching and learning.

Majority of the respondents 95.1% indicated as having a teaching load of between 21 to 30 lessons which according to them is very high. They also agreed that a high teacher's workload had a negative influence towards the integration of ICT in teaching and learning. These findings conquer with the sentiments of Kipsoi (2012) who reported that teachers were already overloaded; they could not cope with the pressure and more so pressure from ICT training. Laaria, (2013) found out that teachers are overloaded to learn, at the same time teaching and preparing for teaching and practice what they learn. The respondents suggested the need to employ more teachers and ICT assistants for teachers to deal with the problem of a high teacher's workload. According to Andoh, (2012) for teachers to realize the aims of educational system as well as implementing new initiatives, it is necessary to lessen their workload. A weak positive correlation coefficient of 0.216 was obtained between the teacher's workload and their use of ICT in teaching and learning. This is an implication that teachers' workload had a very minimal influence on ICT integration in the teaching and learning process.

All the respondents generally agreed that school managers had a very crucial role in the successful integration of ICT in teaching and learning. Majority of the teachers (47.6%) indicated that the school managers' level of support in ICT integration in their schools was below average. Only 14.6% indicated as being satisfied with the support they get from the school managers. These findings conquer with those of a study conducted by Keiyoro et al (2010) which showed that only 9.5% of teachers from NEPAD and cyber e-schools in Kenya indicated that the

school principals were supportive of ICT integration and the support was linked to principals' belief in the usefulness of ICT in teaching and learning. A moderate positive correlation of 0.54 was obtained between the school management support to teachers and ICT integration. This implies as the management increases support to teachers there will be more use of ICT in teaching and learning. Most of the respondents indicated as having no clear ICT policies in their schools. Generally, the respondents agreed that the school management needed to be more proactive in the efforts to integrate ICT in teaching and learning. There is need for school leadership to have clear ICT policies based on the level of the school. Some of the support needed by the teachers as raised by the respondents include, sponsored training, exposure to ICT through seminars and workshops and employment of ICT assistants to help teachers in their efforts to integrate ICT in teaching and learning.

Albion (1999), states that decisions made by teachers about the use of computers in their classrooms are likely to be influenced by the accessibility and availability of relevant software. Majority (54.9%) of the respondents indicated that they have convenient access to computers at school. A moderate positive correlation of 0.51 was obtained between the convenience of access of computers at school and ICT integration. This means that as the access to computers by teachers increase there is an increase in ICT use by teachers in teaching and learning process. Majority of the teacher respondents (56.1%) and 72.7% of head teachers indicated that there was no reliable internet connection in their schools while 43.9% of the teachers and 27.3% of head teachers indicated as having a reliable internet connection. A fair correlation of positive 0.54 was obtained between the reliability of internet connections and ICT integration in teaching and learning. This relationship shows that as internet reliability increases there is an increase in the use of ICT in teaching and learning. Teachers further agreed with the views that; lack of internet

connection affect integration of ICT, Lack of personal computers among teachers limits integration of ICT in teaching and learning and inability to consistently access computer will affect the integration of ICT in teaching and learning. In addition, the main ICT infrastructure challenge that teachers face includes poor internet connectivity, lack of enough computers and frequent electricity failures especially in schools that lacked alternative source of energy other than electricity. The findings of the study were in line with those of Mulwa and Kyalo (2011) who found out that ICT equipment is a crucial requirement for teachers' readiness to adopt e-learning in curriculum delivery. There is need for schools to acquire the necessary ICT equipment for them to be able to utilize this modern technology effectively.

5.4 Conclusion of the study

From the findings, it was established that the competency of the teacher and their confidence in ICT influenced ICT integration in teaching and learning. Teachers with prior training in ICT were more confident in the use of ICT in teaching compared to those without any training. However, the respondents were not in agreement with the views that teachers with ICT training frequently use ICT in teaching and learning process. All the teachers sampled indicated that computer training of the teacher influences integration of ICT in teaching and learning. Respondents indicated that training would make teachers acquire more knowledge on ICT, make teachers more confident and ensure faster coverage of the syllabus.

Teachers indicated to have considered using ICT in teaching in preparing assignments for the learners, preparing and storing schemes of work, storage of student progress records and making and storing their teaching notes. A minority of the teachers however indicated as using ICT tools to research on the topics to be taught and on presenting lessons using power point presentation.

The main reasons given for this include lack of computer proficiency, lack of digital content in their subject areas and lack of exposure to ICT facilities.

The findings indicated that teachers have a positive attitude towards ICT integration in teaching and learning. Respondents suggested the need to expose teachers more to technology, the need for seminars and workshops on ICT and the need for the school management to sponsor teachers for Training courses in ICT. This will make them more confident in the use of ICT and thus enhance its integration in teaching and learning process.

Teachers were in agreement to a large extent that a high workload of the teacher limited them to integrate ICT in teaching due to lack of adequate time to prepare for such lessons and even time for research on topics to be taught. They suggested the need to have ICT assistants to assist them on ICT matters and also the government should employ more teachers to lessen the burden on them. Teachers agreed that the school management has a crucial role in the integration of ICT in teaching and learning especially in provision of infrastructure. The findings indicated that the school managers were not doing much to help in the integration of ICT in the teaching process as their level of support is rated below average by majority of the respondents. Respondents indicated that most schools were still lacking a clear policy on ICT integration.

The findings indicated that teachers had convenient access to computers at school. A correlation coefficient of positive 0.522 was obtained between convenient access to computers at school and the use of ICT in teaching and learning. This means that access to computers at school greatly influence ICT integration in teaching. Majority of the respondents indicated as lacking reliable internet connectivity in their schools. A correlation coefficient of positive 0.537 was obtained between reliability of internet connectivity and the use of ICT in teaching and learning. This is

an indication that reliability of internet connection influenced ICT integration in teaching. In addition, all the computers used are electricity driven but in majority of the schools there lacked alternative source of energy to be used when there are electricity interruptions. Some challenges that teachers faced include; inability to consistently access computers which affected integration of ICT in teaching and learning, lack of internet connections in schools and frequent power interruptions. The respondents' suggestions on how to improve ICT infrastructure included; subsidizing the cost of computers, ensuring proper installation of electricity, continuous and frequent maintenances of ICT infrastructure available in schools and ensuring there is power back up through standby generators as ways of ensuring successful integration of ICT in teaching and learning.

5.5 Recommendations

Based on the conclusion, the following recommendations are made;

- i.** The results of the study indicated that computer competency and confidence of the teacher influences integration of ICT in teaching and learning as competent teachers did not have fear to use technology. The ministry of education should offer compulsory ICT to would be teachers in Universities and Colleges to enhance ICT skills of the teachers. There is also a need for stakeholders in education to frequently organize in-service training for teachers on ICT issues and emerging trends.
- ii.** The findings indicated that a high teachers' workload influenced integration of ICT in teaching and learning. The Teacher Service Commission (TSC) should employ ICT

assistants in each school and also ensure more teachers are employed to reduce the teaching load of a teacher to a manageable level.

- iii.** The findings showed that teachers had a positive attitude towards ICT integration in teaching and learning. The ministry of education should emphasize the use of ICT in school programmes and provide sponsorships to teachers on ICT training.
- iv.** The findings indicated that school managers influenced integration of ICT in teaching and learning. The ministry of education should ensure that school managers come up with policies on ICT integration in their schools which should be in line with the National ICT policy.
- v.** The results of the study indicated that ICT infrastructure influenced integration of ICT in teaching and learning. The government through the ministry of education should ensure that schools are well equipped with ICT infrastructure especially computers and electricity connection. Kenya institute of Curriculum development should ensure digital content prepared is disseminated to schools for use in all subjects.

5.6 Suggestions for further Research

In this study a number of issues could not be comprehensively covered because of a wide range of limitations hence the following areas were suggested for further study.

- 1.** This study focused on Integration of ICT in teaching and learning in secondary schools in Githunguri Sub County. The researcher recommends that further research can be carried out to establish the extent of ICT integration in other areas like in management of resources and finances at the school level.

- 1.** In this study the focus was on the teachers and head teachers in public secondary schools.
The researcher further recommends further research to be carried out to establish the role of learners in integration of ICT in the learning process.

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APPENDICES

APPENDIX I

LETTER OF INTRODUCTION TO RESPONDENTS

University of Nairobi,
P.O. BOX 30197,
NAIROBI.

27th August, 2015.

Dear sir/madam

**REF: FACTORS INFLUENCING THE INTEGRATION OF ICT IN TEACHING
AND LEARNING IN SECONDARY SCHOOLS IN GITHUNGURI SUB COUNTY,
KIAMBU COUNTY, KENYA**

I am a student from University of Nairobi taking a master of Distance Education. I am carrying out a research on the above mentioned topic. The purpose of this study is to establish the factors influencing the integration of ICT in teaching and learning in Githunguri Sub County, Kiambu County, Kenya. Kindly respond to the questionnaire given as correctly and honestly as possible. Be assured that your identity and response will be treated with **utmost confidentiality** and used **for purpose of this study only**. For this reason, **do not write your name** on the questionnaire.

I look forward to your assistance and cooperation. Thank you.

Yours sincerely

Willy K. Gichimu

APPENDIX II

QUESTIONNAIRE FOR THE TEACHERS

This questionnaire contains four sections. Kindly respond to all the questions.

SECTION A-DEMOGRAPHIC INFORMATION

1. What is your gender?

Male [] Female []

2. Indicate your age in the appropriate box

Less than 25 years [] 26-35 years []

36-50 years [] 51-60 years []

3. What is your highest Academic qualification?

Diploma [] Degree (B.Ed.) []

BA/BSC with PGDE [] Masters []

4. How long is your teaching experience?

Less than 5 years [] 6-10 years []

11-15 years [] 16-20 years []

Over 20 years []

5. In which category is your school?

County schools [] Sub County Boarding school []

SECTION B:

THE EXTENT TO WHICH, TEACHER RELATED FACTORS INFLUENCE THE INTEGRATION OF ICT IN TEACHING AND LEARNING.

(a) Influence of Teachers ICT competency and confidence on ICT integration in Teaching and learning.

1. Do you think that ICT competency and confidence of a teacher influences ICT integration in teaching and learning?

Yes [] No []

2. Do you have any training on ICT use as a tool for teaching and learning?

Yes [] No []

3. If yes, to what level?

Certificate []

Diploma []

Degree []

4. What challenges do you face in your efforts to integrate ICT in your teaching?

.....
.....

5. Using a scale of 1 to 5 below (where 1=Strongly disagree, 2= disagree, 3= Somewhat agree, 4=agree, 5= Strongly agree. Please say to what extent you agree or disagree with each statement.

	STATEMENT	1	2	3	4	5
	ICT competency depends on Training					
	Teachers with ICT training are more confident in its use					
	Teachers with no prior ICT training shy from using ICT in teaching					
	Teachers with ICT training frequently use ICT in their teaching and learning					
	Teachers confidence in the use of ICT largely depends on Competency					

(b) The influence of Teachers' attitude on ICT integration in Teaching and learning.

1. What is your feeling about the use of ICT as a tool in teaching?

- (a) I like it. [] (b) Its hard. [] (c) I don't like it. []

2. (i) Do you use ICT in your teaching? Yes [] No []

(ii) If yes, in what ways?

- (a) Giving assignments to learners []
- (b) Preparing assignments for learners []
- (c) Researching on topics to be taught []
- (d) Making and storing teaching notes []
- (e) Power point presentations in your lessons []
- (f) Other, state.....

(iii) If No, state reasons that contribute to the failure to use,

.....

3. (i) How confident are you about your ability to use ICT in the classroom?

- (a) Very confident []
- (b) Confident []
- (c) Fairly confident []
- (d) Least confident []

(ii) Give reasons for your choice in 3 (i) above

.....

.....

4. What do you believe are some of the negative aspects associated with using ICT in teaching and learning? Indicate with a tick (✓) where it's true and a cross (x) where not true.

- (a) It takes a lot of time to prepare []
- (b) It entirely depends on electricity []
- (c) Some internet sites are not authentic []
- (d) There are very high chances of losing work when systems crash []

5. What do you think can be done to positively change teachers' attitudes towards the use of ICT in teaching and learning?

.....

.....

(c) Influence of Teachers' workload on ICT integration in teaching and learning.

1. What is your teaching load? (No. of lessons taught in a week)

- (a) Below 15 lessons. []
- (b) Between 15 and 20. []
- (c) Between 21 and 25. []
- (d) Between 26 and 30. []

(e) Above 30 lessons. []

2. To what extent do you agree that teachers' workload influence ICT integration in teaching and learning?

1. Strongly disagree. []

2. Disagree. []

3. Somewhat agree. []

4. Agree. []

5. Strongly agree. []

3. State three ways in which a high teachers' workload negatively influences ICT integration in teaching and learning.

.....
.....

4. In your opinion, what do you think should be done regarding teachers' workload so as to enhance their integration of ICT in their teaching?

.....
.....

SECTION C:

THE EXTENT TO WHICH, SCHOOL MANAGEMENT INFLUENCE THE INTEGRATION OF ICT IN TEACHING AND LEARNING.

1. Do you think the school management is vital in the integration of ICT in teaching and learning in your school? Yes [] No []

2. In your opinion, how would you rate the level of support on ICT integration from your school managers? Tick (✓) appropriately

- (a) Poor []
- (b) Below average []
- (c) Average []
- (d) Above average []
- (e) Good []
- (f) Excellent []

3. (i) Does your school has a clear policy on ICT integration in teaching and learning?

Yes [] No []

(ii) Do you have a functional computer laboratory in your school?

Yes [] No []

If yes, how many computers are working and functional?.....

4. How would you rate the willingness of the school managers to sponsor teachers for training on ICT use in teaching?

- (a) Below average []
- (b) Average []
- (c) Good []
- (d) Very good []

5. In your opinion, what support should the school managers give to teachers to enhance successful integration of ICT in teaching and learning?

.....

SECTION D:

THE EXTENT TO WHICH ICT INFRASTRUCTURE INFLUENCES THE INTEGRATION OF ICT IN TEACHING AND LEARNING.

1. Do you have convenient access to computer at school? Yes [] No []

2. In your school, do you have a reliable internet connection?

Yes [] No []

3. What is the main source of energy used to run computers in your school?

(a) Solar Panels []

(b) Electricity []

(c) Generators []

4. If the computers are electricity driven, is there consistency of electricity in school?

Yes [] No []

5. (a) When the main source of energy is not available, is there an alternative source of energy? Yes [] No []

(b) If yes, name the alternative source of energy.....

6. Using the scale of 1 to 5 below (where 1=strongly disagree,2=disagree,3=somewhat agree,4=agree,5=strongly agree) please say how much you agree or disagree with each statement

Statement	1	2	3	4	5
Lack of internet connections affects the integration of ICT in teaching and learning.					
Lack of personal computers among teachers limits the integration of ICT in teaching and learning					
Inability to consistently access computer will affect the integration of ICT in teaching and learning					

7. What is the main ICT infrastructure challenge that you face personally in school?

- (i) Lack of electricity []
- (ii) Poor internet connectivity []
- (iii) Frequent power failure []
- (iv) Lack of enough computers []

8. In your opinion, what do you think should be done by schools to improve on ICT infrastructure?

.....

.....

APPENDIX III

QUESTIONNAIRES FOR HEAD TEACHERS

Kindly respond to all the questions in the questionnaires

SECTION A-DEMOGRAPHIC INFORMATION

1. What is your gender?

Male [] Female []

2. Indicate your age in the appropriate box

Less than 25 years [] 26-35 years []

36-50 years [] 51-60 years []

3. What is your highest Academic qualification?

Diploma [] Degree (B.Ed.) []

BA/BSC with PGDE [] Masters []

4. How long is your teaching experience?

Less than 5 years [] 6-10 years []

11-15 years [] 16-20 years []

Over 20 years []

5. In which category is your school?

County schools [] Sub County Boarding school []

Sub County Day School [] Special school []

SECTION B:

THE EXTENT TO WHICH, TEACHER RELATED FACTORS INFLUENCE THE INTEGRATION OF ICT IN TEACHING AND LEARNING.

(i) Influence of Teachers ICT competency and confidence on ICT integration in Teaching and learning.

1. How many teachers in your school are ICT competent in its use?

.....

2. Do you think that computer training of teachers is important in improving teachers' ICT skills? Yes [] No []

3. In your school, do you have enough educational resources to integrate ICT in teaching and learning? Yes [] No []

4. How would you rate the level of ICT confidence among your teachers?

(a) Poor []

(b) Below average []

(c) Average []

(d) Good []

(e) Excellent []

5. What do you think should be done to improve on teachers' competency and confidence in the use of ICT tools in teaching and learning?

.....

(ii) The influence of Teachers' attitude on ICT integration in Teaching and learning

1. Do you have computers in your school? Yes [] No []

2. Do teachers use the computers to prepare for their lessons?

Yes [] No []

3. Are there teachers in your school who have taken part in the ESP-ICT project by the ministry of Education? Yes [] No []

4. Do teachers in your school use internet to access educational resources?

Yes [] No []

5. In your opinion, do teachers like utilizing ICT in the teaching and learning process?

.....

6. Based on your own opinion, what are some of the reasons that would make teachers not to utilize ICT in teaching even when ICT tools are availed?

.....

7. What measures would you suggest towards modifying the teachers' attitude towards integration of ICT in teaching and learning?.....

.....

(iii) The extent to which a teachers' workload influences the integration of ICT in teaching and learning.

1. On average what is the workload of your teachers?

(a) Below 15 lessons []

(b) Between 15-20 []

(c) Between 21-25 []

(d) Above 25 lessons []

2. Do you think a teachers' workload influences the integration of ICT in teaching and learning? Yes [] No []

3. What do you think should be done to deal with the problem of high teachers' workload?

.....

4. In your school, are teachers using ICT in teaching provided with technical support from technicians? Yes [] No []

5. State three ways in which a high teachers' workload negatively influence the integration of ICT in teaching and learning.

.....

SECTION C:

THE EXTENT TO WHICH, SCHOOL MANAGEMENT INFLUENCES ICT INTEGRATION IN TEACHING AND LEARNING.

1. (i) Do you think the school management has a vital role in the integration of ICT in teaching and learning? Yes [] No []

(ii) If yes, in what ways do the managers in your school support teachers in their efforts to integrate ICT in teaching and learning?.....

.....

(i) How many functional computers are there in your school?.....

2. (i) Do you personally use ICT in teaching and carrying out your administrative duties?

 Yes [] No []

(ii) If yes, in what ways?

.....

(iii) If No, give three reasons for the failure to use ICT.

.....

3. (i) Do you have a clear policy on ICT integration in teaching and learning in your school?

Yes [] No []

(ii) Do you think an ICT policy is important for successful integration of ICT in teaching and learning? Yes [] No []

4. (i) In your school, do the school management sponsor teachers for training courses in ICT? Yes [] No []

(ii) If yes, how many teachers have benefited from such sponsorship?

SECTION D:

THE EXTENT TO WHICH ICT INFRASTRUCTURE INFLUENCES THE INTEGRATION OF ICT IN TEACHING AND LEARNING.

1. Do teachers in your school have convenient/consistent access to computers at school?

Yes [] No []

2. Do you have a reliable internet connection in your school? Yes [] No []

3. What is the main source of energy used to drive the computers in your school?

(a) Electricity []

(b) Solar energy []

(c) Generators []

4. Is there consistent supply of power in your school? Yes [] No []

5. In your opinion, does your school have the right ICT infrastructure? Yes [] No []

6. Do you think ICT infrastructure influences the integration of ICT in teaching and learning in secondary schools? Yes [] No []

7. What plans do you have of expanding ICT programs in your school?

.....

8. In your view, what are the major challenges of integrating ICT in teaching and learning?



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

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NAIROBI-KENYA

Ref: No. **NACOSTI/P/16/35422/9201**

Date:

22nd February, 2016

Willy Kimani Gichimu
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “*Factors influencing ICT integration in teaching and learning in secondary schools in Githunguri Sub County, Kiambu County,*” I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for a period ending **22nd February, 2017.**

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

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


DR. S. K. LANGAT, OGW
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kiambu County.

The County Director of Education
Kiambu County.



