

**USE OF INFORMATION COMMUNICATION TECHNOLOGY IN
TEACHING AND LEARNING PROCESSES IN SECONDARY
SCHOOLS IN RACHUONYO SOUTH DISTRICT, HOMA-BAY
COUNTY, KENYA**

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for the Award of the Degree of Master of Education in Curriculum
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DECLARATION

This research project is my original work and has not been presented for a degree in any other university

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DEDICATION

I dedicate this project to my wife Roseline A. Odhiambo for her immense support during the entire period of my study. To our three sons Paul, Vincent and Japheth two daughters, Dorah and Benedette for their perseverance during my long absence from home when they needed me most. To our loving father Elijah Obonyo and all my brothers for their support and encouragement.

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TABLE OF CONTENTS

Content	Page
Title page	i
Declaration.....	ii
Dedication.....	iii
Acknowledgement	iv
Table of contents.....	v
List of tables	x
List of figures.....	xi
Abbreviations and acronyms	xii
Abstract	xiii

CHAPTER ONE

INTRODUCTION

1.1. Background to the study	1
1.2. Statement of the problem.....	4
1.3. Purpose of the study	5
1.4. Objectives of the study	6
1.5. Research questions	6
1.6. Significance of the study	7
1.7. Limitations of the study.....	7
1.8. Delimitations of significant terms.....	8
1.9. Basic Assumptions of the study.....	8
1.10. Organization of the study	9
1.11. Definition of terms	9

CHAPTER TWO
LITERATURE REVIEW

2.1. Introduction.....	12
2.2. The concept of ICT integration.....	12
2.2.1. ICT integration	13
2.3. Effects of ICT on students academic performance	15
2.3.1. ICT and student performance.....	15
2.3.2. Individual learner interactivity	15
2.3.3. Engage students by motivation	16
2.3.4. Increasing learner independence	16
2.3.5. Enhancing efficiency and effectiveness of education administration .	17
2.3.6. Active learning and authentic assessment	17
2.3.7 Teachers pedagogical skills in teaching and learning processes.....	17
2.4. Impact on the role of teachers.....	18
2.4.1. Access to information.....	18
2.4.2 Teacher-students relationship	19
2.5. Teachers’ attitude of the application of ICT in teaching and learning...	19
2.6. Student’s attitude towards use of ICT to enhance teaching and learning	20
2.7. Challenges affecting the use of ICT in enhancing teaching and learning attitude	22
2.8. Summary.....	25
2.9. Theoretical framework	25
2.10. Conceptual framework of ICT integration in teaching and learning ...	28

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction.....	30
3.2. Research design.....	30
3.3. Target population	30
3.4. Sample size and sampling techniques	31
3.5. Research instruments.....	32
3.6. Validity of instruments	32
3.7. Reliability of instruments	33
3.8. Data collection instruments	34
3.9. Data analysis technique	34

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1. Introduction.....	36
4.2. Questionnaire return rate	36
4.3. Demographic information of respondents	36
4.3.1. Demographic information of principals	37
4.2. Age of the principals	37
4.3. Professional qualification of principals.....	38
4.4. Demographic information of teachers at the schools under study	39
4.5. Age of the teachers.....	40
4.5.1. Demographic Information of the Students at the Secondary Schools.	42
4.6. Age Distribution of the students	42
4.7. Respondents experience, knowledge and skills in use of ICT.....	43

4.8. Students' ICT skills and knowledge.....	46
4.9. Principals' training/course in ICT.....	49
4.10. Establishment of ICT departments.....	51
4.11. Accessing the internet.....	51
4.12. Using ICT in teaching and learning	52
4.13. Availability of ICT personnel in the schools.	53
4.14. Availability of various ICT.....	54
4.15. Teachers perception of the application of ICT in teaching and learning.....	55
4.16. Perception of students towards ICT in teaching and learning	57
4.17. Teachers perceived skills in using ICT	58
4.18. General use of ICT	59
4.19 Students involvement in using ICT.....	60
4.18. Challenges or barriers for effective ICT implementation in schools ...	60

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction.....	64
5.2. Summary of the study.....	64
5.3. Summary of the study findings	65
5.4. Conclusion	67
5.5. Recommendations	68
5.6. Suggestions for further research	69
REFERENCES	70

APPENDICES

Appendix I: Letter of introduction.....	77
Appendix II: Questionnaire for students	78
Appendix III: Questionnaire for teachers.....	81
Appendix IV: Questionnaire for principals	89
Appendix V: Observation schedule	95
Appendix VI: Research authorization letter	96
Appendix VII: Research permit.....	97

LIST OF TABLES

Table 4.1. Gender Distribution of Principals.....	37
Table 4.2. Age Distribution of the Principals.....	37
Table 4.3. Professional Qualification of the Principals.....	38
Table 4.4. Gender of the Teachers.....	39
Table 4.5. Professional Qualification of Teachers in the Schools.....	41
Table 4.6. Age Distribution of the Students.....	43
Table 4.7. Principal experience in using ICT.....	44
Table 4.8. Teachers Experience in Using ICT.....	47
Table 4.9. The core theme of the ICT Course/Training that the teachers had attended.....	48
Table 4.10. The Core Theme of the ICT Course or Training that the Principals had Attended.	50
Table 4.11. Accessing the internet by Teachers and Students	51
Table 4.12 Availability of ICT Personnel in the School.....	53
Table 4.13. Availability of various ICTs in the Schools.....	54
Table 4.14. Descriptive Statistics of Teachers Perception of the Application of ICT in Teaching	56
Table 4.15. Result of Teachers' perceived ICT skills.....	58
Table 4.16. Descriptive Statistics of Hardware used by Teachers	59
Table 4.17. Students' involvement in using Computers.	60

LIST OF FIGURES

Figure 2.1. Conceptual Framework	28
Figure 4.1. Age of the teachers in the schools.....	40
Figure 4.2. Gender of the Students	42
Figure 4.3. Respondents Experience as teachers in the whole of their career.....	45
Figure 4.4. Students ICT skills and knowledge	46
Figure 4.5. Teachers who had attended an ICT Course or Training.....	47
Figure 4.6. Principals' ICT Training.....	49

ABBREVIATIONS AND ACRONYMS

BECTA	British Educational Communication and Technology Agency.
D.E.O	District Education Officer
DEB	District Education Board
DSTV	Digital Satellite Television.
EFA	Education For All.
E-learning	Electronic learning
ICT	Information Communication Technology
K.C.S.E	Kenya Certificate of Secondary Education.
K.I.E	Kenya institute of Education.
KENET	The Kenya Education Network Trust.
KESSP	Kenya Education Sector Support Programme.
MDGs	Millennium Development Goals.
MoE	Ministry of Education.
MOEST	Ministry of Education, Science and Technology.
P.D.E	Provincial Education Office.
UK	United Kingdom
UNESCO	United Nations Education, Scientific and Cultural Organization.

ABSTRACT

The purpose of this study was to investigate the use of Information Communication Technology (ICT) in teaching and Learning in Rachuonyo South District secondary schools. The focus was on three main subject matters: on ICT use and competence, on teacher and student and on ICT infrastructure and teaching practices. The study is closely connected to the national educational policy, which has aimed strongly at supporting the implementation of ICT in pedagogical practices at all institutional levels. Six research questions were formulated to guide the researcher investigate the phenomena. A descriptive survey design was used to collect data from the field through the use of questionnaire and an observation schedule. The result indicated that ICT has not been successfully integrated in teaching and learning in schools. In general, students are capable and motivated users of computers. Some students have the skills to use new kinds of applications and their ICT skills are wider although not necessarily adequate. Teachers' skills are more heterogeneous. The large majority of teachers have sufficient skills for everyday and routine working practices, but many of them still have difficulties in finding a meaningful integration of ICT into teaching and learning. Most teachers reported that the use of ICT in learning and teaching was slow in the past years and proposed upgrading of students computer labs and accelerating internet connectivity in the schools. Further, teachers' good ICT competence helps them to adopt new pedagogical practices and integrate ICT in a meaningful way. The results also showed that students are capable and motivated users of new technology and their ICT skills are wide, although not necessarily adequate; the working habit might be ineffective and wrong. Some students have a special kind of ICT related adaptive expertise, which develops in a beneficial interaction between students and teachers, and individual interest and activity. The most common goal to student use of ICT is challenged by the internet, digital communication and the need to filter information. Since students' ICT skills can be translated to increased creativity, which include innovation and productive workforce, to develop capacity to ICT which support the country's knowledge base. The findings further indicated that ICT integration realized some challenges such as availability of sufficient number of ICT tools, lack of motivation and support and lack of technical support. The challenges are either teacher-level (Micro-level), school level (Meso-level) or system level (Macro-level). These barriers have hindered successful implementation of ICT into teaching and learning processes. The study also recommended that teachers should be given sufficient training on how to use ICT tools to enhance teaching and learning in schools. The study also recommended that students should be equipped with ICT skills such as Microsoft software applications such as word, excel and access. Finally, further research on the perception of teachers and students towards the use of ICT in enhancing teaching and learning and relevant strategies for using ICT to improve teaching and learning practices should be conducted.

CHAPTER ONE

INTRODUCTION

1.1. Background to the study

The use of Information Communication Technology (ICT) in education and training has been a priority in most European countries during the last decade, but progress has been uneven (Pelgrum, 2004). In most developed countries such as UK, schools have embedded the use of ICT in teaching and learning into the curriculum and demonstrate high level of effective and appropriate use to support teaching and learning Organization for Economic Cooperation and Development, (OECD, 2004).

Furthermore, (UNESCO, 2005) reiterates that those countries have integrated ICT into their education system because of its profound implications such as enabling teachers and students to construct rich multi-sensory, interactive environments with almost unlimited teaching and learning potential. According to (Unwin, 2004), computers and internet can be used to increase teachers' basic skills and subject mastery, to provide resources that can later be used in classroom, and to help teachers build familiarity with specific instructional approaches. (Privateer, 1999) also notes that ICT is supposed to add value to education and to support more effective pedagogy to provide knowledge for learners and by enhancing communication that promotes learning. In addition, as ICT becomes more pervasive, computer based equipment is integrated into every aspect of schools operation, having thus an influence on the student's performance. A number of researchers including

(Iding et al, 2000) among others assert that the use of ICT in teaching and learning can help learners become more knowledgeable. In addition to efforts to employ ICT to improve learning, the emergence of knowledge economy has also brought a much greater emphasis on education (Wong, 2003).

The rapid growth of the global economy and the information based society has pressurized education systems round the world to use ICTs to teach the knowledge and skills they need in the 21st Century (World Bank, 2004). The growth of the ICT sector has challenged teachers to prepare for effective use of the new teaching and learning tools in their teaching profession. (UNESCO, 2002) (Laferreire, Breuleux and Bracewell, 1999) argue that there are significant benefits of using ICT as part of teaching and learning process as long as teachers recognize the relationship between the use of ICT and overall curriculum. (Haddad and Draxler ,2005) point out that different ICTs do make some valuable contributions to various parts of educational development and effective learning through expanding access, promoting efficiency, improving the quality of learning, enhancing quality teaching and improving management systems.

On the contrary, many developing countries in Africa are living in a world of technological deficiency, that is, lack of access to knowledge that is learnt via the internet (OECD, 2006). Additionally, if Africa aims to better prepare its citizens for the challenges of the 21st century, it must also foster thorough integration of ICT in order to tap new, attractive, promising and diversified

potentials. In cognizance of the critical opportunities accorded by ICT in service delivery as well as teaching and learning, the governments of many African countries have over the years invested heavily in the requisite ICT infrastructure.

New partnership for African's Development, (NEPAD, 2003). Grabe and Grabe, (2007) emphasizes that technologies can play an important role in enabling students gain skills and knowledge in the teaching and learning process. In Kenya, this sessional paper NO1 of 2005 emphasizes that ICT skills play a key role in Promoting the economic development of a country MOEST (2005). As a result, the government recognized that an ICT literate workforce is the foundation on which Kenya can acquire the status of knowledge and economy.

The Government as a result has made education the avenue for equipping the nation with ICT skills in order to create a vibrant and sustainable economic growth. The National ICT policy was launched in 2006 in response to issue raised in seasonal paper NO1 of 2005 according to MOE, (2006). It was also meant to assure the nation achieve part of the Millennium Development Goals (MDGs). The policy framework of Ministry of Education indicates that there are a number of challenges concerning access to and use of ICT in Kenya, including high level of poverty, limited rural electrification and power disruption. Most secondary schools have some computer equipment. However, this could consist of a few computers in the schools operations. Very few secondary schools have sufficient ICT tools for teachers and

students. Even the schools, which have computers, the students-computers ratio is 150:1 (Farell, 2007).

1.2. Statement of the problem

The use of information and communication technology (ICT) in Kenyan education is lagging behind expectation and desire. This was revealed by the fact while most secondary schools have some computer equipment; only a fraction was equipped with basic ICT infrastructure necessary for teaching and learning. Essentially, ICT in education is used to promote information literacy that is the ability to access use, evaluate information from different sources so as to enhance teaching and learning, solve problems and generate new knowledge. Furthermore, United Nations and the World Bank affirms that ICT can increase access to education network for students, teachers and broaden availability of quality education material for emerging global economies.

According to (MOEST, 2003) if secondary schools in Kenya provide access to ICTs, there would be improvement in quality education that would enable improve the productivity and competitiveness of Kenya's human resource pool by developing a highly skilled human resource base to respond to social and economic challenges.

However, was noted that Rachuonyo South district in Homabay County like many other districts in the county was still limited to computer use in secondary schools. Statistics from the DEOs office Rachuonyo South indicated that only eight Secondary schools had embedded the integration of

ICT out of eighty-five Secondary schools in the district. This signified that over 90% of the schools had not embraced ICT in their curriculum. This described the use of ICT in the district as almost negligible. This meant that learning outcomes of the students in secondary in the district might be dismal due to the absence of ICT in most of the secondary schools in the district.

This short fall in learning outcomes created a “gap” because it is at secondary schooling where returns to student education are highest and it is particularly important to acquire skills and competencies needed to become ideally empowered to respond to social change in societies for the better. But without ICT in education, especially students in Rachuonyo South might lack the social empowerment that can make them compete with others favorably. Thus, failure to re-shape education practices to embrace ICT in schools in the district might be the main bottleneck preventing the students from acquiring equitable access of educational opportunities for quality education. Therefore, the researcher intended to find out the use of computers in teaching and learning process and its subsequent effects in Rachuonyo South District schools.

1.3. Purpose of the study

The purpose of this study was to establish use of Information Communication Technology (ICT) in teaching and learning in secondary schools in Rachuonyo South District, Homa-bay County.

1.4. Objectives of the study

The objectives of this study were as follows:

- i) To examine availability of ICT tools for use in enhancing teaching and learning.
- ii) To establish the extent to which teachers were endowed with skills on ICT use in enhancing teaching and learning.
- iii) To investigate the principals' and teachers' attitude towards the use of computers in teaching and learning.
- iv) To establish the students' attitudes towards the use of computers in teaching and learning.

1.5. Research questions

Based on the objectives of the study, the following were the research questions for examination:

- i) To what extent had secondary schools in Rachuonyo South District established ICT tools for use in enhancing teaching and learning?
- ii) To what extent were teachers endowed with skills on ICT use in enhancing teaching and learning?
- iii) What were the principals and teachers' attitudes towards the use of computers in teaching and learning?
- iv) Which were the factors that encouraged the use of ICTs in enhancing teaching and learning processes?

1.6. Significance of the study

ICTs have the potential to play a powerful role in enhancing teaching and learning in schools and preparing students to acquire skills, knowledge and competencies to enable them compete in the emerging global 'knowledge' economy. Data and information obtained in this study would hopefully be used to provide various education stakeholders with information that ICT integration in schools held a great promise in developing economies like Kenya. The findings could also help the Ministry of Education (MOE) in formulation of policies and strategies that can be used to enhance the academic standards in our schools. The study will also make possible recommendation towards increasing the use of ICTs in enhancing teaching and learning processes.

In addition, the study provided information to curriculum developers in Kenya such as K.I.E on the benefit of computers as an instructional mode. Furthermore, KNEC might benefit by determining which approach of instruction can lead to better achievements in examinations. Finally, the study can also help other researchers and educational administrators in strengthening the educational theories behind ICT use in schools.

1.7. Limitations of the study

The use of ICT in teaching and learning is considered to be very crucial and therefore little time for the respondents to respond to the questionnaire would make the findings absolute. The principals, teachers and students may have

given responses that seemed not to portray the actual phenomena in the study because most of the schools were in their early phase of ICT integration into teaching and learning characterized by patchy and coordinated provision and use. Further, the schools were far apart and therefore, the long distance associated with poor road network within the district would negatively affect the study. It was also not possible to relate improvement in teaching and learning on only the use of ICT because many unobservable factors might also influence better outcomes of teaching and learning in schools.

1.8. Delimitations of significant terms

The study was conducted in secondary schools that use computer assisted approach to learning. The scope of the study was delimited to schools that had had ICT integration in their process of learning for the last three years since the introduction of ICT in the school. The research was conducted in schools that had had at least 10 computers and using the computers for instructional purposes.

1.9. Basic Assumptions of the study

The study was based on the following assumptions:

- i) The information given by the respondents were true and free from bias.
- ii) That there could be a positive impact if ICT is used appropriately in teaching and learning.
- iii) That the information given by the respondents were treated as confidential.

1.10. Organization of the study

The study is organized into five chapters. Chapter one presents a general introduction and includes the background to the study, the statement of the problem, purpose of the study, objectives of the study, research questions, significance, limitations, delimitations, basic assumptions of the study, definition of significant terms and the organization of the study. Chapter two covers literature reviews on use of ICT in teaching and learning in secondary schools, the theoretical background in use of ICT in teaching and learning and the conceptual framework of ICT use in secondary schools. Chapter three describes the research methodology to be used. This included the research design, target population, sample and sampling procedure and data analysis techniques. Chapter four focused on data analysis, interpretation and discussion of findings. Chapter five contains the summary, research findings, discussions, conclusions and recommendations of the study.

1.11. Definition of terms

The following terminologies have been used throughout this study:

Computer: refers to Electronic machine operated under the control of instructions stored in its own memory, that can accept data (input) manipulate data according to specific rules (process) produce results (out-put) and store the results for future use.

Computer literacy:- refers to people being able to use computer technology to facilitate the completion of necessary tasks and the solution of problems.

Curriculum: refers to a set of courses, and their content offered at school or university.

E-learning: refers to the purposeful use of electronic systems or computer in support of learning process, Allen 2003.

Hardware: refers to tangible components of computers including processors, input, output communication and memory.

ICT Integration: refers to the process of using any ICT (Information resources on the web, multi-media programmes in CD-ROMs, learning objects or other tools) to enhance student teaching, William, 2003.

Impact: refers to the overall achievement of an intervention on the educational system and can be described by a variety qualitative of indicators such as improvements in national test results or improved learning in schools' depending on the policy target. It is the end-point of an intervention involving input, process, output and outcome.

Informal learning: It refers to the life-long process whereby every individual acquires attitudes, values, skills and knowledge from daily experiences and the educative influences and resources in him or her environment, from the library and the ICTs, Colley, H. Hodkinson, P & Malcom J. 2002.

Information and Communication Technologies (ICTs): refers to networks that provide new opportunities for teaching, learning and training through delivery of digital contents, Prytherch 2000: 357. For the purpose of this study and in the context of curriculum, ICTs will refer to the range of tools and techniques relating to computer-based hardware and software, to

information sources as the internet, audio and video tapes, CD-ROMs and DVDs.

Integration: refers to a sense of completeness or wholeness, Earle, 2002; by which essential elements of a system are seamlessly combined together to make a whole.

Pedagogy: refers to what the teachers do when they interact with children to support their learning. (Most educators would consider that pedagogy encompasses the beliefs and actions of teachers including their teaching strategies, the organization of learning experiences and the learning environment generally.

Questionnaire: refers to information data collection to be undertaken that consist of students, teachers and administrators on the resources required and ICT assisted educational support.

Software: refers to sets of instructions and data used by computers, sometimes referred to as computer programmes.

Student-centered teaching: refers to teaching that allows students to develop critical thinking and problem-solving skills, foster independent learning and enable students to be responsible for learning and collaborate with other contacts.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter discussed literature on what ICTs in teaching and learning entail, theoretical back-ground in use of ICT in teaching and learning, global overview of ICT, ICT in education in African context, ICT education in the Kenyan context, conceptual framework of the study and theoretical framework. Specifically, this review provides a framework of understanding regarding this study.

2.2. The concept of ICT integration

The term Information Communication Technology (ICT) has had a long history in its evolution process. According to Pelgrum and Law (2003), towards the end of 1980's, the term 'computers' was replaced by IT (Information Communication Technology). This signified as shift of focus from computing technology to the computer's enhance capability to store and retrieve information. This was followed by the introduction of the term 'ICT' around 1992, when e-mail started to become available to the general public. The concept of Information Communication Technology consists of three words. The term 'Information' refers to any communication or representation of knowledge such as facts, data or opinion in any medium. 'Communication' is an integral part of human existence. It refers to the process of transferring information from a sender to a receiver with the use of a medium in which the Communication Information is understood by both. 'Technology' is the

practical form of scientific knowledge or the science of application of knowledge.

Therefore, Information Communication Technology (ICTs) are commonly defined in education as 'a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information' Blurton, (2000). These technologies include computers, the internet, broadcasting technologies (Radio and Television), and (Mobile) telephony. Basically ICT is a tool. It can be hardware (such as Computers, Digital cameras), software (such excel, discussion forum) or both.

2.2.1. ICT integration

Integrating ICT in to teaching and learning is not a new concept. It may be as old as other technologies such as radios or televisions. However, with the rapid development of emerging technologies, such as web technology, ICT integration has increasingly attracted the attention of educators. Technology should be used not because it is available or it has been shown effective in some cases. It should be used to enable the process and enhance learning because inappropriate use of technology can lead to negative effects Russel, (1999).

Integration has a sense of completeness or wholeness (Earle, 2002), by which all essentials elements of a system are seamlessly combined together to make a whole. In education, simply handing out to students a collection of websites or CD-ROM programmes, taking your students to the computer lab once a week or using an electronic worksheet is not necessarily ICT integration. In a

properly prepared ICT integrated lesson, ICT and other crucial educational components such as content and pedagogy are molded into one entity. As a result, the objective of the lesson may be achieved: but if the ingredients were taken away from the ICT integrated lesson, the quality of the lesson would be somehow be diminished William, (2003).

Instead, technology is integrated when it is used in a seamless manner to support and extend curriculum objectives and to engage students in a meaningful learning. It is not something one does separately; it is part of the daily activities taking place in the classroom. Based on the above, within the education sector in Kenya. ICT is defined as the seamless incorporation of technology to support and enhance students' engagement in meaningful learning and for attainment of curriculum objectives.

ICT integration is more of a process rather than a product. The computer should be fitted into the curriculum not the curriculum into the computer Earle, (2002). Therefore, effective ICT integration should focus on pedagogy design by justifying how the technology is used in such a way and why. Effective ICT integration into learning process has the potential to engage learners. Additionally, ICT can support various types of interactions in the learning environment: learner – content, learner- learner, learner-teacher and learner-interface. These types of interactions make the learning process more interactive and learners more active and engaged Wong et al, (2006).

2.3. Effects of ICT on students academic performance

As with ICT more generally, direct casual effect are not easily identifiable. Furthermore, drawing clear conclusions on the effect of ICT from the range of research evidence and studies can be problematic. There are a number of factors that limit effective comparison, such as difference in sample size, methodologies and effects, not to mention many differences between education systems in different countries. Notwithstanding these reservations, a number of proven effects of ICT in terms of learning outcomes emerge. They include:

2.3.1. ICT and student performance

When considering the effects of ICT in education, there tends to be a focus on whether and to what extent ICT can raise student performance. According to research conducted by the British Educational Communication and Technology Agency Becta, (2000), there is evidence of a statistically positive association between ICT and higher achievement. Lowe, (2001) supports this view by arguing that computer based education positively affected students achievement when compared to traditional classroom instruction.

2.3.2. Individual learner interactivity

Recent trends towards cognitive approach on teacher-learner integration suggest that the learning process can be enhanced through the use of ICT. For effective use of ICT in instruction, the pedagogical practices used by teachers will need to change from teacher based to learner based Underwood, (1998).

Furthermore due to the interactive nature of ICT, it is well situated for creative learning approach in which experimentation and critical thinking are emphasized World Bank, (2004)

2.3.3. Engage students by motivation

Studies carried out in UK by impaCT2, (2000) on student attainments revealed that there is a positive effect on behavior, motivation, communication and process scales when teachers use ICT in teaching and learning. This is most often linked to a shift in the attitude of students and greater involvement in learning activities. This view is further emphasized by the e-learning Nordic, (2006) which places a strong emphasis on ICT impact on student's motivation, engagement and creativity. Moreover, ICT is seen as increasing students confidence and motivation by making school work more enjoyable, considered as fun and not a regular education and hence students enhance their learning capacity.

2.3.4. Increasing learner independence

ICT allows for greater differentiation (especially in primary schools), with programmes tailored to individual students' needs. In other words, ICT provides teachers with the opportunity to provide various learning tasks within the same classroom for the benefit of the individual students' e-learning Nordic study, (2006). It further stated that students assume greater responsibility for their own learning when they use ICT working more independently and effectively.

2.3.5. Enhancing efficiency and effectiveness of education administration

New technologies can help improve the quality of administrative activities and process including human resource management, student registration and monitoring student's achievements in assessment tests Mugenda, (2006).

2.3.6. Active learning and authentic assessment

In many classroom situations, it is difficult to allow students to be sufficiently active as participants. Typically, students are often passive spend a lot of time listening and reading. But with the use of ICTs students are more likely to be interested and attentive and will achieve a wider range of learning outcomes if they can be active, learning by doing Committee on Developments in the Science of Learning , (2000).

2.3.7 Teachers pedagogical skills in teaching and learning processes

Teachers are a key component in the learning environment and therefore the impact of ICT on teachers and the strategies they employ to facilitate the environment are critical. They are sometimes appear to be an assumption that using ICT to support learning requires change for all whereas clearly some teaching have been creating appropriate learning environment for the years without using ICT, However, teacher need to use ICT because it is believed that in doing so, they will provide ever better learning environments Becker et al, (1999). The use of ICT in teaching and learning has varied impact on teachers. Some general areas of impact may be identified as:

2.4. Impact on the role of teachers

The link between technological development and the transformation of learning is clear in history. Among the pervasive changes in professional practice is emerging as a result of the implementation of ICT in teaching and learning. The role of teachers as changed and continues to change from being an instructor to be coming a facilitator, coach and creator of learning environments. This view is supported by Collis, (1989) who points out that teachers will always need to be instructional leaders in teaching and learning process. Additionally, Becker, (1994) emphasize that the teacher's pedagogical practices best supported by computers –use should result in improvement in student academic competencies.

In view of the above, it is clear that ICT heralded a paradigm shift in education in that its use in schools is changing how teachers teach and how students learn. Riel, (1990) suggests that teachers require new competencies to be able to integrate the use of ICT in teaching and learning. In assuming their new roles, teachers are expected to upgrade their knowledge and acquire new skills in their pedagogical practices and curriculum development to be able to integrate ICT in teaching and learning effectively.

2.4.1. Access to information

ICT gives teacher access to information to support them in trying new strategies, thinking, reflecting on practice and engaging with new materials Committee on Development in the Science of Learning, (2000).

Teacher needs support in making use of new technologies to enhance their personal work before learning to use them in their teaching. Much of this support may be accessed more readily using ICT Reginald Gregorie Inc. et al, (1996).

2.4.2 Teacher-students relationship

The Norwegian (2006) Pilot study emphasized on the role of the teacher as being more of an advisor, critical dialogue partner and leader for specific subject domains; thereby promoting greater independence of learning. This point out that teachers use ICT to change the way they interact with their students; emphasizing student-centered approach. It is further affirmed by Scardamallia, (2002) that the nature of teachers' role has the strongest impact on the student's role to enhance learning outcomes. The teaching and learning outcomes were dependent on whether teachers and students are engaged in meaningful classroom activities focusing on the lesson objectives.

2.5. Teachers' attitude of the application of ICT in teaching and learning

Underwood, (2006) provides evidence that teachers use ICT to support existing pedagogies. On supporting this view, Romboll Management, (2005) illustrates the current dilemma concerning the pedagogical use of ICT in the classroom. He states, "Even though a large number of teachers have gained more pedagogical knowledge (through better access to ICT-based materials and pedagogical concept via training and discussion), teachers have increased the use of ICT in teaching and learning". Similar positive results are affirmed

by Haggins (2005) by stressing that an overwhelming majority of teachers have confidence in using ICT in classroom.

ICT gives teachers access to information to support them in trying new strategies, thinking, reflecting on practice and engaging with new materials, committee on development in the science of learning, (2000). There is no doubt that teachers who use ICT in classrooms have to demonstrate high levels of energy, hard work and confidence, Lanksher & Snyder, (2000).

In addition, a number of studies have found that, “personal access for teachers to a computer for the purpose of preparation and planning is one of the strongest influence on the success of ICT training and subsequent classroom use”, office for standards in Education, (2002). Becta, (2002), also supports that enthusiastic and visionary leadership has a positive impact on teachers’ attitudes and behaviours.

2.6. Student’s attitude towards use of ICT to enhance teaching and learning

The use of ICT in schools should have a positive impact on students in terms of supporting their learning and providing them with relevant technological literacy. In addition, ICT should increase the engagement of students and in most cases increase their independence, so that students are not only required to use ICT completely but may also be required to adjust to change in their role. In many cases, the students’ role becomes more; i) Independent and responsible ii) Co-operative and collaborative, and iii) Directive and negotiate.

It follows from the above that there is need to develop students' computer literacy because research studies indicate that students assume greater responsibility for their own learning when they use computer, working more independently and effectively, Becta, (2002).

Eurydice (2005) argues that students' ICT skills cannot only be learnt in school but also in informal content, at home and with friends. It is emphasized that students' informal learning and experiences in using ICT are far more attractive than the school can offer. As a result, students face few challenges using ICT in school. Rockman and Chessler, (2000) found in their studies that students' computer literacy improves their academic achievements and positive attitudes in learning. Research studies further indicate that learners participate more actively when ICT is used in learning. However, some students may become frustrated when they perceive that their ICT skills are being under-estimated and under-utilized, Becta (2002). Therefore, teachers are required to use ICT integration in teaching and learning effectively in order to realize the objective of ICT integration. The e-learning Nordic, (2006) studies also places a strong emphasis on ICT, positive impact on what might be called secondary or indirect variables such as motivation, concentration, engagement, cognitive processing, creativity, critical thinking, independent learning and teamwork. According to Comber, (2002), and Higgins, (2005) increased motivation goes together with a positive learning and leads for example to more attention during lessons with students being involved in learning activities.

Teamwork between students is greater when they use ICT for project work, Romboll Management, (2006), Kezzel (2005).The above affirms that ICT enhances a more student-centered learning approach which is of important benefit to learners. They further identified that involvement and increased effectiveness of learning is also a key impact of ICT in the classroom. It also helps students to reflect on what and how they have learnt and thus a catalyst for reflection. Romboll Management, (2006) indicates that learners with special needs or behavioral difficulties also gain in different ways from the use of ICT. Finally, there can be a positive impact on students when ICT is used appropriately in learning.

2.7. Challenges affecting the use of ICT in enhancing teaching and learning attitude

Brooks, (1999) believes that many educators perceive computers as just another burden, commenting on the lack of awareness among educators of the potential offered by computers in education context, and noting that education have tended in consequence to confine the possibilities of computer use towards processing and e-mail. Other researchers such as Pascopella, (2001) emphasize that some educators felt that computers served only a recreational function, with learners being allowed, for instance, to play games after computing work. However, Potosky and Bobko, (2001) demonstrated that computer use has a positive impact on teaching and learning.

Teachers Training in ICT use

Hakkarien, (2001) analyzed the relations between teachers' skills in using the new ICTs; their pedagogical thinking and their self-reported practices. The results indicated that only a small percentage of teachers had adequate technical ICT skills. Furthermore, Veen, (1993) suggested that lack of initial training of teachers was a serious obstacle to ICT implementation.

Access to ICTs and other related infrastructure

Cuban, (1993) suggested that placement of computers within the reach of teachers and within supportive school cultures was very important so that teachers and students can improve their ICT potential. This view was supported by, Preston and Cox, (1999) in their study carried out to examine factors relating to the uptake of ICT in learning. The results showed that teacher who are regular users of ICT have confidence in using ICT, perceive it to be useful for their personal work and for their teaching.

Administrative support of ICT in schools

According to Anderson and Dexter, (2000) unrestricted access to training would amount to effective use of computers if teacher are expected to use ICT in a meaningful way. In this regard, they suggested that strong leadership is critical to computer integration and ICT implementation in teaching and learning in general. However, many leaders and administrators are not ICT literate thought they have gained little experience or knowledge that make

them use computers only for basic functions such as word processing and PowerPoint presentation.

ICT policy in education

Hawkins notes that while in many ministries of education around the world have made the commitment to computerize schools, few have developed coherent strategies to fully integrate the use of computers as a pedagogical tool in the classroom. Educational institutions are required to develop an ICT strategy that incorporates the goals of institution and how this will be met using ICTs, provide a supporting framework for the development of ICT in the institution and outline how the full potential of ICT is to be exploited to support all aspects of teaching and learning. Chisenga, (2006)

Funding for ICT investment in education

Cost is an important factor that guides the adoption and growth of ICT in a country. Most developing countries are constrained by resource scarcity. Even where the importance of ICT is recognized, allocation for the development of ICT is often inadequate. Mugenda, (2006) points out that one of the greatest challenges in ICT use in education is balancing educational goals with economic realities.

Inadequate time to prepare to teach with ICTs in classrooms

According to Labourde, (2002) adequate time must be allowed for teachers to develop new skills, explore their integration into their existing teaching

practices and curriculum, and undertake necessary additional lesson planning, if ICTs are to be used effectively. Rose and Weil, (1995) reports that lack of time required to successfully integrate ICT into their curriculum is a major obstacle in integration in ICT teaching and learning.

2.8. Summary

The use of ICT in teaching and learning is most definitely not a cheap solution for secondary education, but by facilitating the creation of new modes of teaching and learning and provision of education resources, it is believed to have a significant role to play in education sector. To date the integration of ICT tools into teaching and learning has not been successful. However, emphasis has been put across the continent to provide teachers and students with relevant ICT skills in the hope that this will mystically enable them to embrace the use of ICT positively in teaching and learning in learning institutions.

2.9. Theoretical framework

According studies carried out by scholars such us (Mishra, 2002, Villalba and Romiszowsski, 2001) three schools of thought have been widely used in the use of technology to support teaching and learning. These include; behaviorism, cognitive psychology and constructivism. However, (Hung, 2001) points out that constructivist learning theory has been identified as the most suitable one for the use of ICT in teaching and learning. Constructivist learning theory is based on education psychology. Jean Peaget (1896-1980)

was the first theorist who regarded children as “builders of their intellectual structures”. Another soviet psychologist Le Semanovitch Vygotsky (1896-1934) studied how children learn through communication with others (such as parents and peers). He posits that learning takes place by learners completing tasks for which support (scaffolding) is initially required. This support may include a tutor, peer or a technology such as the applications of computers. This has led to the term computer supported learning. Computer supported learning environments are those in which computers are used to either maintain a learning environment or used to support the student learner in this Vygotskian sense. These educational theories have further been developed by a number of constructivists (Wilson, 1996, Duffy and Jonassen, 1993 Papert, 1980) in the recent years.

According to (Lou, 2005),the rapid development of ICTs, especially computer-supported teaching and learning, several teaching models based on the constructivist theory such as Problem Based Learning (PBL) and Case Based Learning (CBL) have widely been adopted. The aim is to create learning environments centered on students as learners and a believe that they learn more from what they do and think about rather than from what they are told.

In comparison with other teaching methodologies, approaches based on constructivist have certain characteristics. These include:

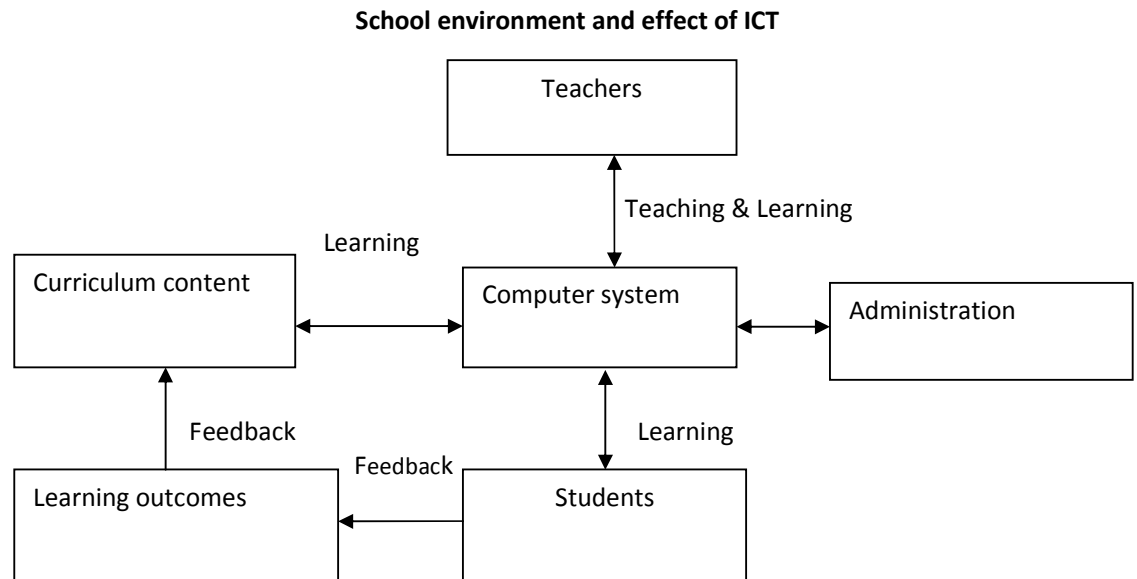
- i) Student centered learning: Students have more control on their study.

- ii) Group-work: Students are divided into groups when they are learning which in turn can help them improve their communication skills.
- iii) During the process of learning, knowledge, the ability to learn is developed; with tables such as; seeking meaning, forming opinions, evaluating information and thinking critically, (Lou, 2005).

In a constructivist learning environment, the role of the teacher shifts from being the source of knowledge to facilitating learning. (Khine, 2003) argued that students should not be left to explore alone but teachers should provide support, coaching and modeling the students to make certain learning takes place. Unlike the teacher-centred model in which teachers impart knowledge to students, “knowledge for constructivism cannot be imposed or transferred intact from one knower to the mind of others, (Kargiorgi and Symeou, 2005). Against this theoretical background, it is important to investigate the various applications of ICTs in enhancing teaching and learning in secondary schools.

2.10. Conceptual framework of ICT integration in teaching and learning

Figure 2.1. Conceptual Framework



Learning environments in schools typically involves one or more adult teachers connected with a number of students, usually in well defined physical settings. These people interact and form a variety of relationships, creating what Solomon, (1994) calls 'a system of inter-related factors' that jointly affect learning. Figure one above suggest that students and teacher have the primary interaction with the curriculum subjects and contents. The schools are organized to deliver subject matter to students, and the teacher is the core agent that delivers the curriculum content through various pedagogical practices. The teacher has to select the content of the lesson and define the objective of the lessons as well as set the instructional strategy. The teacher can therefore use computer strategy as a mode of delivering the specific

content through PowerPoint presentation. Likewise, students interact with curriculum content through learning the subject matter. Through the computer, the student acquires knowledge and skills and applies this knowledge to other respective subject areas. The use of computer as a mode of learning in the classroom is supported by main researchers such as Lynch, (1999), Oslon, (1998) and Rieber, (1994). They characterize computers as interactive and thus admit them a place within the relationship structure of the classroom-learning environment. The effects of the student learning the curriculum content are evaluated through a feedback process. Evaluation helps in assessing the attainment of objectives and revising the instruction process are required. Evaluation also helps in assessing the ability of using computer for instruction. In school administration, computers do help in management of various school systems. The administration is responsible for procuring the computer and adoption of computer in the school learning system.

As mentioned earlier, the components of content, students and teachers operate as a system within the organizational structure of the school system. Based on the individualized nature of computer instruction, the basis of this study is that when interacting with computers, secondary school students using computer assisted instruction would perform differently from the students using conventional methods. This shows that computer technology if used in the school system can have a positive effect on these interactions in the teaching and learning process as well as management Haggins, (2005)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter focused on the methodology that is to be used in the study. In the subsequent sections, detailed description of research design, target population, sample size and sampling procedures are discussed. In addition, description of research instruments, instrument reliability, instrument validity and data collection procedures and data analysis are also discussed.

3.2. Research design

This study used descriptive survey design. The descriptive survey research design is used for its appropriateness in making reality known through collecting detailed factual information that describes existing phenomena at a given moment in time (Vyhmeister, 2001). This research design will sought to solicit information by asking respondents questions about their perceptions, skills, knowledge and attitudes towards ICT. The responses are given in writing (Vyhmeister, 2001). This design is appropriate in this study because it enables the researcher to collect data from the respondents through the use of questionnaires and observation checklists.

3.3. Target population

The target population for this study consisted of students, teachers and principals in selected public secondary schools in Rachuonyo South District.

Principals are chosen because they are pivotal to planning, implementing and evaluating ICT integration in their respective schools. Teachers also play a key role in operational planning on ICT use in teaching and learning. They are in better position to provide relevant information about the use of ICT in teaching and learning. Students are also important respondents in this research because they are the sole beneficiaries of the outcome of appropriate and effective use of ICT. There were eight principals, twenty-four teachers and three hundred and twenty four students from form four students expected to participate in the research study.

3.4. Sample size and sampling techniques

Sampling makes it possible to draw valid inferences or generalizations on the basis of careful observation of variables with a relatively small proportion of the population.

(Best and Khain, 2008) in this study, only eight schools in the district are included. The choice of the schools was purposive in that they had to have computers used for instructional purposes and that the rest of the schools were without computers and are not part of the sample size of this study. From the identified schools simple random sampling procedure was used to select students that participated in the research study. From the sample area of study, there were 320 students drawn from form four. In addition, 24 teachers, and 8 principals were purposively selected to fill questionnaires designed for them. Thus, total sample of respondents was 352.

3.5. Research instruments

In order to explore the use of ICT in enhancing teaching and learning, data was collected using three sets of questionnaires and observation schedule. The three sets of questionnaires include; students' questionnaire, teachers' questionnaire and principals' questionnaire. The questionnaires attempted to answer the research questions developed by the researcher. The students' questionnaire had four sections which include:- demographic information, students' ICT skills and knowledge, attitude towards ICT integration and challenges faced by students in the use of ICT in teaching and learning .

The teachers' questionnaire had five sections which include:- demographic information, attitude towards ICT integration in teaching and learning, knowledge and skills in ICT, expertise in using ICTs and challenges to the implementation of ICT in schools. The principals' questionnaire had four sections, which cover the following areas:-demographic information, infrastructure and access, experience and perception towards the use of ICT, and challenges affecting use of ICT in teaching and learning. The observation schedule had four sections namely: ICT infrastructure put in place at the computer laboratory, access to ICT infrastructure, technical support available and use of ICT to enhance teaching and learning.

3.6. Validity of instruments

(Mugenda, 1999) defines validity as the accuracy and meaningfulness of inferences, which are based on the research results. In other words validity

refers to whether a measure is really measuring what it was intended to measure, (Coolican, 1994). To ensure validity, the researcher carried out a pilot study in two secondary schools to determine content validity through the responses and results of respondents. Items that may fail to measure the variables as intended were modified or discarded completely. The schools that were used in the pilot study are excluded from the main study.

3.7. Reliability of instruments

According to (Mugenda and Mugenda, 2003), reliability is a measure of the degree to which the instrument yields consistent results or data after repeated trials. Further, reliability of the research findings also depends on the clarity of the research instrument used in collection of data. The researcher tested the reliability of research instrument by carrying out a pretest study in two secondary schools. The findings from pilot study helped to determine the instruments, reliability. The response from the pilot study were scrutinized by the researcher for consistency, relevance of information captured and for omission of content. Pilot study findings helped to improve the instrument items before the actual research was done.

Ambiguous questions can lead to different interpretations by the participants to the same questionnaire items hence errors due to lack of consistency in the responses would have been committed. The questionnaire items were designed such that as more items as possible of equal kind and quality were used in

each research instrument and in different research instruments (Kerlinger, 2003).

3.8. Data collection instruments

The researcher collected a permit from the Kenya National Council for Science and Technology to allow him to conduct the research study. In addition a letter from Rachuonyo South District Education office addressed to all principals accompanied the permit to ease introduction of the researcher to the school. The researcher attached self-introduction letter (Appendix I). Questionnaires were distributed personally to individual respondents in the schools by the researcher. The respondents filled the questionnaires and gave them back to the researcher immediately. The observation checklist was filled by the researcher after visiting computer labs in the various schools and interviewing the respondents.

3.9. Data analysis technique

The research used qualitative and quantitative research methods to analyze data. Each question had its responses coded by assigning codes of responses for each item. The responses were categorized into themes based on research questions and objectives. Categories like demographic information were analyzed using descriptive statistics such as frequencies, percentages, and averages. Some of the coded items were analyzed with the aid of a computer on the statistical package of social science programs (SPSS). Data such as

gender, ages academic qualification and professional experience were

analyzed using the following formula will be use. $\bar{X}_1 - \bar{X}_2$

$$[\frac{N_1-1}{N_1}S_1 + \frac{N_2-1}{N_2}S_2] \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}$$

$$N_1 + N_2 - 2$$

Where \bar{X}_1 – Mean of sample 1 \bar{X}_2 Mean of sample 2 N_1 – Size of sample 1

N_2 – Size of sample 2 S_1 – Variance of sample 1 S_2 – Variance of sample 2

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1. Introduction

This chapter focus on the questionnaire return rate, demographic information of respondents, perceptions and self-efficacy on the use of ICT, presentations, interpretations and discussion of findings. The presentation of the findings was done based on the research questions.

4.2. Questionnaire return rate

Questionnaire return rate is the proportion of the sample that participated as estimated in all the research procedures. All the 8 Principals (100%) returned the questionnaires of the 24 teachers, all (100%) returned the questionnaires and of the 320 students all (100%) returned the questionnaires.

4.3. Demographic information of respondents

This section deals with demographical information of respondents; Principals, teachers and students at the secondary schools.

4.3.1. Demographic information of principals

The principals were asked to indicate their gender. The information was tabulated as shown in table 4.1.

Table 4.1 Gender distribution of principals

Gender	Frequency	Percentage
Male	5	62.5
Female	3	37.5
Total	8	100

Data in table 4.1 indicates that majority were male principals and few females. Majority of the respondents were male. This data shows that boys Schools were headed by male principals while girls' schools are headed by female principals.

4.2. Age of the principals

The principals were asked to indicate their age. The distribution of the principals by age was tabulated in table 4.2.

Table 4.2 Age distribution of the principals

Age Bracket	Frequency	Percentage (100%)
36 – 40 years	4	50.00
41-45 years	3	37.5
46 – 50 years	1	12.5
Total	8	100

Data in table 4.2 indicates that majority of the principals were within the age bracket 36-40 years, a few principals were within the age bracket 41-45 years and only one principal was within the age bracket 46-50. It is therefore necessary to state that most secondary schools are headed by principals within the age bracket 36-45 years.

4.3. Professional qualification of principals

To find out the professional qualifications of the principals, they were asked to indicate the same. Table 4.3 represents the data

Table 4.3. Professional qualification of the principals

Professional Qualification	Frequency	Percentage
B.ED	7	87.5
B.A/Bsc with PGDE	1	12.5
Total	8	100

Information in table 4.3 reveal that majority of Principals were bachelor of Education graduates with only one principal reported to have B.A. /Bsc with PGDE degree. Majority of the principals were Bachelor of Education graduates. These findings indicate that Secondary Schools in the district are run and managed by principals who have relevant professional qualifications and can therefore adapt to the changes posed by ICT integration in the schools.

4.4. Demographic information of teachers at the schools under study

This section describes the gender, age, professional qualification, experience of the teachers using ICT duration of time they had been in the current school. In order to find out the gender of teachers, they were asked to indicate their gender. Table 4.4 represents the data

Table 4.4. Gender of the Teachers

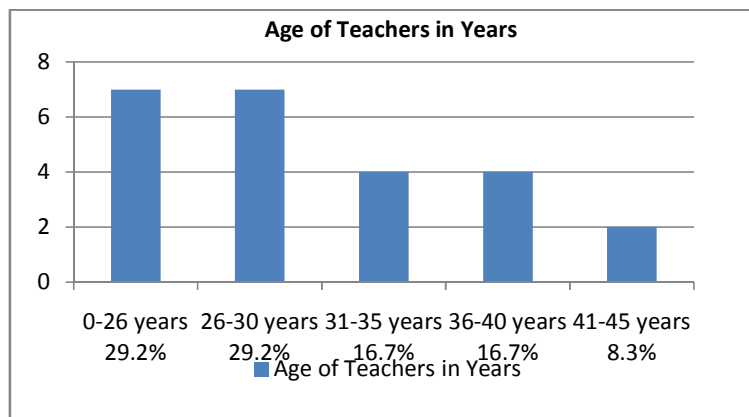
Gender	Frequency	Percentages
Male	16	66.6
Female	8	33.3
Total	24	100

Findings in table 4.4 above reveal majority of teachers in the school who were respondents to the study were male while a few teachers were female. Hence, there was a gender balance in the study since the country's constitution requires one-third of females in every group of persons.

4.5. Age of the teachers

To establish the ages of teachers, they were asked to indicate their ages. Their age distribution is represented in figure 4.1

Figure 4.1. Age of the teachers in the schools



The results in figure 4.1 indicate that 29.2% of the teachers were both in the age brackets below 26 years and age brackets 26-30 years respectively. 16.7% were in the age brackets 31-35 years and 36-40 years respectively. Only 8.3% of the respondents were in the age bracket 41-45 years. Majority of the teachers were therefore below 30 years. Results of the study imply that teachers differ in their age groups. This is an essential factor behind ICT use (Lakkala & Lehitinen, 2001) who pointed points out that the youngest group of teachers have increased their self evaluated ICT use than the oldest group.

Teachers were asked to indicate their professional qualifications. Table 4.5 represents their responses.

Table 4.5. Professional Qualification of Teachers in the Schools

Professional Qualification	Frequency	Percentage
MA	1	4.2
BA/Bsc with PGDE	1	4.2
Bed	3	12.5
EACE/KACE/A level/Diploma	15	62.5
Any other	3	12.5
	1	4.2
Total	24	100

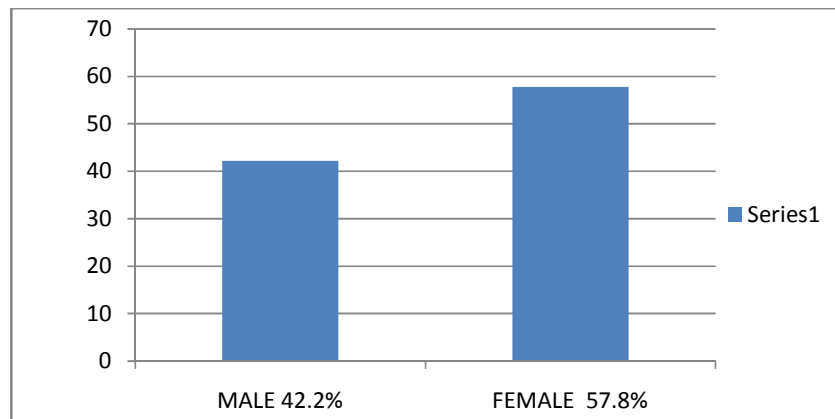
Data in table 4.5 revealed that majority of the teachers were Bachelor of Education holders. A few of the teachers had BA/BSc with PGDE. Other teachers were holders of EACE/KACE/Diploma. Other teachers had Master of Education, Master of Art Degree and any other qualification. Majority of teachers were holders of B ed. This implies that most teachers have basic skills in teaching and presumably experienced. Therefore, it is obvious that teachers if exposed to ICT tools and practices that support their beliefs about “good learning” would easily adopt use of ICT in teaching and learning (Marx, Blumenfield, Krajcik and Soloway, 1998).

4.5.1. Demographic Information of the Students at the Secondary Schools

In order to find out the demographic information of the students, they were asked to indicate their gender and age.

To establish the gender of the students, they were asked to indicate their gender. Their gender distribution is as shown in the figure 4.2.

Figure 4.2. Gender of the Students



Results in figure 4.2 show that majority of the students were female and a few of the students were male.

4.6. Age Distribution of the students

The students were also asked to show their age. The findings are as summarized in table. 4.6.

Table 4.6. Age Distribution of the Students

Age	Frequency	Percentage
12- 15 years	27	8.4
16 -19 years	287	89.6
20 years and above	06	1.6
Total	320	100.00

The result in table 4.6 revealed that majority of the students were in the age bracket 16 – 19 years. A few students were in the age bracket 12 - 15 years. While other students were in the age bracket of 20 years and above. The findings indicate that majority of the students in the schools are young and more open to the use of ICTs in schools to develop their skills and improve their learning. This implies that the ICT resources at school are most important and should be for access and development of skills (E-learning Nordic, 2006).

4.7. Respondents experience, knowledge and skills in use of ICT

This section deals with experience knowledge and skills of the respondents in use of ICT in teaching and learning.

The Principals were asked to rate their own experience as ICT coordinators by qualification years in their current schools. The findings are as indicated in table 4.7.

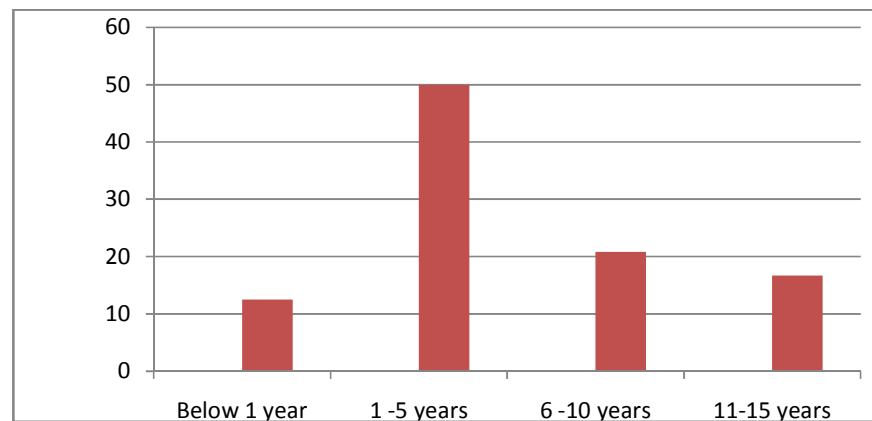
Table 4.7. Principal experience in using ICT

Experience in Years	Frequency	Percentage (%)
6 – 10	2	25.0
11-20	5	62.5
Over 20	1	12.5
Total	8	100.0

Data presented in table 4.7 reveal majority of the principals had 11-20 years experience while a few had 60 to 10 years experience and others had over 20 years experience. Further, the findings indicate that the majority of principals with the longest experience to make use of ICT in school is 11 years and above. The time that a principal had in a current school can be considered important in the principals' engagement in planning and implementation of ICT integration in their respective schools.

The respondents were asked to indicate their experience as teachers in the whole of their career. The findings are presented in figure 4.3.

Figure 4.3. Respondents Experience as teachers in the whole of their career

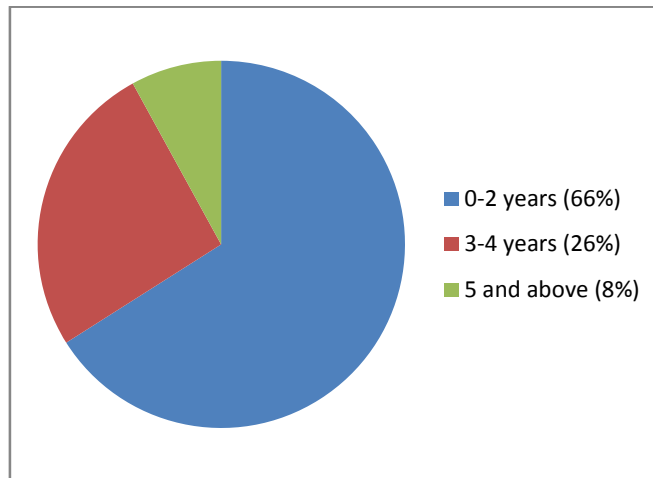


The findings in figure 4.3 reveal that majority of teachers had a teaching experience of 1 -5 years. While a few teachers had a teaching experience of 6 – 10 years. Other teachers had a teaching experience of below 1 year. This indicates that teachers have enough experience to ensure the implementation of ICT integration in their respective schools.

4.8. Students' ICT skills and knowledge

The students were asked to indicate their experience in using ICT. Their response is as indicated in figure 4.4

Figure 4.4. Students ICT skills and knowledge



Data in figure 4.4 show that majority of students had 0 – 2 years experience in using computers, a few students had 3 – 4 years using computers and others had 5 and above experience in using computers. Implications of the findings are that students have not been exposed to using computers for a long time. This concurs (Pedesen et al 2006) who points out that there is a cultural gap between students and teachers in term of the digital world. This differentiation and students ICT competence are challenges for teachers because the digital skills are today basic skills in teaching and learning.

Teachers were asked to indicate their experience in using ICT. Their responses are summarized in Table 4.8.

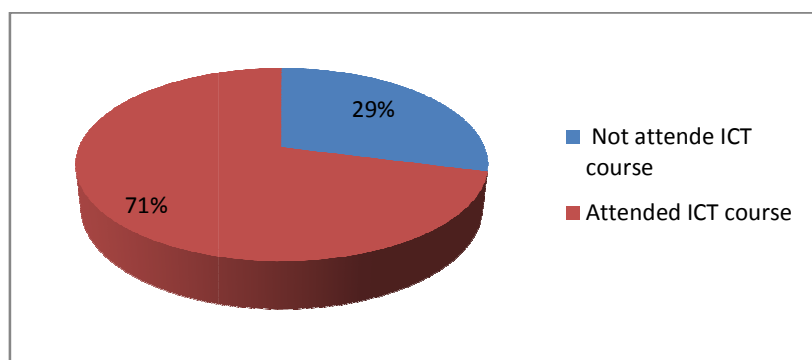
Table 4.8. Teachers experience in using ICT

Experience in years	Frequency	Percentage
1 – 2 years	4	16.7
3 – 4 years	13	54.2
5 – 6 years	4	16.7
7 years and above.	3	12.5
Total	24	100.0

Data from table 4.8 indicate that majority of teachers had an experience of 3 – 4 years, a few teachers had an experience of 1 – 2 years and other teachers had an experience of 5 – 6 years. However, three teachers (12.5%) had an experience of 7 years and above. This findings indicate that majority of teachers have an experience of 3 – 4 years.

Teachers were asked to indicate if they had attended any ICT course for training. The responses are presented in figure 4.5

Figure 4.5. Teachers who had attended an ICT Course or training



Findings in figure 4.5 show majority of teachers had attended an ICT course or training. A few teachers had not attended an ICT course or training. Majority of the teachers therefore had attained ICT skills and hence ICT literate.

The teachers were also asked to indicate the core theme of the ICT course or training that they had attended. The results are tabulated as in table 4.9.

Table 4.9. The core theme of the ICT Course/Training that the teachers had attended

Core Theme of Training	Frequency	Percentage
Basic computer literacy, not necessarily linked to teaching and learning.	10	41.6
Use of ICT hardware and software linked to teaching and learning.	8	33.3
Use of ICT in improving pedagogy in teaching different subject areas and classroom management	6	25.0
Total	24	100.0

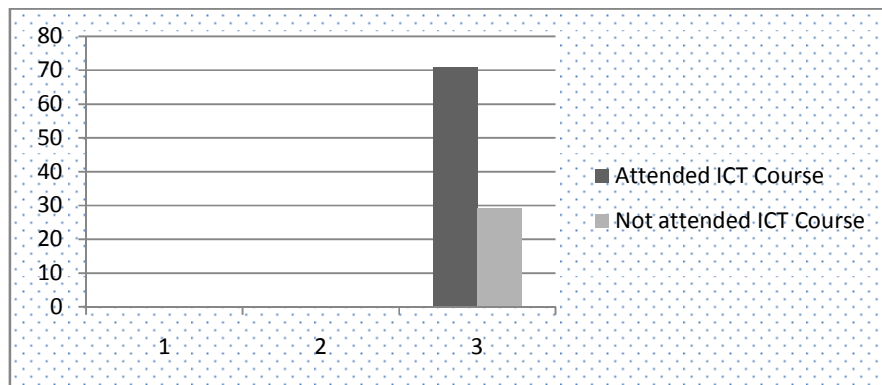
Result in table 4.9 reveal that majority of teachers had attended a training whose core theme was basic computer skills not linked to teaching and learning. A few teachers had attended a course of use of ICT hardware and software linked to teaching and learning. While others had attended training on use of ICT in improving pedagogy in teaching different subject areas and classroom management. These findings indicate that majority of the teachers are computer literate. These results concur with the e-learning Nordic study 2006 results that suggest that more teachers are becoming computer literate to meet the demands of the 21st century. The findings provide strong evidence

that use of ICT in improving teaching and learning has not been fully embraced by secondary school teachers. This trend may influence teachers' pedagogical approaches to teaching and learning and thereby students' attainment (Belta, 2003).

4.9. Principals' training/course in ICT

Principals were asked to indicate if they had attended ICT course/training. Their responses are shown in figure 4.6.

Figure 4.6. Principals' ICT Training



Results in figure 4.6 reveal that majority of the principals had attended an ICT course or training. Two principals had not attended an ICT course or training. An overwhelming majority of principals in the secondary schools had made initiative to acquire ICT skills hence ICT literate. Principals with good ICT skills used ICT more and more often supported the use of ICT in teaching and learning.

The principals were also asked to indicate the core theme of the course or training that they had attended. The findings were summarized in the table 4.10.

Table 4.10. The Core Theme of the ICT Course or Training that the Principals had Attended.

Core theme of training	Frequency	Percentage
Basic computer literacy, not necessarily linked to teaching and learning.	6	75.0
Use of ICT hardware and software linked to teaching and learning.	1	12.5
Use of ICT in improving pedagogy in teaching different subject areas and classroom management	1	12.5
Total	8	100.0

Results in table 4.10 indicate that an overwhelming majority of principals had attended a course /training whose core theme was basic computer literacy not necessarily linked to teaching and learning. A few principals had attended a course/training on use of ICT in improving teaching and learning. These findings reveal that majority of the principals are computer literate. However, their training typically concentrated on the explicit knowledge about ICT and not its use in teaching hence lack understanding and competence about how to readily use ICT in teaching and learning.

4.10. Establishment of ICT departments

The principals were asked to indicate if they have ICT departments in their schools. Their responses were as follows: All the 8 principals (100%) revealed that they had established ICT department in their schools. However, from the observation schedules, it was revealed that though all the principals (100%) had established ICT departments but the provision for adequate infrastructure appeared to be the least concerns to the secondary school principals.

4.11. Accessing the internet

Principals were asked to indicate whether teachers and students are able to access the internet. Their responses were sought and analyzed. The findings were summarized in table. 4.11

Table 4.11. Accessing the internet by Teachers and Students

Category	Frequency Distribution			Percentage Distribution		
	Yes	No	Total	Yes	No	Total
Teachers	7	1	24	87.5	12.5	100.0
Students	4	4	320	50	50	100.0

As shown in table 4.11, majority of the principals reported that teachers were able to access the internet. A few indicated that teachers were not able to access the internet with this evidence, majority of teachers in the secondary schools are ready to use ICT in teaching and learning on the other hand, the observation, schedule revealed that teachers relied on eternal technical support

provided by an ICT champion in the district. There is necessity to provide internal technical support for active use and full integration, as the interest might increase positive outcomes especially the delivery of educational services to students. Half of the principals (50%) reported that students were able to access the internet while another half (50%) reported that students were not able to access the internet. This suggests that students experience need to be improved in order to ensure full integration of ICT in teaching and learning.

4.12. Using ICT in teaching and learning

The principals were asked to indicate if teachers are able to use ICT for teaching. Four principals (50%) indicated that teachers were able to use ICT in teaching and learning. 37.5% of the principals revealed that some of the teachers were able to use power point presentations while 12.5% (1 principal) indicated that no teacher could use ICT in teaching and learning. Majority of the teachers (50%) were able to use ICT in classrooms. This implies that an increasing number of teachers are embracing integration of ICT in education hence the nation's development with earlier warning cited by (Okebukola, 2000) that the low ICT capacities of teachers would have serious implications for the nation's development efforts. Together, these findings reveal that though secondary school teachers acquired computer skills, they to a less extent made use of ICT for teaching and learning in schools.

4.13. Availability of ICT personnel in the schools.

The principals were asked to indicate the availability or unavailability of various personnel in the ICT department. Their responses are as indicated in table. 4.12

Table 4.12. Availability of ICT Personnel in the School.

ICT Personnel	Frequency	Percentage (%)
ICT Coordinator	6	75
Computer Specialist	3	37.5
Total	9	100

Data in table 4.12 indicates that majority of principals had ICT coordinator and a few had computer specialists. Majority of the schools therefore did not have an ICT specialist. This calls for comprehensive policies enhancing schools to have ICT specialists who can provide technical support to ICT beginners to broaden access to computer to enhance quality and develop both students and teachers' knowledge and skills responsive to changing teaching and learning opportunities. It is worth mentioning that efficient ICT use has the potential that can indeed foster new learning environment with improved learning outcomes.

4.14. Availability of various ICT

The principals were asked to indicate the availability or unavailability of various information communication technologies. The results were analyzed as follows in table 4.13

Table 4.13. Availability of various ICTs in the Schools

Internet Facilities	Radio
Available and Adequate (25%)	Available and Adequate (37.5%)
Available and inadequate (62.5%)	Available and inadequate (25%)
Not available 12.5%	Not available 37.5%
Computer	Telephone
Available and Adequate (62.5%)	Available and Adequate
Available and inadequate (37.5%)	Available and inadequate
Not available	Not available
Tape Recorder	Overhead Projector
Available and Adequate	Available and Adequate (25%)
Available and inadequate (25%)	Available and inadequate (62.5%)
Not available 75%	Not available 12.5%
Film Projector	Cassette Recorder
Available and Adequate (12.5%)	Available and Adequate
Available and inadequate (87.5%)	Available and inadequate (37.5%)
Not available	Not available 62.5%

Printer	T.V. Set
Available and Adequate (37.5%)	Available and Adequate (25%)
Available and inadequate (62.5%)	Available and inadequate (62.5%)
Not available	Not available 12.5%

Results in table 4.13 reveal that majority of the schools had internet facilities, which were available and inadequate while a few schools had available and adequate internet facilities. Others did not have internet facilities.

On the other hand majority of the schools indicated to have available and inadequate film projectors. A few schools reported that they had available and adequate film projector. Majority schools reported that they had no cassette recorders, only a few schools indicated that cassette recorders were available and inadequate. Majority of the schools reported that printers were available and inadequate. A few schools reported to have available and adequate printers. Majority reported that T.V were available and inadequate. A few schools indicated that T.V.s were available and adequate. Other schools had no T.V.

4.15. Teachers perception of the application of ICT in teaching and learning

Respondents were asked to indicate on a five-point scale ranging strongly agree (5) to strongly disagree (1) their views on the transformative role of ICT in their teaching and learning situations.

Their feelings are shown in table. 4.3.13

Table 4.14. Descriptive Statistics of Teachers Perception of the Application of ICT in Teaching

Variables	SA	A	U	D	SD	MEAN	ST. DEV
	%	%	%	%	%		
ICT can improve teaching and learning processes.	12.5	-	-	-	87.5	1.5	1.32
Computer can enhance students' critical thinking skills.	75	12.5	12.5	-	-	4.625	0.696
ICT can enhance students' participation and feedback to teachers.	-	12.5	12.5	12.5	50	1.625	1.218
ICT cab enhance collaboration among students	-	12.5	12.5	12.5	50	1.625	1.409
ICT can enhance teacher and student interaction	62.5	37.5	-	-	-	4.625	0.484
Internet can offer opportunities to teachers for obtaining learning resources to improve course content	62.5	25	12.5	-	-	4.5	0.707
ICT tends to increase students learning motivations	75	12.5	12.5	-	-	4.625	0.696
ICT can enhance students' language and writing skills	50	25	12.5	12.5	-	4.125	0.927

Scale: SA = Strongly Agree: A = Agree: U = Undecided: D= Disagree: SD = Strongly Disagree

The findings of the study revealed that (75%, mean = 4.625) respondents indicated that use of computers in teaching and learning can enhance students critical thinking skills. It also revealed that (62.5%, mean = 4.5) of the respondents showed that ICT can enhanced teacher and student interaction and that internet can offer opportunities to teachers for obtaining learning resources to improve course content for learners. This affirms that majority of the respondents had positive perception of the application of ICT in teaching and learning. However, (87.5%, mean = 1.5) strongly disagreed that ICT can improve teaching and learning.

4.16. Perception of students towards ICT in teaching and learning

The respondents were asked to indicate their attitude towards ICT in teaching and learning. The results of the survey revealed that majority of the students (77.8%) enjoy doing assignments using computers. The second category of students (72.8%) strongly agreed that lesson presented using power-point presentation were more enjoying than lessons presented using the traditional methods. On the other hand, the respondents (72.3%) strongly agreed that ICT would stimulate creativity in them. These finding imply that the respondents believe that they need to learn more about ICT since it is rapidly being integrated in teaching and learning in the 21st century. Moreover, the present-day students are essentially in a different situation from the previous generations with a large majority having ICT skills (Erstad, 2007). However, they find ICT difficult to use (58.4%) because the majority of them have not

learnt essential ICT skills. This makes them conscious of their work and might be afraid of being ridiculed for errors that might be found.

4.17. Teachers perceived skills in using ICT

Teachers were asked to rate their expertise in using ICT on a five point Likert-type scale ranging from Very good (5), Good (4), Average (3), Weak (2) to poor (1).

Table 4.15. Result of Teachers' perceived ICT skills.

ICT Skills	V.G. %	G %	A %	W %	P %	MEAN
ICT skills in spreadsheet packages e.g (M.s. Excel)	62	25	12	0.5	0.5	4.475
Search Engine (e.g. Google, Opera mini)	72	12	15	0.5	0.5	4.55
Word processors (e.g. Microsoft Word)	78	12	10.5	3.5	0.5	4.77
Communication (e.g. Email)	67.5	16	12.5	1.5	2.5	4.445
Presentation Packages e.g. Power Point	78	12	7	1.5	1.5	4.655
Database applications e.g. Microsoft Access	50	25	12.5	7.5	5	4.075

As shown in table 4.15 majority of the respondents were very good in word processors (78%, mean = 4.77) and using power point presentation is classroom (78% mean = 4.655) because both of which have educational potential (OECD, 2005). On the other hand, majority of the respondents perceived their skills on database as average (50% mean 4.075). The results

are in agreement with (Jegade et al 2007) and (Lau and Sim 2008) who found teachers to be more proficient in word processing than the other applications.

4.18. General use of ICT

Teachers were asked to respond to the extent to which they integrate ICT into their teaching on a four-point Likert- type scale ranging from “always” (4) to “never” (1). The result were tabulated in table 4.16

Table 4.16. Descriptive Statistics of Hardware used by Teachers

Hardware	A (%)	O (%)	S(%)	N(%)	Mean	St. Dev.
Computer	20	3	1	-	3.79	0.498
Internet	15	5	3	1	3.417	0.861
Printer	18	4	2		3.667	0.622
Overhead Projector	19	3	2		3.708	0.613
Scale:	A= Always	O = Often	S= Sometimes			

N= Never.

The results of the study showed that computer was almost always used by teachers (mean = 3.79) as shown in the table 4.3.15 and this was followed by the use of overhead projector (mean= 3.708) as indicated in the table 4.3.15. The least used hardware by teachers was the internet (mean = 3.417) as indicated in the table 4.3.15. The least used hardware by teachers was the internet (Mean = 3.417). The overall mean score was 3.646 and the overall

standard deviation was 0.649 signifying moderate use of hardware tools by teachers in their teaching.

4.19 Students involvement in using ICT

Teachers were asked to indicate frequency at which they had students involved in using ICTs. Their findings were tabulated in table 4.17

Table 4.17. Students' involvement in using Computers

Rating	Frequency	Percentage
Everyday	13	54.2
Once a week	8	33.3
Once or twice a month	2	8.3
Never	1	4.2
Total	24	100

Findings from table 4.17 majority of teachers involved students in using computers every day. A few teachers engaged students in using computers once a week. The findings indicate that minority of teachers did not involve students in using computers. This result is in agreement with Chapman (2003) who found that most teachers embraced ICT integration in their teaching.

4.18. Challenges or barriers for effective ICT implementation in schools

This part of analysis tried to establish the challenges affecting the use of ICT in enhancing teaching and learning in secondary schools. Relevant questions

from the principals and teachers' questionnaire were sought and analyzed. The barriers are broadly divided into three categories: Teacher-level barriers i.e. those related to teachers' attitude and approach to ICT, school –level barriers i.e. those related to institutional context and system- level barriers, i.e. those related to the wider educational framework.

Lack of motivation and confidence

The principals and teachers were asked to indicate whether lack of motivation and confidence was a major, minor or not a challenge. Teachers (87.5%) indicated that it was major challenge and four principals (50%) indicated that it was a major challenge. This finding concurs with (2000 Becta) findings on perceived barriers to the uptake of ICT by teachers and affirms the teachers' fear of admitting to their students their limited ICT knowledge. However, 4.2% of teachers and 25% of the principals indicate that it was not a challenge.

Lack of ICT skills

Six principals (75%) and 16 teachers. 966.7%) indicated that lack of ICT skills was a major challenge. These findings shows that majority of the respondents identified lack of ICT skills as a major challenge that hinder full integration of ICT in teaching and learning . The E-learning Nordic Study revealed that in some cases the reasons for selecting a technology are affected more by the teachers' skills than by professional consideration. The findings of this study confirms the same.

Inappropriate teacher trainings

293 teachers (91.7%) indicated that inappropriate teacher training was a major challenge hindering full implementation of ICT in teaching and learning. Unsuitable teacher training programmes fail to engage teachers in using ICT both during their lessons and also in the preparation of the lesson beforehand. This result is in agreement with (Becta, 2004) study which found that although some teachers have good ICT skills in terms of their own personal use, they are unable to transfer those skills to using ICT in classrooms.

Lack of access to ICT equipment- 267 teachers (83.3%) and 20 principals (82.5%) revealed that lack of access to ICT equipment is a major challenge in the integration of ICT in teaching and learning. As a result teachers and students do not have the opportunity to use ICT at any time according to their needs.

The absence and poor quality of ICT infrastructure

18 principals (75%) indicated that the absence and poor quality of ICT infrastructure in schools is a major hindrance to implementation of ICT. The finding is in agreement with E-learning Nordic study, which found that the absence of technology is a crucial hindrance.

Absence of ICT mainstreaming into schools' strategy

18 principals (75%) indicated that absence of ICT mainstreaming into schools strategy was a major challenge in school. Schools face the problem of

unsuccessful organizational implementation of ICT because ICT is not seen as part of the general strategy at school level. Even if some schools have developed ICT strategies, these are not integrated into the schools' overall strategy.

Lack of technical support

16 principal (67.5%) indicated that lack of technical support was a major barrier in the full implementation of ICT in teaching and learning. Technical support may be reviewed in terms of supporting users, implementation and appropriate pedagogy user problems are probably the most obvious in that much of the resistance from classroom teachers to the user of the computers across the curriculum is put down to lack of knowledge and skills in operating ICT (Becta, 2002)

Lack of internet connection in school

Eighteen Principals (75%) indicated that lack of internet connection in school was a major challenge. However, 6 principals (25%) reported that it was a minor challenge. The results revealed that majority of principals (75%) identified lack of internet connection in school as a major challenge. These finding is consistent with a survey carried out by (AAU, 2000) which revealed that Internet Connectivity in African Tertiary Institutions is inadequate and expensive to install.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

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

5.2. Summary of the study

The purpose of the study was to establish the use of Information Communication Technology in teaching and learning in secondary schools in Rachuonyo South District, Homa-Bay County. The research had six aims out of which six research questions were formulated to guide the study. Research question one aimed at examining the extent to which secondary schools in Rachuonyo South have established ICT tools for use in enhancing teaching and learning. Research Question two aimed at investigating the extent to which teachers are endowed with skills on ICT use in enhancing teaching and learning. Research question three aimed at establishing the principals and teachers attitude towards the use of computers in teaching and learning. Research question four aimed at establishing students' attitude towards the use of computers in teaching and learning. Research question five aimed at identifying challenges affecting the use of ICT in enhancing teaching and learning in secondary schools. Research question six aimed at investigating factors that encourage the use of ICT in enhancing teaching and learning processes. A self-report questionnaire was constructed for assessment. The participants were 8 principals, 24 teachers and 320 students.

The background to the study were the common comments on ICT Skills' competence and integration into teaching and learning globally and in Kenya. Literature was reviewed on what ICT in education entails, the theoretical background and conceptual framework. The study applied descriptive survey design. The target population for the study consisted 320 students, 24 teachers and 8 principals in both private and public primary school in Rachuonyo South District. A self-report questionnaire was constructed and observation schedule for assessment. Data was collected through the use of questionnaires for principals, teachers and students and observation schedule for the research. The findings revealed that:

5.3. Summary of the study findings

The results revealed that computers were not adequate for full integration of ICT in teaching and learning. This was reported by five schools (62.5%). This signifies low use of these hardware tools. Regarding hardware application the results showed that computers were almost always used by teachers and students (Mean 3.79). The least used hardware by teachers was the internet (Mean= 3.417). The results revealed that the majority of teachers were very good in word processors (78%, Mean 4.77) and using power point presentations in classroom (78%, Mean 4.655) This is an important achievement in use of ICT in teaching and learning because both of which have educational potential (OECD, 2005).

The results of the study indicated that the intensive use of ICT and the process-oriented learning environment supported the development of students' expertise in ICT and enhanced students' in critical thinking skills (Mean 4.625), teacher and student intervention (Mean= 4.625) and increase students' learning motivation. Furthermore, ICT can offer opportunities to teachers for obtaining educational resources from the internet to enrich course content. (Mean 4.5). The results indicated that majority of teachers (54.2%) involved students in using computers every day. This result is in agreement with (Chapman, 2003) who found that most teachers have embraced integration of ICT in their teaching.

The findings revealed that majority of students (66%) had experience in using computers in school. The finding revealed positive correlation between ICT and competences. This result is consistent with (Petrogiannis, 2010) who found that computer experienced teachers were more ready to use ICT in their classes than non-experienced teachers. Further, the analysis revealed that teachers' perception, with regards to the use of ICT were positive and low but not statistically significant. The study revealed that there was inconsistency between teachers' belief and their actual use of technology in classroom.

This study has identified the major barriers preventing more successful integration of and achieving higher impact. They are: The findings of the study revealed that majority of teachers (66.7%) and principals (75%) indicated that lack of ICT skills was a major challenge.

The results revealed that 83.3% of teachers and 62.5% of principals indicated that availability of sufficient number of computers was a major challenge hindering successful integration of ICT in teaching and learning. As often shown the availability of technology alone is not the only factor for successful integration of ICT, but its maintenance is a crucial hindrance. Schools without sufficient ICT resources are clearly missing out on the extra educational opportunities ICT can offer. The analysis revealed that majority of the respondents 87.5% reported that lack of motivation and confidence was a major factor that hinders successful implementation of ICT integration in schools.

Further, the analysis revealed that majority of respondents 97% identified inappropriate teacher training as a major barrier in the integration of ICT in teaching and learning. The evidence from the study also proves that majority of the respondents 62.5% indicated that lack of technical support in schools to enhance successful integration of ICT was a major hindrance.

5.4. Conclusion

The linking of computers to education across the world is known to many people because it is believed that ICT has a crucial impact on teaching and learning. Therefore Educational Institutions are witnessing a paradigm shift brought about by the use of ICT that others have even started seeing ICT as an indispensable tool in the teaching and learning process. As a results the research findings revealed that students, are continually exposed to the capabilities of ICT, their perceptions towards change. The teachers

involvement in use of and perception have also change positively towards use of ICT in teaching and learning. It is evident from the findings in the study that some schools that have put more effort to integrate ICT in teaching and learning. With this, teachers are faced with the responsibility to utilize ICT. The findings also reveal that teachers in this era should adopt a paradigm shift from old traditional methods of teaching to new methods of teaching in order to implement ICT integration effectively. This will enable them to cater for the needs of 21st century learners.

5.5. Recommendations

From the findings of the study, it is recommended that;

- (i) teachers be given sufficient training on how to use ICT in teaching and learning processes to acquire the requisite knowledge and skills in integrating the technology in classrooms.
- (ii) Teachers should also be provided with adequate technological resources, technical support and administrative support to encourage them successfully use ICT in teaching and learning.
- (iii) Students should be involved in using ICT in learning activities such as doing assignments and searching the internet for learning resources because it is believed that ICT can enhance teacher and student interaction and also tends to increase students learning motivations.
- (iv) Students should be equipped with ICT skills such as Microsoft software applications such as word, excel and access.

5.6. Suggestions for further research

The study recommends the following suggestions for further study:-

- (i) Research on the perception of teacher and students towards the use of ICT in school.
- (ii) Relevant strategies for using ICT to improve teaching and learning in secondary school.
- (iii) Teacher's role and competence in organizing, structuring, and guiding the whole process of ICT implementation in schools.
- (iv) The characteristics of implementation of ICT that supports the development of student's skills.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

University of Nairobi
Department of Education,
Administration and Planning,
P. O. Box 92,
KIKUYU.

Dear Respondent,

RE: REQUEST TO FILL THE QUESTIONNAIRE FOR RESEARCH PURPOSE

I am a postgraduate student at the University of Nairobi, pursuing a Master degree. I am currently carrying out an Educational research on use of ICT in teaching and learning in secondary schools in Rachuobyo South District, Homa Bay County, Kenya.

You have been selected to participate in this study. I would very much appreciate if you would kindly assist me by responding to all the items in the attached questionnaire.

You are assured that your identity will be treated with utmost confidence for the purpose of this research.

Your particulars and that of the school need not appear anywhere in the questionnaire.

Thank you very much for your co-operation.

Yours faithfully,

Samson O. Obonyo
M.Ed Student

APPENDIX II: QUESTIONNAIRE FOR STUDENTS

Please enter the choice you have made by ticking (√) the answer in the space corresponding to your choice for structured questions. Write the response for the open ended question in the space provided.

Your name will be treated with strict confidentiality and will not be published in this study.

Section I. Demographic information

1. Kindly indicate your gender. (Tick as appropriate)

Male Female

2. Select your age bracket. (Tick as appropriate)

12-15 years 16-19 years 20 and above

Section II: ICT skills and knowledge

3. Do you take or have you taken computer studies as a subject in school?

(Tick as appropriate) Yes No

4. How long have you been using computers?

0-2 years 3-4 years 5 years and above

5. Do you currently have regular access to a computer?

Yes No

6. Are you on social media, i.e. face book, twitter or any other?

Yes No

7. Do you use a computer connected to the Internet at school?

Yes No

8. Do you find it easy to learn something by reading from a computer screen?

Yes [] No []

9. Do you use computers to do assignments Yes [] No []

10. Do you find it easy to attach a file to an E-mail address? Yes [] No []

11. Do you find it easy to print a computer document or a file? Yes [] No []

Section III: Attitude

12. The table below is designed to measure attitude towards the use of computers in teaching and learning. Please indicate your level of agreement by ticking (√) the appropriate response using the following key: SA – Strongly Agree, A-Agree, U-Undecided, D- Disagree, SD-Strongly Disagree

	STATEMENT	SA	A	U	D	SD
1.	I enjoy lessons presented using a computer					
2.	I think that computers are difficult to use					
3.	I would like to use computers in the classroom					
4.	I think that my learning can be improved by using computers					
5.	I believe that it is important for me to learn how to use computers					
6.	I learn more from computers than from books					
7.	I enjoy doing my assignments using computers					
8.	Using computers will be a frustrating experience					
9.	Computers would stimulate creativity in me					

14. How comfortable do you feel using the Internet?

Very comfortable [] Somewhat comfortable []

Somewhat uncomfortable [] Very much uncomfortable []

15. Experience with computers (Please place a tick by the appropriate response)

None [] Very limited [] Somewhat experienced []

Quite a lot [] Extensive []

Section IV: Challenges faced by students in the use of ICT in enhancing teaching and learning

1. The following is a list of potential challenges in use of ICTs in enhancing teaching and learning. Please indicate whether you consider each obstacle not a challenge, a minor challenge or a major challenge.

	Potential challenges	Not a challenge	A minor challenge	A major challenge
2.	Insufficient number of computers			
3.	Lack of Internet facilities in school			
4.	Teachers are not adequately prepared to use computer presentation in classroom			
5.	Frequent power failure			

Thank you for your co-operation.

APPENDIX III: QUESTIONNAIRE FOR TEACHERS

Please enter the choice you have made by ticking (✓) the answer in the space corresponding to your choice for structured questions. Write the response for the open ended question in the space provided.

Your name will be treated with strict confidentiality and will not be published in this study.

Section I: Demographic Information

Please indicate by a use of a tick (✓) as appropriate

1. Please indicate your gender

Male [] Female []

2. Indicate your age by placing a tick(✓)

Below 26 yrs [] 26-30 yrs [] 31-35 yrs [] 36-40 years [] 41-45 years
[] 46-50 years [] 51-55 years [] 56 and above []

3. Kindly Indicate your highest academic qualification

PhD [] MA [] M. Ed [] B. Ed [] B. A/B.Sc with PGDE []
EACE/KACE (A-level with diploma) []

Any other please specify _____

4. Indicate your experience as a teacher in the whole of career

Below 1 year [] 1-5 years [] 6-10 years []
11-15 years [] 16-20 years [] Over 20 years []

5. Indicate your experience as a teacher in this school.

Below 1 year [] 1-5 years [] 6-10 years []
11-15 years [] 16-20 years [] Over 20 years []

6. How long have you been using computers?

1-2 years 3-4 years 5-6 years

7 years and above

7. Do you currently have regular access to a computer?

Yes No

Section II: Attitude, knowledge and skills in ICT

8. Have you attended an ICT course in training? Yes No

9. If Yes above, please indicate the core theme of the training by ticking (✓)
the appropriate response.

Basic computer literacy, not necessarily limited to teaching	
Use of ICT hardware and software but linked to teaching and learning	
Use of ICT for improving pedagogy in teaching different subject areas and classroom management	

The table below is designed to measure attitudes towards the use of computers in teaching and learning. Please indicate your level of agreement or disagreement by ticking (✓) the appropriate response using the following key:

	STATEMENT	SA	A	U	D	SD
1.	ICT can improve teaching and learning processes					
2.	Computers can enhance students' critical thinking skills					
3.	ICT can enhance student participation and feedback to teachers					
4.	ICT can enhance collaboration among students					
5.	ICT can enhance teacher and student interaction					
6.	Internet can offer opportunities to teachers for obtaining course content					
7.	ICT tends to increase students learning motivation					
8.	ICT can enhance students' language and writing skills					

10. My experience with computers. (please tick as appropriate)

None [] Very limited []

Some experience [] Quite a lot []

11. Have you ever attended a computer training course?

Yes [] No []

Section III: Expertise in using ICTs

Please rate your expertise in the following by ticking(✓) the appropriate response using the following key: Very Good, Good, Average, Weak, Poor

	STATEMENT	Very good	Good	Average	Weak	Poor
1.	ICT Competencies, basic computer parts and functions (opening, closing and saving files etc)					
2.	Operating systems (Windows Operating Systems and others)					
3.	Software applications- MS-Office, MS Word, Excel, Power Point, Internet and E-mail, Graphics and Drawing, Databases and data entry, Desktop publishing, video production and editing.					
4.	Using and producing video for classroom presentation					
5.	File management for teachers for creating folders, moving files, renaming files for classroom assignments and documents					
6.	Using publisher software to create a class newsletter or teacher's newsletter and student publication					
7.	Use of internet for teaching and learning					

General use of ICTs

In the table below are statements about general use of ICTs in teaching and learning. Respond by ticking (✓) the appropriate response.

	STATEMENT	Always	Often	Sometimes	Never
1.	Use of word processors or desktop publishing package to produce task-sheets, tests, handouts				
2.	Accessing the internet in order to find and collect lesson ideas				
3.	Using Printers to produce test mark sheets and handouts				
4.	Recording or calculating assessment, marks and grades				
5.	Use of E-mail for working together with other teachers and students on issues related to teaching and learning.				
6.	Using overhead projector in teaching and learning.				
7.	Searching the internet for good multi-media lessons, activities and resources as well as pedagogical issues.				

Section IV: Use of ICT in enhancing teaching and learning with students

12. In the table below, there are statements about students' involvement in using ICTs. Respond by ticking (✓) the appropriate response.

	APPLICATION	Every day	Once a week	Once or twice a month	Never
1.	How often do you have students use computer technology to find information?				
2.	How often do you have students record their class presentation for with other students?				
3.	How often do you have students use computer to write notes or other texts?				
4.	How often do you have students use computers to process and analyze data?				
5.	How often do you use different ICT for entertainment to engage and motivate students?				

Section V: Challenges or barriers to implementation of ICT in schools.

The following is a list of potential challenges in use of ICTs in enhancing teaching and learning. Please respond by ticking (✓) appropriately.

	POTENTIAL CHALLENGE	Not a challenge	A minor challenge	A major challenge
1.	Limited access to computers			
2.	Lack of adequate technical support for ICT projects			
3.	Teachers do not have access to ICTs at home to improve the ICT skills			
4.	Lack of ICT skills			
5.	Centralization of computers in a laboratory			
6.	Lack of motivation and confidence in using ICT			
7.	Low computer literacy level among students			
8.	Inappropriate teacher training			
9.	Number of computers in school is inadequate for integrating ICT in learning programmes			
10.	Lack of computer-based learning materials			

13. Please list any other challenges experienced apart from those mentioned above

14. What other factors would enhance the use of ICTs in teaching and learning in your schools?_____

15. What possible recommendations would you make towards increasing the use of ICTs in enhancing teaching and learning in secondary schools?

Thank you for your co-operation

APPENDIX IV: QUESTIONNAIRE FOR PRINCIPALS

Please enter the choice you have made by ticking (√) the answer in the space corresponding to your choice for structured questions. Write the response for the open ended question in the space provided.

Your name will be treated with strict confidentiality and will not be published in this study.

Section I: Demographic information.

1. Please indicate your gender
Male Female
2. Indicate your age by placing a tick(√)
Below 26 years 26-30 years 31-35 years
36-40 years 41-45 years 46-50 years
51-55 years 60 and above
3. Indicate your highest academic qualification
PhD MA M. Ed
B. Ed B. A/B.Sc with PGDE
EACE/KACE (A-level with diploma)
Any other please specify _____
4. Indicate your experience as a principal in this school.
Below 1 year 1-5 years 6-10 years
11-15 years 16-20years Over 20 years
5. Please indicate the number of four (4) students currently enrolled in your School _____
6. Are you trained in ICT? Yes No

7. If yes above, please indicate the core theme of the training by ticking (√) the appropriate response.

1.	Basic Computer literacy, not necessarily linked to teaching	
2.	Use of ICT hardware and software linked to teaching and learning	
3.	Use of ICT for improving pedagogy in teaching and classroom management	

Section II: Infrastructure and access

1. Do you have ICT department in your school?
Yes [] No []
2. When was the ICT department introduced in your school? _____
3. Do teachers have in-service training opportunities in order to equip themselves with skills on how ICTs can be used to enhance teaching and learning?
Yes [] No []
4. Do you have internet facility in your school Yes [] No []
5. Are teachers able to access the internet Yes [] No []
6. Are students able to access the internet Yes [] No []
7. What is the adequacy of computers in your school?
Adequate [] Not adequate []
8. Are teachers able to use ICT for teaching?
Yes [] No [] Some []
9. Are students able to use ICT in learning process?
Yes [] No [] Some []

10. Is there a teacher who serves as an ICT coordinator?

Yes No

11. Is there a computer specialist who assists students and teachers in using ICT in school? Yes No

12. Which of the following does your school have?

Item	Available adequate	Available and inadequate	Not available
Internet facility			
Radio			
Computer			
Telephone			
Tape recorder			
Overhead projector			
Film projector			
Cassette recorder			
Printer			
T.V set			

13. Do you have computer laboratory in your school?

Yes No

14. If yes above, how many computers are functioning ?_____

Section III: Experience and perception

The following are statements concerning attitude towards teaching and learning on the use of ICT. Please indicate your level of agreement or disagreement by ticking (✓) the appropriate response using the following key:
 SA – Strongly Agree, A – Agree, U – Undecided, D– Disagree, SD – Strongly disagree.

	STATEMENT	SA	A	U	D	SD
1.	Computers can help me learn things more easily					
2.	Computers are difficult to understand					
3.	Knowing how to use computers will help me do well in my career					
4.	All students and teachers should have an opportunity to learn about computers at school					
5.	Computers will improve education					
6.	The challenge of solving problems with computers does not appeal to me					
7.	Using computer would encourage me to be creative					
8.	Having a computer available to me would improve my general satisfaction					
9.	Computers will relieve teachers of routine duties.					

Section IV: Challenges affecting use of ICT in teaching and learning

1. The following is a list of potential challenges in use of ICT in enhancing teaching and learning. Please indicate whether you consider each obstacle not a challenge, a minor challenge or a major challenge.

Potential Challenge	Not a challenge	A minor challenge	A major challenge
Limited access to ICT equipment			
Absence of ICT mainstreaming into school's strategies.			
Lack of digitalized books (electronic books) or content of CDs			
Lack of internet connection in school			
Lack of technical assistance			
Lack of high quality hardware and software			
Lack of administrative support			
Running cost is too expensive			
Lack of learners' motivation to use ICT			
www.slownetworkperformance			
www.difficultfindinginformation			

2. Please list any other challenges encountered apart from those listed above _____

3. What factors would enhance the use of ICTs in teaching and learning in your schools _____
4. What possible recommendations would you make towards increasing the use ICTs in education? _____

Thank you for your co-operation

APPENDIX V: OBSERVATION SCHEDULE

Unit of observation	Comments
ICT Infrastructure put in place <ul style="list-style-type: none"> • ICT infrastructure at the learning resource centre • Computer laboratory 	
Access to ICT infrastructure <ul style="list-style-type: none"> • Access of ICT infrastructure to teachers • Access of ICT infrastructure to students 	
Technical support <ul style="list-style-type: none"> • Availability of technical personnel to help students use ICTs • Availability of technical personnel to help teachers use ICTs 	
Use of ICTs to enhance teaching and learning <ul style="list-style-type: none"> • Teachers' use of ICTs • Students' use of ICTs 	

APPENDIX VI: RESEARCH AUTHORIZATION LETTER

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550
Mobile: 0713 788 787, 0735 404 245
Fax: 254-020-2213215
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RCD/13/013/67**

Date: **11th June 2013**

Samson Odhiambo Obonyo
University of Nairobi
P.O Box 92-0902
Kikuyu.

RE: RESEARCH AUTHORIZATION

Following your application dated **4th June, 2013** for authority to carry out research on "*Use of information communication technology in teaching and learning in secondary schools in Rachuonyo South District, Homa-Bay County, Kenya.*" I am pleased to inform you that you have been authorized to undertake research in **Rachuonyo South District** for a period ending **31st July, 2013.**

You are advised to report to **the District Commissioner and District Education Officer, Rachuonyo South District** 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.

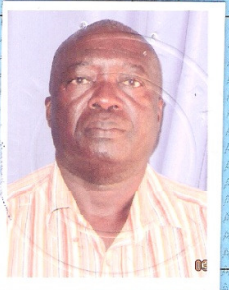
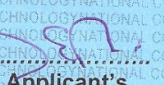
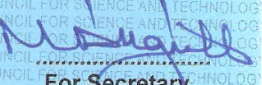
A handwritten signature in blue ink, appearing to read 'M. K. Rugutt'.

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:
The District Commissioner
The District Education Officer
Rachuonyo South District.


"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development"

APPENDIX VII: RESEARCH PERMIT

<p align="center">PAGE 2</p> <p>THIS IS TO CERTIFY THAT:</p> <p>Prof./Dr./Mr./Mrs./Miss/Institution Samson Odhiambo Obonyo of (Address) University of Nairobi P.O Box 92-0902, Kikuyu.</p> <p>has been permitted to conduct research in</p> <p align="center">Location Rachuonyo South District Nyanza Province</p> <p>on the topic: Use of information communication technology in teaching and learning in secondary schools in Rachuonyo South District, Homa-Bay County, Kenya.</p> <p>for a period ending: 31st July, 2013.</p>	<p align="center">PAGE 3</p> <p>Research Permit No. NCST/RCD/13/013/67</p> <p>Date of issue 11th June, 2013</p> <p>Fee received KSH. 1000</p> <div style="text-align: center;">  </div> <p align="right">  Applicant's Signature </p> <p align="right">  For Secretary National Council for Science & Technology </p>
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CONDITIONS

- 1. You must report to the District Commissioner and the District Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.**
- 2. Government Officers will not be interviewed with-out prior appointment.**
- 3. No questionnaire will be used unless it has been approved.**
- 4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.**
- 5. You are required to submit at least two(2)/four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.**
- 6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.**


REPUBLIC OF KENYA
RESEARCH CLEARANCE PERMIT

GPK605513mt10/2011 (CONDITIONS—see back page)