SCHOOL FACTORS INFLUENCING INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGY IN TEACHING AND LEARNING IN PUBLIC SECONDARY SCHOOLS IN HOMA –BAY DISTRICT, KENYA

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A Project Report Submitted in Partial Fulfillment for the Requirements for the Award of the Degree of Master of Education in Curriculum Studies

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DECLARATION

This project report is my original work and has not been presented for an award of a degree in any other university.

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DEDICATION

This project report is dedicated to my mother Silpah Oyugi Ondiegi, my beloved wife Everlyne Akoth Odhiambo, and our children Benjamin Doncaster Otieno, Roselyne Adhiambo and Lindah Aketch.
ACKNOWLEDGEMENTS

My sincere appreciation goes to my supervisors, Prof. Winston Akala and Mrs. Lucy Njagi of the University of Nairobi for their professional advice and guidance from the start to the end of this research work. I also wish to thank all the lecturers from the Department of Educational Administration and Planning who taught me and laid a firm foundation on which this research work was built. I wish to acknowledge the cooperation received from Homa Bay District Commissioner and the District Education Officer for having allowed me to carry on with my research work in the District and for making available crucial information for the study. I also thank head teachers and teachers in the school where research was done.

I would like to thank my family members, my wife Everlyne Akoth, my children Benjamin, Roselyne and Lindah for their patience, understanding and immense support during difficult financial times. I further wish to acknowledge my classmates - the Masters’ of Education Group 29 for their wonderful encouragement throughout the course. Special mention goes to Aduwo Fredrick and Lorna Ochuodho. May God bless them abundantly. Most importantly I wish to thank the Almighty God for giving me the opportunity to be alive and more so for giving me wisdom and strength to go through the course and finally write this research project.
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<td>Full Form</td>
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</tr>
<tr>
<td>BoM</td>
<td>Board of Management</td>
</tr>
<tr>
<td>BOG</td>
<td>Board of Governors</td>
</tr>
<tr>
<td>DEO</td>
<td>District Education Officer</td>
</tr>
<tr>
<td>EFA</td>
<td>Education for All</td>
</tr>
<tr>
<td>ICT</td>
<td>Information Communication Technologies</td>
</tr>
<tr>
<td>KESSP</td>
<td>Kenya Education Sector Support</td>
</tr>
<tr>
<td>MOEST</td>
<td>Ministry of Education Science and Technology</td>
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<tr>
<td>NCST</td>
<td>National Council for Science and Technology</td>
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<tr>
<td>PTA</td>
<td>Parents Teachers Association</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for Social Science</td>
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<td>UNESCO</td>
<td>United Nations Educational Scientific and Cultural Organization</td>
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ABSTRACT

The purpose of this study was to investigate school factors influencing integration of Information Communication Technology in teaching and learning in public secondary schools. The justification for this study emanated from the need to conform to the major education reforms in line with technological development of the 21st century. ICT supported education can promote the acquisition of the knowledge and skills that will empower students for life-long learning. The study objectives included: to assess the ICT infrastructure for teaching and learning in public secondary school, to determine the influence of teacher training in ICT in integration of ICT in teaching and learning, to determine the influence of teachers’ demographic characteristics towards the integration of ICT into teaching and learning and to examine the extent to which school related factors influences the integration of ICT in teaching and learning in secondary schools in Homa Bay district. The study adopted the descriptive survey design. The respondents were head teachers and teachers from each of the five major departments in secondary schools namely: humanities, sciences, languages, mathematics and technical subjects. Data collection was done using questionnaires and observation checklists which were piloted and tested for validity and reliability. Both quantitative and qualitative techniques were used in data analysis. Descriptive statistics was used to present the result of the study and general trends. The findings of the study were that the majority of the schools in Homa Bay district did not have adequate ICT infrastructure to enable them integrate the use of ICT in teaching and learning. The level of teacher training in ICT influenced integration of ICT in teaching and learning. It was also noted that teachers’ demographic characteristics influenced integration of ICT into teaching and learning. The study also revealed that school related factors like proper ICT policy, teaching load, finances and teacher development programs greatly influenced the integration of ICT into teaching and learning. The study made recommendations as follows; the Ministry of Education to invest heavily in the provision of ICT infrastructure in collaboration with the board of management (BOMs), the ministry of education to train more teachers on the use of ICT facilities and organize in service staff training programmes on the use of ICT facilities, and school administrators use of ICT facilities and school administrators to familiarize themselves with the national ICT policies in order to help them develop school ICT policies and plans that would enable them integrate ICT facilities in teaching and learning effectively. Suggestions for further research were: Comparative study be conducted in other districts in the county using similar research tools, a similar study be conducted in private schools in the district using similar research tools for comparison and a study be conducted on other factors influencing integration of ICT in secondary schools in Homa-Bay district other than school factors.
CHAPTER ONE
INTRODUCTION

1.1 Background to the study

All over the world education is viewed as playing a major role in both social and economic development. Sharma (1997) as quoted in Yator (2003) education is an effective weapon to fight out ignorance, poverty and diseases. To achieve global goals of education, the provision of quality education and training is very important. This will lead to a wide range of benefits. Globally the USA took the first initiative to incorporate information technology (ICT) into its mainstream affairs, for example, in education and government among others (Barnes, 2006).

Many governments in Africa have tried to put emphasis on education since independence. This has made many governments to increase their budget allocation in education (United Nations Educational, Scientific and Cultural Organization, 2008). The move is motivated by the fact that education is the cornerstone of economic growth and development. Apart from expanding allocation to education, governments have been reforming their education system especially in the less developed countries. Education reform efforts in less industrialized countries have aimed at making education an effective tool for national development (Abagi & Odipo, 1997). Information and Communication Technology (ICT) is now at the centre of education reform efforts that involve its use in coordination with changes in curriculum, teacher training, teaching and learning and assessment (Kozma, 2000).
Quality in education is globally recognized and valued. One of the education for all (EFA) goal stressing on quality of education states. “To improve all aspects of the quality of education and ensure the excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills.” According to the Republic of Kenya (2002), among the determinants of quality in education are the availability of qualified and motivated teachers, a conducive environment for teaching and learning including the curriculum, facilities, the resources available for their provision and the use of modern techniques in teaching and learning. This involves the integration of information communication technology in education. The UNESCO defines ICT as the range of technology that are applied in the process of collecting, storing, editing, retrieving and transfer of information in various forms (UNESCO2008).

The job of teaching in schools today is a highly complicated one due to the emerging challenges that have risen as a result of rapidly changing technology. According to Okumbe, 2001), teachers are changed with the tasks of planning for teaching and guiding the learning process. This possess allot of challenges to the teachers.

According to Spense and Smith (2009) ICT enable communications build-human capabilities and freedoms and also offer students tools to access information and develop tools to access information and develop research skills in solving problems. United Nations and the World Bank reported that ICT can increase access to education network for students, training teachers

Goko (2012), postulates that there are ICT facilities in secondary schools such as computers, computer laboratories, internet connections, alongside the traditional methods of telecommunication. He further notes that teachers do not make real use of ICT’s, at their disposal hence weak integration and usage in classroom activities. The Kenyan government commitment to the integration of Information Communication and Technology in education has been indicated through development of a number of strategies. These include prioritizing ICTs in education in national development plan (2002-2008), the development of Kenya Education Support Sector Support Program (KESSP) (2005) in which ICT feature as one of the prioritized areas with an aim of integrating ICT into teaching and learning process. This was followed by the development of national policy for information technology in 2006. The policy has a section that sets out objectives and strategies for use in education lastly in 2006; the Ministry of Education Science and Technology (MOEST) introduced national information communication technology strategy for education and training (Goko, 2012).

Even with these commitments from the government, Zelesa (2005) observed that ICT was not fully embraced in teaching and learning. Zelesa (2005) further noted that there are various factors influencing the integration of information communication technology into teaching and learning like the ICT infrastructure, the level of teachers ICT knowledge and skills, teachers’
attitude towards integration of ICT in teaching and learning and school administrative practices that support the use of ICT in teaching and learning.

These problems were found to be true for Homa Bay District. Inadequate usage of information communication technology in teaching and learning in public secondary schools is an indication that problems exists in the institution and the users. This is true in Homa Bay District, it is against this background that this study seeks to establish the school factors influencing integration of information communication technology in teaching and learning in public secondary schools in Homa Bay District, Kenya.

1.2 Statement of the problem

Computers are spreading rapidly in various schools both in developed and developing countries. However, although schools have had computers for almost two decades, ways to use them effectively have evolved slowly. Technological revolution in schools have been greatly influenced by a number of factors such as the ICT infrastructure capacity, level of teachers ICT knowledge and skills, teachers’ attitude towards integration of ICT teaching and learning and school administrative practices that supports the use of information communication technology in teaching and learning (Spence and Smith, 2009).

The Ministry of Education has come up with an ICT policy and has also worked tirelessly to equip selected secondary school with e-learning infrastructure. This is a project that resulted in the integration of ICT into the curriculum and the subsequent training of teachers to acquire the basic

Andhendha (2011) undertook a research on factors influencing the integration of ICT into teaching and learning in secondary schools in Bondo district Siaya County while Goko (2012) did a research on factors affecting the use of Information Communication Technology in teaching and learning in secondary schools in Kangema-Muranga County. They found out that despite the numerous effort being made by the ministry of education to integrate ICT into teaching and learning in secondary schools in Kenya, there seems to be various drawbacks to attaining this development agenda. These drawbacks are like, lack of enough ICT infrastructure, lack of enough trained teachers in ICT, teachers demographic factors and school related factors. This research therefore sought to establish the school factors influencing integration of information communication technology in teaching and learning in public secondary schools in Homa Bay district Kenya. This study is timely and will help to fill gap.

1.3 Purpose of the Study

The purpose of this study was to establish the schools factors that influence the integration of information communication technology in teaching and learning in secondary schools in Homa Bay District- Homa Bay County, Kenya.
1.4 Objectives of the study

The objectives of the study were;

1. To assess the ICT infrastructure for teaching and learning in Homa Bay district.

2. To determine the influence of teacher training in ICT in integration of ICT in teaching and learning in secondary schools in Homa Bay district.

3. To determine the influence of teachers’ demographic characteristics towards the integration of ICT into teaching and learning in public secondary schools in Homa Bay district.

4. To determine the extent to which school related factors influences the integration of ICT in teaching and learning in secondary schools in Homa Bay district, Kenya.

1.5 Research questions

The study was guided by the following questions

1. What is the status of ICT infrastructure for teaching and learning in secondary schools in Homa Bay district?

2. In what ways does the level of teacher training in ICT influence the application of ICT in teaching and learning in secondary schools in Homa Bay district?

3. To what extent does the teachers’ demographic characteristics influence the integration of ICT in teaching and learning?
4. To what extent does the school related factors influence ICT integration into teaching and learning in public secondary schools in Homa Bay District

1.6 Significance of the study

The information from the study may give an insight or create a desire in stakeholders in education in Homa Bay district to understand the factors that influence the use of ICT in the education system and make relevant decisions on ways and means of improving the ICT facilities in secondary in the district. The Ministry of Education may use the findings to formulate the appropriate ICT policies that guide the use of ICT in teaching and learning.

The school administration could use the findings in making decisions on the type of ICT infrastructure to acquire as well as the necessary technical support needed to maintain the ICT. The curriculum developers would find the result of the study important in developing ICT curriculum that would maximize the potential of ICT in education.

The findings may help the teachers understand how technology affects their instructional materials in class and may find it necessary to adopt the available ICT equipment in their schools. The teacher training colleges would find the results crucial in developing education courses to enhance pre-service ICT training on better application of ICT in the classrooms. The findings may help in improving the awareness on the need to embrace the use of ICT in the community would understand their role in education and be more supportive in the development of ICT infrastructure in the schools especially in the rural
areas. The research findings would provide rich data for policy utilization in integrating ICT in teaching and learning in schools. The gaps realized would also form action points for further academic research by the educationists whose efforts would inform policy enhancement. It is therefore very fundamental that studies such as this one are continuously done all over before curriculum developers and the government decides to integrate ICT into teaching and learning.

1.7 Limitations of the study

A limitation is an aspect of a research that may influence the results negatively and affect the generalizability of the results but over which the researcher has no control (Mugenda & Mugenda, 2003). There were two limitations in this study. Firstly, although integration of Information Communication Technology in teaching and learning has been identified as an important factor in the improvement of teaching and learning most teachers lacked the knowledge on the need to integrate ICT into teaching and learning. Secondly some respondents intentionally ignored some questions in the questionnaires.

1.8 Delimitations of the study

Delimitation is a purposeful and conscious action taken in order to make the research manageable (Kombo & Delno, 2006). The study was only conducted in the randomly selected public secondary schools in the district. Private schools were not focused on as their management differs from that of the public schools. They are owned by private individuals or groups. The school
factors focused on in the study were ICT infrastructure, teacher training in ICT, teachers demographic characteristics and school related factors. There were other environmental factors which influence the integration of ICT into teaching and learning but which would have made the study too wide to be covered within the set duration.

1.9 Basic assumptions of the study

i. All the respondents would have the required knowledge and they were competent enough to give accurate responses to the questions raised through the questionnaires

ii. Stakeholders would be willing to participate as requested

1.10 Definition of significant terms

The following terms are defined within the context of this study.

Application of ICT refers to the use of ICT to enhance instruction and create a rich environment to help each individual student develop a depth of understanding and critical thinking.

Attitude refers to the way that you think and feel about somebody or something

Computer refers to an electronic machine that can store, organize and find information, do calculation and control other machines.

Infrastructural capacity refers to the ICT hardware like computers, software, internet connectivity and electrification
**Influence** refers to the capacity to improve or lower the integration of ICT in teaching and learning.

**Integration** refers to the usage of ICT facilities like computers in planning, teaching, setting and preparation of exams.

**Information Communication Technology** refers to both traditional (for example radio, television, print, video) and modern technologies like (internet, computer, mobile phones etc) that are intended to fulfill information processing and communication.

**ICT Infrastructure** refers to the Physical equipment/hardware and software that enables a network to function.

**IT Capacity building** refers the process of creating or enhancing local human and organizational abilities to use IT to perform specific tasks in organizations in order to attain organizational objectives and it is based on the idea of human capital.

**School based factors** refer to those factors which are found in the school and which may affect the integration of ICT in teaching and learning.

**Technical support** refers to the basic skills used to overcome technical problems when ICT facilities are applied. It can be provided by in-school staff or external service provider.

### 1.11 Organization of the study

This study is organized into five chapters. Chapter one contains the background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study,
limitations of the study, delimitations of the study, basic assumptions of the study, definition of significant terms and organization of the study. Chapter two focuses on the literature review on school based factors influencing integration of ICT in teaching and learning. It entails discussions on ICT infrastructure and curriculum, the influence of teacher training in ICT in integrating ICT into teaching and learning, the influence of teachers’ demographic characteristics towards the integration of ICT into teaching and learning and school related factors that influences integration of ICT into teaching and learning. It also entails discussions on the theoretical and conceptual frameworks.

Chapter three covers the research methodology which includes; research design, target population sample, sample size and sampling techniques, research instruments, their validity and reliability and data analysis techniques. Chapter four covers data analysis, interpretation and discussion. Chapter five consists of a summary findings, conclusion, recommendation of the study and suggestion for further research.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter contains reviewed literature on the school factors influencing integration of informational communication technology in teaching and learning from global, regional, and local perspectives. The chapter focuses on various school factors such as information communication technology infrastructure, the level of teachers ICT knowledge and skills, the availability of ICT technicians in schools and school administrative practices that support the integration of ICT.

2.2 Benefits of integration of ICT in teaching and learning

Goko (2012) notes that information communication technologies integration in education enhances all forms of information exchange, observation learning and decision making. Information communication technology promote access to information for private and professional decision making which expand the range of choices and opportunities by facilitating greater access to economic, educational and development related information. They create more awareness of factors affecting individual well being and greater ability to influence and participate in decision making. According to Gok (2007) Information Communication Technologies also facilitate reduction of distance as a factor in social and economic participation, research is much easier with Information communication technology, especially through the internet. There is greater ability to learn. Distance learning permits students to get accreditations online
from recognized universities. Information communication technologies in general enable new ways of teaching and learning which constitute a shift from a teacher-centered pedagogy to one that is learner centered.

2.3 School factors influencing integration of ICT in teaching and learning in the world

The link between ICT and development has been articulated in the alarming terms of the ‘digital divide’ and the widening of the gap between developed and developing countries. There is concern that developing countries are deprived of the opportunities for economic growth and life improvement generally enjoyed by advanced economies because of the scarcity of ICT: particularly limited internet connectivity. Capacity of a country’s information and communication technology capability can potentially bring about development (Kamal and Qureshi, 2009).

Kozma (2005), notes that knowledge creation, technological innovativeness, organizational networking, and knowledge sharing can support both sustained economic growth and social development. Singapore is a world class leader in science and technology and she is building a multi-technology ultramodern telecommunications and information infrastructure. (Goko, 2012).

Malaysia is committed to the use of ICTs to achieve its development objectives and to transform Malaysia successively to an information society, a knowledge society and finally a value-based knowledge society. According to UNDP HDR (2001) most developing countries that are dynamic in the use of
new technology can be defined as dynamic adopters which include countries like Brazil, China, India, Indonesia, South Africa and Tunisia among others. Many of these countries have important high technology industries and technology hubs, but the diffusion of old inventions is slow, uneven and incomplete to all levels of society, including rural dwellers and the poor.

China’s commitment to adapt to modern technology in all sectors in the country is supported at the highest levels and represents a significant national investment in technology and other capabilities. A clear objective is to make China a major participant in the global economy. China’s efforts to connect all major centres with fibre optic cabling is another clear example of the enthusiasm with which ICTs are being rolled out in countries. Other developed countries have expansive ICTs in all aspects of their daily activities. (Samad 2009). Kriz and Quresh (2009) in their research, concluded that there is close link between ICTs and economic growth and development.

2.4 School factors influencing integration of ICT in teaching and learning in African countries

There is a lot of literature on the use of ICTs in Africa, which reports on the rapid growth of ICT use, especially in urban areas. African governments have liberalized their information and communication technologies (ICT) sectors and invested huge portions of their annual budget in ICT (Bollou & Ngwenyama, 2008) amid other necessities like hunger and combating of diseases. There are challenges that confront sub-Saharan Africa as a whole which pose challenges in striking a balance between technology and the need
for local development. Slow connectivity in Africa is characterized by scarce resources, absence of access or the lack of ICT, the lack of integration of the local languages into the system varying and updating the contents of materials that are posted on the websites (Kamel & Weigler, 2001).

Africa is facing today the uneven access to information and communication technology (ICT) which results to digital divide with the developed countries. This has resulted to over dependence on the developed western countries. Jensen (2002) observes that prohibitive cost and sparse and unreliable telecommunication networks forms the major hindrance for many people in Africa to use ICTs. Findings show that the greatest number of internet users in Africa resides in either South Africa or Kenya in the sub-Saharan region or in Morocco and Egypt in the northern region. South Africa has a well-developed internet infrastructure in business and academia and its degree of connectivity places it in the top 25 in the world (Langmia 2008). This well-developed internet infrastructure has greatly influence the teaching and learning activities.
Table 2.1: Internet access and usage (2007/2008)

<table>
<thead>
<tr>
<th>Country</th>
<th>Household Internet Connectivity</th>
<th>With Working Citizen 16 Years And Below Using Internet</th>
</tr>
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<tbody>
<tr>
<td>South Africa</td>
<td>4.8%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Namibia</td>
<td>3.3%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Kenya</td>
<td>2.2%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Cameroon</td>
<td>1.2%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Mozambique</td>
<td>0.9%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Ghana</td>
<td>0.5%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Botswana</td>
<td>0.1%</td>
<td>5.8%</td>
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<tr>
<td>Ethiopia</td>
<td>0.1%</td>
<td>0.7%</td>
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<tr>
<td>Uganda</td>
<td>0.0%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>0.0%</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

Source: Langmia (2005)

2.5 School factors influencing integration of ICT in teaching and learning in Kenya

In order to make Kenya’s educational systems more competitive, the country has developed National ICT Policy. It sets out the nation’s aims, principles and strategies for the delivery of Information and Communication Technology to improve the livelihoods of Kenyans. Ministry of education introduced the national ICT strategy for education and training (Farrel 2007). The ICT policy gives an opportunity for establishment of grassroot based infrastructure for knowledge sharing to all.
The ICTs in Education Options Paper (MOEST, 2005) discusses the ways in which information and communication technologies can be integrated into education to support and improve the delivery of quality education for all Kenyans. It provides a comprehensive range of potential technologies to improve teaching, learning and management. It is intended to enable the government of Kenya to plan and put into place appropriate ICTs in education interventions as they move forward with the comprehensive Kenya Education Sector Support Programme (KESSP) sessional paper no. 2005. This includes interactive radio instructions (IRI), use of computers in schools, development of ICT skills and the access of internet. The attempt to integrate ICT in Kenya secondary schools is faced by various challenges such as ICT infrastructural capacity for teaching and learning, ICT knowledge, skills and technical support and school administration Langmia (2005).

2.6 ICT infrastructure for teaching and learning

Schools need to be equipped with the necessary ICT infrastructure in order to equip the next generations with the needed tools and resources for access and use and to be able to attain the expected skills (Gulbahar & Guven 2008). Schools are equipped with different kinds of technological infrastructure and electronic resources available like: hardware, software and network infrastructure. These are very necessary for the integration of ICT into teaching and learning (Afshari 2009), he further argues that limited access to computers is a barrier to effectively using computers in classes. Muntaz (2000)
observed that lack of well-established ICT infrastructure is one of the reasons why teachers do not use technology in their classes.

Efficient and effective use of technology depends on the availability of hardware and software and the equity of access to resources by staff. The quest for connectivity has been problematic and will require fundamental shifts in the regulatory environment as well as the new attention to public-private partnerships and social sizes. Developed countries have 80% of the world’s internet users. (UNHD, 2001).

Table 2.2 Number of Internet Users Between 1999 -2002

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of users (million)</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>3.11</td>
<td>4.15</td>
</tr>
<tr>
<td>Asia/pacific</td>
<td>104.88</td>
<td>157.49</td>
</tr>
<tr>
<td>Europe</td>
<td>113.14</td>
<td>171.35</td>
</tr>
<tr>
<td>Middle east</td>
<td>2.40</td>
<td>4.65</td>
</tr>
<tr>
<td>Canada &amp; USA</td>
<td>167.12</td>
<td>181.23</td>
</tr>
<tr>
<td>Latin America</td>
<td>16.45</td>
<td>25.33</td>
</tr>
<tr>
<td>World total</td>
<td>407.10</td>
<td>544.20</td>
</tr>
</tbody>
</table>

Source: UNHD 2001, Pg. 61-62

High costs incurred in infrastructural capacity building, sparse and undesirable telecommunication networks greatly influence the accessibility to computers. This can be seen as illustrated in the table below.
Table 2.3 Computer Penetration Ratios at Schools in Some African Countries.

<table>
<thead>
<tr>
<th>County</th>
<th>Number of schools</th>
<th>Schools with computers</th>
<th>% of schools with computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>26,000</td>
<td>26000</td>
<td>100%</td>
</tr>
<tr>
<td>Ghana</td>
<td>32,000</td>
<td>800</td>
<td>2.5%</td>
</tr>
<tr>
<td>Mozambique</td>
<td>7,000</td>
<td>80</td>
<td>1.2%</td>
</tr>
<tr>
<td>Namibia</td>
<td>1,519</td>
<td>350</td>
<td>22.1%</td>
</tr>
<tr>
<td>South Africa</td>
<td>25,582</td>
<td>6,651</td>
<td>22.6%</td>
</tr>
</tbody>
</table>

Source: NEPAD e-schools project Pg. 13

It is evident from the table that in countries like Ghana, Mozambique, Namibia and South Africa only very few schools are with computers. Therefore lack of a well-built ICT infrastructural capacity influences negatively the integration of ICT in teaching and learning.

2.7 The influence of training in ICT in the integration of ICT in teaching and learning

The pre-service and in-service training for teachers in ICT is very necessary for proper integration of ICT in the education system in any country. Teachers need to be fully prepared in order to be able to manipulate and use effectively the ICT materials and resources to enhance the teaching and the learning process. The teacher is responsible for establishing the classroom environment and preparing the learning opportunities that facilitates student’s use of technology to learn and communicate (UNESCO 2008).
Research findings have revealed that most teacher training courses are focused on basic computer operations rather than advanced computer skills and subject specific pedagogical applications (Tin 2002). The use of new technology requires new teacher roles, new pedagogies and new approaches to teaching and learning. It therefore requires that teachers need to have a comfortable level of ICT skills to enable them use ICT as a primary tool for teaching and learning as they endeavour to cover the curriculum. Teachers need to be competent and confident users of hardware and software to understand how to organize the classroom, to structure learning tasks so that IT resources becomes a necessary and integral part of teaching and learning (Tin 2002).

Several researchers have realized that the use of ICTs alone does not change the traditional teaching practices and that ICTs need to be supported by innovative pedagogic techniques to enhance students self learning and active interaction.

2.8 Teachers’ demographic characteristics towards integration of ICT in teaching and learning

According to Eggen and Kanchak cited in Olaleye (2011), positive teachers’ attitudes are fundamental to effective teaching and learning. They identified a number of teachers’ attitudes that will facilitate a caring and supportive classroom environment, they are enthusiasm, caring, firm, democratic practices to promote students responsibility, use of time for lessons
effectively and have established efficient routines and interact freely with students and providing motivation for them.

Scott, E. (2011) noted that Cyprus primary school principles generally hold positive attitudes towards ICT. He also noted several statistical differences across their gender, years of service, academic qualifications, access to a computer and internet services, in-service training on ICT for training and learning etc which affected the teachers attitude towards integration of ICT in teaching and learning. These factors are found to affect the integration of ICT into teaching and learning in public secondary schools in Homa Bay District. Scott further noted that positive attitudes towards computer have been found to decrease with age, experience, voluntariness specialization, and computer ownership. Due to this teachers’ attitudes towards the integration of ICT into teaching and learning is an important variable to be investigated. This will help in allowing the stakeholders in Education at various levels in making informed decisions at the planning and implementation levels.

2.9 The influence of school related factors on the integration of ICT in teaching and learning

For successful integration of ICT in teaching and learning there has to be proper planning at the school level. This is because the school is expected to provide the necessary ICT resources for the teachers and students to use. An ICT integration plan provides a detailed blueprint of the steps and methods needed to translate the school ICT vision into reality (Afshari, 2009). A plan
is a guide to action of a substitute for it, the existence of a written ICT plan and strategy does not guarantee the comprehensive use of ICT in school, nor does the absence of an ICT plan necessarily equate to the lack of ICT integration in a given school (Bryderup, 2002). School administrations have a major task in ensuring that they equip their school with the necessary ICT fatalities like the computer. However, the school administrators are faced with major challenges like to implement the ICT policies which require heavy amount cash of in relation to other pressing educational needs such as the need for classrooms and basic classroom, furniture and resources.

2.10 Summary of literature review

This section has dealt with school factors influencing integration of ICT in teaching and learning in secondary schools. The following school factors are discussed, ICT infrastructure for teaching and learning, the influence of teacher training in ICT, the influence of teachers demographic characteristics towards integration of ICT in teaching and learning and finally school related factors that influences the use of ICT in teaching and learning.

Ndiku (2003) conducted a research based on the experience of managers and teachers of computers integrated lessons in eight schools in Uasin-Gishu district in western Kenya and came up with a number of problems encountered in the implementations of such lessons. The research identified the following as important factors influencing the integration of information communication technology into teaching and learning. These are:- insufficient number of computers, ICT infrastructure, the influence of teacher

The study seeks to provide an insight on the need to put in place the ICT infrastructure like the computers, need to improve the level of teachers ICT, training in ICT, to highlight the need to understand the role played by teachers demographic factors in the integration of ICT into teaching and learning and to explore further the school related factors that influences the integration of ICT into teaching and learning. Therefore there is need to investigate these factors to see how best they can be manipulated in order to promote the integration of ICT into teaching and learning.

2.11 Theoretical framework

This study was based on Roger’s theory of Diffusion of Innovations (2003). The original work on this theory was done as early as 1903 by a French Sociologist Gabriel Tarde. Diffusion research centres on the conditions which increase or decrease the likelihood that a new idea, product or practice is adopted by members of a given culture of social system. More research on this theory has attempted to explain the variables that influence how and why users adopt new form of information such as the use of internet services.

Robinson, (2009) observed that, instead of focusing on persuading individuals to change, the theory sees change as being primarily about the
evolution or retention of products better fits for the needs of individuals and groups. Rogers theory of Diffusion of Innovation has four elements: (i) Innovation which refers to an idea, practice or object that is perceived as new by an individual. (ii) A Communication channel which is the means by which the messages get from one individual to another. (iii) Time is simply the length of period or duration required to pass through the innovation-decision process. Rate of adoption is the relative speed with which an innovation is adopted by members of a social system. (iv) Social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

The theory further illustrate that each member of the school system faces his or her own innovative – decision that follows a five steps process: The five stages process are: Knowledge- this is where a person becomes aware of an innovation and has some idea of how it functions. Secondly, persuasion where a person forms a favourable or unfavorable attitude towards the innovation. Third is the decision where the person engages in activities that lead to choice to adopt or reject the innovation. Forth is the Implementation where a person puts an innovation into use.

Finally, we have the Confirmation stage. This where by the person evaluates the results of an innovation decision already made. This compels the user to continue adopting or later rejects the technology. The researcher used the whole theory in the study. The theory was appropriate to this study because of its appropriateness to the research topic.
2.12 Conceptual framework

The conceptual framework is the diagrammatic presentation of the independent and dependent variables of the research study. Figure 2.1 shows the relationship between the schools based factors and teaching and learning outcome and the integration of information communication technology into teaching and learning.

Figure 2.1: The relationship between school factors and integration of Information Communication Technology into teaching and learning

- **ICT infrastructure**
  - Hardware/computers
  - Software/ ICT Programs
  - Internet connectivity

- **Teacher training in ICT**
  - Teachers pre-service training
  - In-service training and induction
  - Specialization in ICT

- **Teachers’ demographic characteristics**
  - Gender
  - Age
  - Experience

- **School related factors**
  - ICT policy
  - Teaching load
  - Finances
  - Teacher development

- **Integration of ICT in teaching and learning**
  - Improved mean scores in KCSE
  - Improvement in planning for teaching for teaching i.e. in making schemes and lesson plans
The integration of information communication technology in teaching and learning is dependent on the school factors such as ICT infrastructure, teachers training in ICT, teachers demographic characteristics and the school related factors. There is a direct relationship between the school factors and the integration of ICT into teaching and learning which finally leads to improvement in student’s performance in Kenyan Certificate of Secondary Examinations.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology that was used as follows:- research design, target population, sample size and sampling techniques, research instruments, instrument validity, instrument reliability, data collection procedures and data analysis techniques.

3.2 Research design

Orodho (2009) says that the term research design refers to the procedures selected by a researcher for studying a particular set of questions or hypothesis. This study adopted the descriptive survey design. Kerlinger (2003) postulates that descriptive survey design is that branch of social scientific investigation which studies large and small populations by selecting and studying samples chosen from the population to discover the relative incidences, distributions and interrelations. Descriptive surveys have the advantage of securing evidence of current situation and can be used to explore the situation as it is. This research design was deemed suitable for this study because the researcher was interested in finding out the school factors influencing the integration of ICT into teaching and learning with school factors as the independent variables and ICT integration in teaching and learning variables as descriptive studies looks at what exists, happens in society and also looks at measuring the number of times someone does something under certain conditions. It describes and explains phenomena that
observations reflected measure social reality or describe what is in the real world. The study fits within the provisions of descriptive survey research design because the researcher will collect data and report the way things are without manipulating any variables.

3.3 Target population

Oso and Onen (2009) defines the term target population as the total number of subjects or the total environment of interest to the researcher. This study targeted 36 public secondary schools in Homa Bay district which had registered students for KCSE at least once during the study period (2010-2012. The schools were categorized into three main groups as follows; First, National schools which had only 1 school. The second category was county schools which had 7 schools and the last category was the district schools which had 28 schools. The study also targeted 36 head teachers and 259 teachers from the public secondary schools. (DEO Homa- Bay, 2013)

3.4 Sample size and sampling techniques

Sampling is the act, process or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population (Kombo, et al 2006). Stratified proportionate random sampling was used in this study. The stratification variables were National, County and district schools. This stratification is in line with the argument of Best and Kahn (2005) that at times it’s advisable to
subdivide the population into smaller homogenous groups to get more accurate representation.

Mugenda and Mugenda (1999) recommend that a stratified random sample of 30 percent of the target population from within each group in proportions that each group bears to the population as whole be taken. For this study the researcher randomly selected 50 percent of public secondary schools from each category to take care of non-response rate which could make the sample to be biased. This concurs with Mugenda and Mugenda (2003) who says that the rule of the thumb can be used to obtain a reasonable sample for a study. Of all the schools in each category 50 percent translated to a sample of 18 schools. The actual schools were picked using simple random sampling which allowed each member of the population an equal and independent chance of being selected. The sample size therefore comprised of 18 schools, 18 head teachers and 90 teachers from the various departments (Languages, Sciences, Mathematics, Technical subjects and Humanities)

<table>
<thead>
<tr>
<th>School category</th>
<th>Population</th>
<th>Schools’ sample</th>
<th>Head teachers’ sample</th>
<th>Teachers’ sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>County</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>District</td>
<td>28</td>
<td>13</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>18</td>
<td>18</td>
<td>90</td>
</tr>
</tbody>
</table>
Eighteen schools made up the sample size representing 50.0 percent. There is only one National school hence has to be represented in the sample size. There are 7 county schools out of which four of them are purely boy’s schools while two schools are purely girls schools. Two schools were chosen to represent the girl’s category while two schools were chosen to represent the boys category.

From the district schools thirteen schools were chosen to represent the population. All these kinds of sampling was done purposively to allow for each category to be full represented in the sample and to be able to come up with a proportionate figure of respondents. Purposive sampling allows the researcher to deliberately select participants who in the researcher view would provide data that illuminate the phenomenon under study (Borg and Gall 1996). Purposive and proportionate sampling of head teachers and teachers was done. From each sampled school in every category 1 head teacher and 5 teachers were chosen as respondents.

3.5 Research instruments

This study used questionnaires and observation checklist to collect data. The questionnaires and observation checklist were of advantage as the information was to be gathered from a large sampled and the population under study was literate. Head teachers questionnaires had three sections A, B and C. Section A obtained data on head teachers demographic information. Section B obtained information on school background. These were very vital in that it help the researcher to understand the respondents.
These are tools that are used by the researcher to collect data from the sampled respondents in the study (Kombo and Tromp, 2006). This study used questionnaires to collect data. The questionnaire was of advantage as information is to be gathered from a large sample. It also be suitable as the population under study is literate. Head teachers questionnaire had three sections A, B and C. Section A obtained data on Head teacher’s demographic information. Section B obtained information on school background. Section C gathered data related to researcher questions. Teachers questionnaire had three sections A, B, and C. Section A gathered data on teachers’ demographic information. Section B gathered data on the school Background. Section C gathered data related to researcher questions. Also it had three sections A, B, and C. Section A gathered data on teacher’s demographic information. Section B gathered data on the school background. Section C gathered questions on ICT infrastructure available at the school. All the three research instrument were developed by the researcher and presented to the respondents by the researcher. Most of the respondents were very positive in responding to the questionnaires while a minority did not respond to the questionnaire.

3.6 Instrument validity

Instrument validity is the degree to which research results obtained from the analysis of the data actually represent the phenomenon under study (Mugenda Mugenda, 1999). To ensure instrument validity content validity was tested. Content validity refers to a measure of a degree to which data collected using a particular instrument represent a specific domain of indicators or content a
particular concept. The items in the questionnaires were presented to the supervisors from the department for assessment of relevance of content. The suggestions, comments and the recommendations made were incorporated in the final questionnaires.

### 3.7 Pilot study

A pilot study was conducted in three schools selected from the target population but not part of the sample. This is in line with Gay as quoted in Mugenda and Mugenda (2003) who suggests that ten percent of the accessible population is enough for experimental studies. Through the pilot study the researcher modified and discarded all the ambiguous items in the questionnaires. A pilot test was conducted to detect weakness in design and instrumentation and to provide proxy data for selection of a probability sample. According to Mugenda and Mugenda (2003), the accuracy of data to be collected largely depends on the data collection instruments in terms of validity and reliability. Feedback from piloting of questionnaire was used to refine the questionnaire before final administration.

### 3.8 Instrument reliability

Instrument reliability of measurement concerns the degree to which a particular measuring procedure gives similar results over a number of repeated trials (Orodho, 2008). For this study test-retest method was used to test the reliability of the questionnaires. This technique is good because it gives a time lapse between the two tests and the researcher can use this to prove instrument
reliability. The developed questionnaires were administered to three public schools randomly selected. The same questionnaires were re-administered after two weeks and responses were scored. The scores from test one and test two were correlated to get the reliability coefficient using the Pearson Product Moment correlation formula.

\[
r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{\left(\sum X^2 - \frac{(\sum X^2)^2}{N}\right) \left(\sum Y^2 - \frac{(\sum Y^2)^2}{N}\right)}}
\]

Where 

- \( N \) = Number of respondents
- \( X \) = Scores from test one
- \( Y \) = Scores from test two

The reliability coefficient (\( r \)) of the head teachers’ questionnaire was found to be 0.890 that of the teachers was 0.722. According to Gay (1992) any research instrument with a Correlation Coefficient between 0.7 and 1.0 was to accept as reliable enough. The research found that the instruments were reliable enough to be used in this study.

### 3.9 Data collection procedures

Before embarking on data collection the researcher sought authority from the National Council for Science and Technology (NCST) by obtaining a research permit. The researcher got permission from the District Commissioner and the DEO Homa-Bay district before visiting the schools. The researcher proceeded
to the schools and sought permission from the respective head teachers to conduct research in their schools. The research instruments (questionnaires) were administered by the researcher in person to the head teachers and teachers. The filled questionnaires were collected on the same day.

3.10 Data analysis techniques

The questionnaires collected from the respondents were checked to ascertain they were complete and accurate. The questionnaires were then edited and coded. The data was then be entered in the computer to be analyzed using the Statistical Package for Social Science (SPSS) using the latest version number 18. Quantitative data was analyzed using descriptive statistics tools such as frequency distribution table, graph and pie charts. Qualitative data was analyzed by synthesizing the information from the respondents and arranging them in themes and then finally analyzed using descriptive statistics.
CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSIONS

4.1 Introduction

This chapter deals with data analysis, presentation and discussions on the research findings which were collected in the public schools. The study investigated on school factors influencing integration of Information Communication Technology in teaching and learning in public secondary schools in Homa-Bay district, Kenya. The findings of this study are based on the responses of Head teachers picked from randomly selected schools and the teachers who were randomly picked from each of the five major departments in secondary school regarding their opinions on most of the issues in the questionnaires. The chapter is organized into the following section: questionnaires return rate, demographic information, and findings from the research questions based on the study objectives.

4.2 Questionnaire return rate

The questionnaires were administered to 18 head teachers and 90 teachers from the sampled schools. A total of 18 head teachers responded to the questionnaires representing 100 percent return rate. Eighty six teachers responded to the questionnaires representing 95.6 percent return rate. The total questionnaire return rate was 96.3 percent. According to Kumar (2005) a questionnaire return rate above 50 percent is considered a good response. This return rate was considered excellent.
4.3 Demographic information

The researcher sought to identify the personal characteristics of both the head teachers and the sampled teachers who took part in the study. The demographic data explored various personal aspects of the respondents namely; gender, age bracket, experience and professional qualifications. These aspects were considered important in understanding the respondents with regard to the integration of Information Communication Technology in teaching and learning. Frequencies and percentages were used in describing the demographic data and the results presented in tables 4.1, 4.2, 4.3, and table 4.4.

4.3.1 Head teachers’ gender

The study sought to know the gender disparities of the respondents. This was very necessary to help the researcher understand the respondents in their participation in the integration of ICT into teaching and learning. The findings were recorded in table 4.1.

Table 4.1: Gender of head teachers

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12</td>
<td>66.7</td>
</tr>
<tr>
<td>Female</td>
<td>06</td>
<td>33.3</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The analysis of head teachers’ gender distribution revealed that there were more male head teachers (66.7%) than females (33.3%). A possible
explanation for this disparity could be that there were few girls schools in the
district and all the boys’ schools and mixed secondary schools were headed by
male teachers.

4.3.2 Head teachers’ age

The head teachers were asked to indicate their ages by showing the age
brackets in which they belonged. The responses are presented in Table 4.2

**Table 4.2: Age distribution of head teachers**

<table>
<thead>
<tr>
<th>Age bracket (years)</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-40</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>41.50</td>
<td>10</td>
<td>55.6</td>
</tr>
<tr>
<td>51 and above</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As shown in table 4.2 majority of the head teachers in Homa-Bay
district fall in the age bracket of 41-50 years representing 55.6 percent. A
possible explanation to this is that to be appointed a head teacher one must
have been in the profession for a longer period of time and also once you have
reached the age bracket of 51 years and above the head teachers retire at the
age of 60 years and go home hence few head teachers in this age bracket.

4.3.3 Head teacher’s experience in headship

Head teachers’ were asked to indicate the experience they had in headship by
showing the number of years they had been working as head teachers. This
information was appropriate in explaining the head teachers understanding of in Information Communication Technology in teaching and learning. The results obtained are shown in the table below 4.3.

**Table 4.3: Head teachers’ experience in headship**

<table>
<thead>
<tr>
<th>Head teachers’ experience</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 years and below</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>6-10 years</td>
<td>5</td>
<td>27.8</td>
</tr>
<tr>
<td>11-15 years</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>16 years and above</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The indication is that majority (78%) the head teachers in the district have at least 5 years administrative experience to help them understand the school factors which may influence the integration of Information Communication Technology and hence the need to actively play their roles in the Integration of Information Communication Technology into teaching and learning.

**4.3.4 Head teachers’ professional qualifications**

The professional qualifications of head teachers were considered a very important variable based on the assumption that there is a high correlation between professional qualifications and the teachers’ understanding of the school factors influencing integration of Information Communication Technology findings are indicated in Table 4.4.
Table 4.4: Head teachers’ professional qualification

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.Ed</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>B.Ed</td>
<td>15</td>
<td>83.3</td>
</tr>
<tr>
<td>Diploma</td>
<td>1</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Most of head teachers’ (83.3%) are holders of Bachelor of Education degree which is the considerate qualification for teaching in a secondary schools, 11.1% of head teachers are holders of the masters of Education degree while a smaller number of head teachers, 5.6 percent are diploma holders a qualification below the basic requirement for teaching in secondary schools. This is an indication that most of the head teachers in the district may lack the deeper understanding of the school factors influencing integration of ICT into teaching and learning as this understanding is acquired through further education.

4.3.5 Teachers gender

From the sampled schools, five teachers were asked to indicate their gender one teacher from each of the five major departments. The findings are represented in table 4.5
Table 4.5: Teachers’ gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>47</td>
<td>52.2</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>47.8</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100.0</td>
</tr>
</tbody>
</table>

From the responses it is evident that majority of teachers in public secondary schools in the district are males representing 52.2 percent, while 47.8 percent are female teachers in the district could imply that girls are still disadvantaged in terms of access to education.

4.3.6 Age bracket of teachers

The researcher sought the ages of the sampled teachers from each department.

The sampled responses received are as shown in the Table 4.6

Table 4.6: Age bracket of teachers

<table>
<thead>
<tr>
<th>Age bracket (in years)</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-30</td>
<td>18</td>
<td>20.0</td>
</tr>
<tr>
<td>31-40</td>
<td>38</td>
<td>42.2</td>
</tr>
<tr>
<td>41-50</td>
<td>23</td>
<td>25.6</td>
</tr>
<tr>
<td>51 and above</td>
<td>11</td>
<td>12.2</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100.0</td>
</tr>
</tbody>
</table>

From the findings it is worth noting that it is very important for a school to have young energetic teachers, teachers in their senior ages and
those headed for retirement as this provides the school with diverse opinions which are key to the discussion of the need to integrate the use of ICT in teaching and learning and the school factors influencing its integration with a view of making education more relevant to the current needs of the society and in line with the advancement in modern Technology. These sentiments are supported by Kinyanjui (Wamahiu, 1995) that the caliber of teachers in schools or school system form an important variable which can have tremendous impact on school outcomes.

4.3.7 Teachers’ teaching experience

The teaching experience of the sampled teachers from each of the five major departments was considered an important variable as it could have an impact on the teachers understanding of the school factors influencing integration of ICT into teaching and learning. The teachers indicated their teaching experiences. The findings are as shown in the table 4.7 below.

**Table 4.7: The teachers’ teaching experiences**

<table>
<thead>
<tr>
<th>Numbers of years</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 years and below</td>
<td>11</td>
<td>12.2</td>
</tr>
<tr>
<td>6-10 years</td>
<td>27</td>
<td>30.0</td>
</tr>
<tr>
<td>11-15 year</td>
<td>18</td>
<td>20.0</td>
</tr>
<tr>
<td>16-20 years</td>
<td>14</td>
<td>15.6</td>
</tr>
<tr>
<td>21 years and below</td>
<td>20</td>
<td>22.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
Most of the teachers had a teaching experience of 6 years and above. This indicates that majority of teachers in the district had been teaching for a reasonable period of time and may be in good position to understand the school factors influencing integration of ICT into teaching and learning in public secondary schools in Homa-Bay District.

4.4 ICT infrastructure in schools

The integration of Information Communication Technology into teaching and learning in education is directly dependent on the availability of the necessary ICT infrastructure which includes the number of computers available, electricity supply, internet connectivity, radios, televisions, DVDS e.t.c.

4.4.1 Availability of the necessary ICT infrastructure in schools

The researcher sought to know the number of ICT infrastructure facilities available. This was to help the researcher know the extent to which ICT could be integrated in teaching and learning. The findings are as shown in figure 4.1

![Figure 4.1 Availability of ICT facilities in schools](image-url)
The findings revealed that the most common ICT facility available in schools are the computers. A possible explanation to this is that computers are viewed to be the most important ICT facility and are highly valued.

### 4.4.2 Distribution of Computers in Schools

It was observed that most of the secondary schools had computers. Schools also had other ICT infrastructure which includes radio, televisions and DVD’ which were mostly used for entertainment as revealed from the findings. Figure 4.2 shows schools with computers in terms of percentages.

![Figure 4.2: Schools with computers](image)

The figure above shows that 90.0 percent of the schools in the district had computers while 9.0 percent had none. Based on the findings it is evident that most schools in the district had some ICTs which could be used in teaching and learning.
4.4.3 Number of computers in schools

Although the findings reveal that most schools in the district had computers, there was a lot of difference in the number of computers per school. The findings are as shown in Figure 4.3.

![Figure 4.3 Number of computers in school](chart.png)

The researcher observed that 58.40 percent of the school sampled had less than five computers. Most of the district schools sampled falls in the category of below 5 computers (58.40 percent) which worsen the situation given that the majority of schools in the district are district schools. This could be attributed to the fact that in the senior and the national schools, students pay a lot of money in terms of fees which could be used to purchase these ICT facilities whereas the district lacked enough funds to purchase the ICT facilities. The ICT facilities available could not be used effectively to integrate ICT into teaching and learning due to high enrolment of students in secondary schools. This has been brought about by the government policy of subsidized secondary education.
4.4.4 Location of the computers in the schools

The location of the computers in the school determines if they are accessible for use in teaching and learning or not. Figure 4.4 shows where the computers are placed in schools.

![Figure 4.4 Location of computers in schools](image)

Based on the findings it was evident that most of the computers in the schools are found in the office in HODs represented by 54.0 percent. This implied that most of the teachers and students could not easily access the computers for teaching and learning. The observation schedule revealed that most of the day schools have less than five computers which are mostly used for clerical work in the school. In addition, the findings revealed that only two schools had a projector. This meant that even presenting the work prepared by the teachers to the learners could only be done through the use of hard copies. To effectively integrate ICT into teaching and learning, teachers should be in a position to access various ICT facilities like computers so that they can use them in scheming, lesson planning, preparation of teaching and learning aid and finally in teaching and learning.
4.4.5 Internet connection in school

The researcher sought to know how many schools had internet connections and those without. The findings were as shown in the figure 4.5.

**Figure 4.5: Internet connection in schools**

From the findings 56.0 percent of the schools did not have internet connections while 33.0 percent had internet connections in their school. The findings indicate that very few schools have internet connections. This could be due to high cost of installation and maintenance of the internet connections. This could also be due to the fact that majority of public secondary schools in the district are district schools which cannot afford these services due to their financial status. The little money they collect they prioritize in the construction of classrooms and other buildings within the school. The teachers were also asked to indicate how they access the internet in their schools. The findings are as shown in table 4.8
Table 4.8: Internet connection in school

<table>
<thead>
<tr>
<th>Internet connection</th>
<th>Frequency</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepaid modem</td>
<td>62</td>
<td>68.9</td>
</tr>
<tr>
<td>Internet server</td>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>73.3</td>
</tr>
</tbody>
</table>

The findings revealed that 68.9 percent of the internet connections was through prepaid modem and only 4.4% were connected through a server. This means that the access to internet is not only erratic but also very expensive because the prepaid moderns are provided by the mobile phone service providers whose rates are very high.

The researcher sought to know the opinions of teachers on statements concerning ICT infrastructure in different schools. They were asked to indicate by use of a tick the extent to which the statements influenced the integration of ICT in teaching and learning as pertains to their schools. Their responses were recorded in the table 4.9 below.
Table 4.9: Influence of infrastructure in the integration of ICT in teaching and learning

**Key:** SA-Strongly Agree, A-agree, U-undecided-Disagree, SD-Strongly Disagree, N- Total

<table>
<thead>
<tr>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>N</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate number of computers</td>
<td>41.7</td>
<td>45.8</td>
<td>4.2</td>
<td>8.3</td>
<td>0</td>
<td>100</td>
<td>4.209</td>
</tr>
<tr>
<td>Lack of internet connectivity</td>
<td>29.3</td>
<td>56.3</td>
<td>4.2</td>
<td>8.2</td>
<td>2</td>
<td>100</td>
<td>4.027</td>
</tr>
<tr>
<td>Lack of access to computers</td>
<td>31.3</td>
<td>50</td>
<td>2</td>
<td>14.2</td>
<td>2.4</td>
<td>100</td>
<td>3.933</td>
</tr>
<tr>
<td>Insufficient or irregular power supply</td>
<td>12.5</td>
<td>35.4</td>
<td>8.3</td>
<td>29.2</td>
<td>14.6</td>
<td>100</td>
<td>3.02</td>
</tr>
<tr>
<td>High cost of hardware and software</td>
<td>31.3</td>
<td>45.8</td>
<td>8.3</td>
<td>10.4</td>
<td>4.2</td>
<td>100</td>
<td>3.896</td>
</tr>
<tr>
<td>Unavailability of appropriate software</td>
<td>16.7</td>
<td>52.1</td>
<td>14.6</td>
<td>6.3</td>
<td>10.3</td>
<td>100</td>
<td>3.586</td>
</tr>
</tbody>
</table>

Table 4.9 shows that 45.8 percent if the teachers agreed that inadequate number of computers under them from using ICT facilities in teaching and learning, 41.7 percent of teachers strongly agreed that inadequate number of computers hinder them from using ICT facilities in teaching and learning 45.8 percent agreed 4.2 percent were undecided, 8.3 percent disagreed while none strongly disagreed. Teachers also felt that lack of internet connectivity also contributed to the slow use of ICTs in teaching and learning ; 29.3 percent strongly agreed ,56.3 percent agreed 4.2 percent were undecided 8.2
disagreed. In addition it was also revealed that lack of regular access to the computers is another factors that hinders the integration of ICT facilities into teaching and learning.

High cost of hardware and software was also noted by a larger number of teachers as being a major hindrance to the teachers in their attempts to acquire appropriate ICT facilities in school 31.3 percent strongly agreed, 45.8 percent agreed 8.3 percent were undecided, 10.4 percent disagreed and 4.2 percent strongly disagreed.

The teachers also pointed out that the little hardware and software available were not appropriate for efficient use in class 16.7 percent strongly agreed, 52.1 percent as greed, 14.6 percent were undecided, 6.3 disagreed while 10.3 percent strongly disagreed.

4.5 The level of teachers training in ICT
Proper integration of ICT facilities into teaching and learning cannot be achieved without basic knowledge, skills and experience on how to use the available ICT infrastructure in schools. Information Communication Technology knowledge and experience depends on the teachers’ pre-service and in-service training which the teachers have undergone through.

4.5.1 Teachers academic qualification
The teachers had varied academic qualifications ranging from diploma to Master’s degree. The researcher sought to understand the academic qualification of teachers by establishing whether they hold master degree,
bachelor degree, and post graduate diploma in education or diploma certificate this was to help the researcher understand the extent to which the respondents could integrate ICT into teaching and learning. Table 4.10 presents the findings on academic levels of the teachers sampled in the study.

**Table 4.10 Teachers’ academic qualifications**

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s degree</td>
<td>9</td>
<td>10.0</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>63</td>
<td>70.0</td>
</tr>
<tr>
<td>PGDE6</td>
<td>6</td>
<td>6.7</td>
</tr>
<tr>
<td>Diploma</td>
<td>12</td>
<td>13.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Out of the 90 teachers sampled in the study, 70.70 percent were bachelor degree holders, 13.3 percent were diploma holder, 10.0 percent, were master degree holders while 6.7 percent were PGDE holders. The findings revealed that majority of the teachers had the basic requirement academic qualifications to teach in secondary schools.

**4.5.2 Teachers level of ICT training.**

The literature review revealed that for proper use of ICTs in schools, teachers should have adequate computer skills and knowledge (Tin, 2002). The researcher wanted to establish the teachers’ level of ICT knowledge and skills that would enable the teachers to use computers and other ICT facilities at
personal or professional level. Table 4.11 below outlines the level of ICT training among the teachers who took part in the study.

**Table 4.11 level of ICT training**

<table>
<thead>
<tr>
<th>Level of ICT training</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate proficiency</td>
<td>69</td>
<td>76.7</td>
</tr>
<tr>
<td>Diploma in ICT</td>
<td>13</td>
<td>14.4</td>
</tr>
<tr>
<td>Degree</td>
<td>8</td>
<td>8.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The findings revealed that 76.7 percent had certificate in computer packages. This was considered to be a very low level in ICT training. It was also noted that 14.4 percent had attained diploma level in ICT training while only 8.9 percent had degree training in ICT training. Diploma level could be considered to be moderate while degree level was considered to be a higher level. This showed that a large number of teachers in public secondary schools in Homa Bay had not attained higher levels of training in ICT which they could use to integrate ICT into teaching and learning.

**4.5.3 Average Number of lessons**

Time is a good resource for all teachers. The teachers need some free time to scheme, lesson plan, prepare teaching and learning aid and more so time to teach. The research findings showed that 75.0 percent of the teachers had an average of 25 lessons and above to teach in one week. This translated to an average of between 5-6 lessons per day. This implied that the teachers had a
very high teaching load and did not have enough time to prepare ICT integrated lessons. From the findings it was also revealed that 64.2 percent of the teachers have an average of 5 lessons per day while 16.7 had 6 lessons per day. In connection to this, the teachers also needed some time for co-curricular activities after normal classes. The implication is that heavy workload influenced the integration of ICT into teaching and learning because teachers did not get adequate time to plan for and use the ICT facilities.

4.6 The influence of teachers demographic characteristics

The teachers were required to indicate whether their personal characteristics were influencing the utilization of ICT facilities. They were asked questions and were required to indicate by use of a tick the extent to which their experience in teaching, age and gender influenced the integration of ICT into teaching and learning. The responses were recorded in Table 4.12.

Table 4.12: The influence of teachers demographic characteristics

Key: SA-Strongly agreed, A-agree, U-undecided, D-disagree, SD-strongly disagree, N- Total

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>N</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience in teaching</td>
<td>6.3</td>
<td>47.9</td>
<td>8.3</td>
<td>31.3</td>
<td>6.2</td>
<td>100</td>
<td>3.168</td>
</tr>
<tr>
<td>Age</td>
<td>29.2</td>
<td>45.8</td>
<td>4.2</td>
<td>12.5</td>
<td>8.3</td>
<td>100</td>
<td>2.852</td>
</tr>
<tr>
<td>Gender</td>
<td>20.7</td>
<td>56.3</td>
<td>2.1</td>
<td>18.8</td>
<td>2.1</td>
<td>100</td>
<td>2.981</td>
</tr>
</tbody>
</table>
Table 4.12 indicates that teachers demographic characteristics greatly affects the integration of ICT teaching and learning. The characteristics are such as gender where: 56.3 percent agreed, that gender greatly affects the integration of ICT into teaching and learning. This is an indication that the females are more positive than males. As regards age, 45.8 percent agreed while experience was also seen to be a major factor where 47.9 percent agreed, that it affects the integration of ICT into teaching and learning.

The findings above are in line with studies by different researchers who have studied the influence of teachers demographic characteristics towards either accepting or rejecting new technologies and have found out that there is significant relationship between teachers demographic characteristics and users of technology. According to Eggen and Kauchak cited in Olaleye (2011), positive teachers’ attitude are fundamental to effective integration of ICT into teaching and learning Tondeur (2007) cites that positive attitudes towards the use of ICT decreases with age, experience and gender.

4.7 School policy on ICT integration

The researcher sought to know whether the schools had well developed plans to enable their teachers develop their knowledge and skills in ICT by undergoing for training in ICT during holidays or weekends. In addition to this, the researcher also sought to know whether the schools had gathered for ICT lessons on their time tables. The findings were recorded in the figure 4.6 below.
Figure 4.6: School Policy on ICT integration

The findings revealed that out of 18 schools only 17.0 percent had developed school policies to enable their teachers advance their knowledge and skills in ICT and catered for ICT lessons for their students on the time table while 83.0 percent did not have. This was an indication as to why the integration of ICT into teaching and learning was still dismal in public secondary schools in Homa- Bay district. Therefore lack of ICT policy and plan affects negatively the teachers’ effort to integrate ICT facilities into teaching and learning.

4.7.1 Teaching load

Teaching load was another factor that greatly affected the integration of ICT in teaching and learning. Teachers needed time to plan and prepare for ICT integrated lessons. The more the lessons one has per day the lesser the time to prepare for ICT integrated lessons while the lesser the lessons the more the time to plan and teach effectively. The average teaching load as outlined by
the Teachers Service Commission of about 5 lessons per week is very high to enable teachers integrate ICT into teaching and learning effectively.

**4.7.2 Teacher development in the integration of ICT into teaching and learning**

The head teachers were asked to indicate in their questionnaire if the teachers in their schools are given chances and opportunities to learn to integrate ICT facilities into teaching and learning. Their responses are as shown in the figure 4.7 below.

![Figure 4.7: Opportunities to learn how to integrate ICT facilities in teaching and learning](image)

From the findings, 14 head teachers representing 77.80 percent the findings, 14 head teachers representing 77.80 percent said No while 4 head teachers representing 22.20 percent said Yes. This implied that due to budget constraints in the schools head teachers could not afford investing in training their teachers on the use of various ICT facilities like computer into teaching...
and learning. Further discussions with the head teachers also revealed that heads of schools fear that after training the teachers, they could also transfer to other schools making the training given to these teachers inappropriate use of the already scarce financial resource in the schools.

Majority of the head teachers, 82.60 percent also agreed that the integration of ICT facilities into teaching and learning improves the efficiency and effectiveness. To add to this, the head teacher concurred that there is increased instructional materials in the internet. A minority of only 17.40 percent saw the integration of ICT facilities into teaching and learning as a waste of time.

4.7.3 Finances to Motivate teachers on the use of ICT in teaching and learning.

The head teachers were required by questionnaire –item 35 to indicate whether teachers are motivated adequately to use ICT in teaching and learning in terms of training or administrative support. Table 4.16 provides their response.

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>07</td>
<td>38.90</td>
</tr>
<tr>
<td>Administrative support</td>
<td>11</td>
<td>61.10</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 4.13 reveals that most of the head teachers were of the opinion that teachers are adequately motivated to use ICT into teaching and learning through administrative support which represents 61.10 percent while a minority of 38.90 percent felt that teachers can be adequately motivated through training. They further explained that the only hindrance to administrative support is lack of enough funds to support teachers by buying the necessary hardware and software.

The head teachers of all the 13 district schools which were sampled for the study revealed that in their schools, there was no clear ICT budget and the costs of ICT are integrated in other vote heads like tuition. This represented 72.20 percent the total number head teachers who filled the questionnaire. Two of the head teachers from the county schools representing 11.1 percent revealed that their ICT budget is purely financed by the parents which include human resource. While the other two county schools, were reluctant to respond on budgetary issues.

The only National school in the sample revealed that they had a clear ICT budget which was partly supported by government grants given to the school, but did not disclose how much they do receive from the government. The other had teachers revealed that they had not benefited from the government economic stimulus programme of providing ICT’s in secondary schools. The head teachers also noted that they did not have specialized ICT teachers in their schools except in National school where they is a teacher who specialize in ICT and is employed by the government. To the other schools, employing teachers was an additional strain to already an over stretched
budget. This was very common in the day schools which did not ask for extra money from the parents a part from the fees as guided by the ministry of education.

4.7.4 Other factors influencing the integration of ICT into teaching and learning

The study sought to determine other factors that influence integration of ICT into teaching and learning. The head teachers responded as shown in Table 4.14

Table 4.14: Other factors influencing the integration of ICT, into teaching and learning.

<table>
<thead>
<tr>
<th>Other factors</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>16</td>
<td>88.9</td>
</tr>
<tr>
<td>School environment</td>
<td>11</td>
<td>61.1</td>
</tr>
<tr>
<td>Staffing levels</td>
<td>17</td>
<td>94.4</td>
</tr>
<tr>
<td>Team work among teachers</td>
<td>10</td>
<td>55.6</td>
</tr>
<tr>
<td>Time management</td>
<td>12</td>
<td>66.7</td>
</tr>
<tr>
<td>Support from parents</td>
<td>9</td>
<td>50.0</td>
</tr>
<tr>
<td>Students home background</td>
<td>6</td>
<td>33.3</td>
</tr>
</tbody>
</table>
As revealed in Table 4.16 there are other factors which influence the integration of ICT into teaching and learning. 88.9 percent cited finance, 61.1 percent mentioned school environment while a vast majority 94.4 percent cited staffing levels which is a National cry in all schools. 55.6 percent mentioned teamwork cited among teachers 66.7 percent cited Time management while support from parents was 50.0 percent. Students’ home background was only cited by 33.3 percent. This indicates that the integration of ICT into teaching and learning is influenced by several school factors and other factors outside the school.

4.8 Summary

The analysis of the findings of this study was based on 104 respondents representing 96.30 percent questionnaire return rate. The participants in this study included head teachers and one teacher from each of the five major departments in the selected public secondary schools. Analysis of data from the respondents was done using the statistical package for social sciences (SPSS). The analysis revealed that the integration of learning is influenced by school factors such as ICT infrastructure, the level of teachers training in ICT, teachers demographic characteristics and school related factors.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the study and its findings and presents conclusions, recommendations and suggestion for further research.

5.2 Summary of the study

The purpose of the study was to investigate school factors influencing integration of information communication Technology in teaching and learning in public secondary schools in Homa-Bay district, Kenya. The study was guided by the following objectives. To assess the ICT infrastructure for teaching and learning in public secondary schools in Homa-Bay district, to determine the level of teacher ICT knowledge and skills in the application of ICT in teaching and learning in public secondary schools in Homa-Bay district, to determine the influence of teachers’ attitude towards the integration of ICT in teaching and learning and to examine the school administrative practices that support the use of ICT in teaching in Homa-Bay district.

Review of literature related to the study topic was done with the main focus put on global, regional and local perspectives. The literature review showed that various school factors have influence on the integration of Information communication Technology (ICT) in teaching and learning. The study was guided by Roger’s theory of diffusion of innovations (2003). This theory centres on the conditions which increase or decrease the likelihood that a new idea, product or practice is adopted by members of a given culture or
social system. The study adopted the descriptive survey design. The design was preferred for its ability to secure evidence of the current situation and to explore the situation as it is. It met the researcher’s affairs already existing in the schools with school factors as the independent variables and the integration of ICT into teaching and learning as the dependent variable.

The target population comprised head teachers and teachers. The population sample was determined using stratified proportionate and simple random sampling method. A sample of 18 schools, 18 head teachers and 90 teachers, one from each of the five major departments in secondary schools namely; Humanities, science, languages, mathematics and technical subjects. Questionnaires and observation checklist were used as Data collection instruments, the questionnaires were presented to the lecturers from the department of educational Administration and planning whose suggestions and recommendations were incorporated in the final questionnaires and the observation checklist. A pilot study was also done in three schools which did not form part of sample under study.

Test-retest method was used to test the reliability of the questionnaires. The questionnaires were administered by the researcher to 18 head teachers and 90 teachers after ascertaining their validity and reliability. A total of 18 head teachers and 86 teachers filled and returned their questionnaires. Data was analyzed using both quantitative and qualitative techniques Descriptive statistics was done using SPSS to generate frequencies and percentages. Data was presented in frequency distribution tables and pie charts.
Head teachers’ questionnaires provided data which revealed that majority of the head teachers were males-66.7 percent of the total head teachers who participated in the study. The head teachers were of mature age of 41 years and above. The study further indicated that most of the head teachers had along time experience in headship with 27.8 percent having served for between 6-10 years, 33.3 percent having served for between 11-15 years and 16.7 percent having served for 16 years and above. As regards professional qualifications the study revealed that all the head teachers were professionally trained with majority being B.Ed degree holders. The findings also indicated that majority of teachers were males representing 52.2 percent, they were of mature age, had enough teaching experience and had the professional qualifications required of secondary school teachers.

As for the number of computers in schools majority of the schools had less than 10 computers. This makes them inadequate and inaccessible for use by the teachers and students because most of them are found in the office. Very few schools use them to access video compact disk or even listen to the radio broadcast as aired by the Kenya Institute of education (KIE).

The findings revealed that very few schools have internet connections. 68.9 percent of the total internet connections are dependent on the prepaid modem. The over reliance on the modem as the main access to internet is expensive and is often disrupted by slow connectivity. It was also noted that there is insufficient power supply in most of the secondary schools in the region which have contributed to the slow integration of ICTs into teaching and learning. In his research findings, Jensen (2002) noted that unreliable
telecommunication networks and insufficient power supply as major drawbacks or hindrances to the integration of ICT facilities in various sectors in Africa including Education i.e. in teaching and learning.

The study revealed that the little hardware and software available were not appropriate. Tin (2002) explains that proper use of ICTs require substantial pedagogical component in Information Technology (IT) curriculum and development of specific software for use in teaching and learning. The findings also revealed that most teachers had insufficient amount of pre-service training on the use of ICT. It was also evident that there was also lack of time for in-service staff training. As per the average number of lessons teachers have an average of 5 lessons per day while some had an average of 6 lessons per day which is very high. This meant that the teachers don’t have adequate time for in-service training. Given that ICT knowledge is highly obsolete, teachers need regular refresher courses to keep them up-to-date with the latest technology and technological changes. The study revealed that teacher’s attitude towards integration of ICT in teaching and learning is highly moderated by: gender, age, experience, and voluntariness of use, specialization and computer ownership.

As concerns the school ICT Policy and plan, the study found that majority of the schools did not have an ICT Policy and plan in their schools. The study also found out that very few schools had a culture of technology use in teaching and learning Teachers also lack familiarity with good practice rooted on understanding of how to use ICTs in teaching and learning due to lack of ICT policy in their schools. Mureithi and Munyua (2006) in their
research findings noted that ICT policy gives opportunity for establishment of proper infrastructure for knowledge sharing. The findings revealed that most of the teachers in the public secondary schools are not given chances and opportunities to learn to integrate ICT facilities into teaching and learning. Majority of the head teachers also noted that teachers are adequately motivated on the use of ICT in teaching and learning through administrative support. The study also revealed that most of the public secondary schools in the district did not have a clear ICT budget.

5.3 Conclusions

Based on the findings of this study the following conclusions were made: Information Communication Technology (ICT) infrastructure influences integration of ICT in teaching and learning, the level of teachers ICT knowledge and skills such as professional qualifications and further training on the use of ICT in teaching and learning influences the integration of ICT in teaching and learning. The analysis of head teachers’ gender distribution revealed that there were more male head teachers than females. In the study it was concluded that teachers’ attitude and reaction towards ICT influences its integration into teaching and learning in secondary schools. Based on the findings majority of the head teachers in the district have enough administrative experience to help them understand the school factors which may influence the integration of Information Communication Technology and hence the need to actively play their roles in the Integration of Information Communication Technology into teaching and learning. The findings also
revealed that specialization was another key factor influencing the attitude of teachers towards the use of ICT in teaching and learning in public secondary schools in Homa Bay district. The study finally concludes that an appropriate school administrative practice, attitude of teachers, the level of teachers ICT knowledge and skills greatly influences integration of ICT into teaching and learning.

5.4 Recommendations

The study makes the following recommendation in order to achieve maximum integration of ICT in teaching and learning in public secondary in Homa-Bay district.

i). The professional qualifications of head teachers should be considered and recognized by the ministry of education as a very important variable in developing ICT in secondary schools and more still as correlation factor influencing integration of Information Communication Technology. This can be done by conducting workshops to help them acquire the necessary skills and undergoing a thorough vetting before being promoted to leadership by the Teachers Service Commission.

ii). The integration of information communication Technology (ICT) into teaching and learning in education should be dependent on the availability of the necessary ICT infrastructure which includes the number of computers available, electricity supply, internet connectivity, radios, televisions, DVDS. This should be considered first by the
government through the ministry of education. Education officers at various levels should do proper survey on this.

iii). The number of computers should be increased in public secondary schools in Homa Bay district. It is evident that most schools in the district have few computers as compared to the users in the schools. This not only limits the accessibility but it also becomes difficult to rely on them in teaching and learning. The board of managements in the schools should find suitable ways of increasing the number of computers in schools.

iv). More teachers need be employed especially ICT proficient to reduce the workload by the Teachers Service Commission. The implication is that heavy workload influences the integration of ICT into teaching and learning because teachers do not get adequate time to plan for and use the ICT facilities. This can be done by allocating more funds to the ministry of education to employ more teachers.

v). The Ministry of Education should develop more pre-service and in-service staff training programmes to help making the teachers have the basic knowledge and skills required in the integration of ICT facilities into teaching and learning. More teachers who have the ICT knowledge and skills should be deployed to teach in all schools by the Teachers Service Commission. This would help in promoting positive teachers’ attitude towards the integration of ICT in teaching and learning. More workshops and seminars should be conducted by educational officers at various levels to help sensitize the teachers, students and parents on need to integrate ICT in to teaching and learning.
5.5 Suggestions for further research

The following are the suggestions for further research

i. A comparative study be conducted in other districts in the county using similar research tools to determine any differences between geographical areas.

ii. A similar study be conducted in private schools in the district using similar research tools for comparison.

iii. A study be conducted on other factors influencing integration of ICT in teaching and learning in secondary schools in Homa-Bay district other than school factors.
REFERENCES


UNESCO (2008). *Integrating ICTs in education, lessons learned*. Published by the Asia and Pacific Regional Bureau for Education

APPENDICES

Appendix I: Letter of introduction

University of Nairobi,
Department of Educational Administration and Planning,
P.O. BOX 30197,
May 2013.

The principal

......................... Secondary School

Dear Sir/ Madam,

**RE: REQUEST FOR PARTICIPATION IN RESEARCH**

I am a post graduate student in the Department of Educational Administration and planning at the University of Nairobi. I am currently working on a research project on the School Factors Influencing Integration of Information Communication Technologies in Teaching and learning in Public secondary schools in Homa- Bay District. Your school is among those chosen for the study. Kindly assist by providing the information sought on the various items. You are assured that the information gathered will be used for academic purposes only while your identity will be confidential.

Yours Faithfully

Ondiegi  Maurice Odhiambo
Appendix II: Questionnaire for Head Teachers

The purpose of this questionnaire is to gather information on the influence of school factors on the integration of information communication technologies in teaching and learning. Please respond to all the items by filling in or ticking (√) where appropriate. Do not write your name or that of your school for confidentiality purposes.

SECTION A: Demographic Information

1. What is your gender?
   - Male □  Female □

2. Which age bracket in years do you fall in?
   - 21- 30 years □  31-40 years □
   - 41- 50 years □  51 years and above □

3. For how long have you been working as a head teacher?
   - 5 year and below □  6-10 years □
   - 11-15 years □  16 years and above □

4. What is your highest professional qualification?
   - M.Ed □  B.Ed □  PGDE □  ATS □
   - Diploma □
   - Other (specify)…………………………………………………………………………………

SECTION B: School Background

5. What is the category of your school?
   - National □  County □  District □

6. Does your school have ICT policy and plan?
7. Does your school have a culture of technology use in Teaching and Learning
   Yes [ ] No [ ]

8. Does your school have computer?
   Yes [ ] No [ ]

9. How do you use the computer available?
   Microsoft office [ ]
   Research for teaching and learning [ ]

10. Do you have internet connection in your school?
    Yes [ ] No [ ]

11. (a) What is the estimate budget of ICT in your school?.......................
    (b) How do you finance the budget?..........................................................

12. Does the government grant any extra funds for the ICT education at your school
    Yes [ ] NO [ ]

13. If yes how do you use the budget allocation?
    a) Classroom infrastructure; the purchase of hardware and software material [ ]
    b) To supplement on the running and working expenses [ ]
    c) Human resource development including hiring and training teachers [ ]

14. Does your school have a teacher(s) who specialize in ICT education?
    Yes [ ] No [ ]
### SECTION C

#### Part I: ICT infrastructure

The following are statements concerning ICT infrastructural capacity as found in different schools. By use of a tick kindly indicate the extent to which the statement influences the integration of ICT in teaching and learning as pertains to your school.

**Key:** SA- Strongly Agree, A- Agree, U- undecided D- Disagree, SD- strongly Disagree

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Inadequate number of computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Lack of internet connectivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Lack of access to computers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Insufficient or irregular power supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>High cost of hardware and software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Unavailability of appropriate software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Structural arrangements of computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part 2: The influence of teacher training in ICT

The following factors influence the level of teachers' ICT knowledge and skills. Indicate the extent to which you agree that the reasons influence the level of teachers' ICT knowledge and skills.

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Lack of finance to train on the use of ICT program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Insufficient amount of pre-service training on ICT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Lack of time for in-service training on ICT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Lack of familiarity with good practice rooted on understanding of how learners learn</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Part 3: The influence of teachers' demographic characteristics in the integration of ICT in teaching and learning

Teachers' attitude and reaction towards integration of ICT in teaching and learning is greatly moderated by the following factors. To what extent do you agree with this?

Key: SA – strongly Agree, A – Agree, U – undecided D – Disagree, SD – Strongly Disagree

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### Part 4 School related factors that influence integration of ICT into teaching and learning

31. Are the teachers given chances and opportunities to learn to integrate ICT facilities into their classroom practices?
   - Yes [ ]
   - No [ ]

32. Lack of ICT policy and plan affects negatively the teacher’s efforts to integrate ICT facilities into teaching and learning?
   - Yes [ ]
   - No [ ]

33. In your own opinion does the integration of ICT facilities improve the efficiency and effectiveness in teaching and learning?
   - Yes [ ]
   - No [ ]

34. Do you believe that teachers are motivated adequately to use ICT in Teaching and Learning in terms of:
   - Training [ ]
   - Administrative support [ ]

35. Does the teaching load for teaching influence the integration of ICT facilities in teaching and learning?
   - Yes [ ]
   - No [ ]

36. As a school administrator which other school related factor influence Integration of ICT into Teaching and learning.

…………………………………………………………………………………………

…………………………………………………………………………………………

**Thank You**
Appendix III: Questionnaire for Teachers

The purpose of this questionnaire is to gather information on the influence of school factors on the integration of information communication technologies in teaching and learning. Please respond to all the items by filling in or ticking (√) where appropriate. Do not write your name or that of your school for confidentiality purpose.

Section A. Demographic Information

Section A: Demographic Information.

1. What is your gender?
   Male  □  Female □

2. Which age bracket in years do you fall in?
   21-30 years □  31-40 years □
   41-50 years □  51 years and above □

3. What is your highest level of professional qualification?
   Master □  B.Ed □
   PGDE □  Diploma □  ATS □
   Other (specify) .................................................................

4. What is your teaching experience in years?
   5 year and below □  6-10 years □
   11-15 years □  16 years and above □

5. What is your Level of ICT training?
Certificate proficiency package  

Diploma in ICT  

6. What is the average teaching lesson per week? ………………………………

7. What is the average lesson per day?………………………………………

SECTION B School Background

8. What is the category of the school?
   National  County  District

9. Does the school have computers
   Yes   No

10. Where are the computers placed?
    Office  staffroom
    Computer lab  classroom

SECTION C

Part 1 ICT infrastructure

10. How frequent do you use ICT facilities in performing the following activities.

<table>
<thead>
<tr>
<th>No.</th>
<th>activities</th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Once a term</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Scheming</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>Lesson planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
11. Do you have internet connections in the school?

Yes  [ ] No  [ ]

12. Apart from computer, what other ICT facilities are there in the school?

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Radio</th>
<th>TV</th>
<th>DVD</th>
<th>VCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td></td>
<td></td>
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</tbody>
</table>

Other (specify)............................................................................................

13. How are the facilities used?

Entertainment

Access broadcast lessons

Access other learning materials

14. How do you use the internet?

a) Communicating with friends and family

b) Communicating with other teachers or students

c) Search for related matters

d) Search for teaching and learning materials.

15. Which application do you use frequently?
16. Have you been trained on how to maintain and repair ICT facilities available?

Yes [ ] No [ ]

17. Teachers’ attitude and reaction towards integration of ICT in teaching and learning is greatly moderated by the following factors. To what extent do you agree with this?

Key: SA – strongly Agree, A – Agree, U – undecided D – Disagree, SD – Strongly Disagree

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Genders attitude and reaction towards integration of ICT in teaching and learning</td>
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<td></td>
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</tr>
<tr>
<td>b</td>
<td>Age attitude and reaction towards integration of ICT in teaching and learning</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Experience attitude and reaction towards integration of ICT in teaching and learning</td>
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<tr>
<td>d</td>
<td>Voluntariness of use attitude and</td>
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</tbody>
</table>
Thank you for taking your time to fill this questionnaire

<table>
<thead>
<tr>
<th>reaction towards integration of ICT in teaching and learning</th>
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</thead>
<tbody>
<tr>
<td>e Specializations attitude and reaction towards integration of ICT in teaching and learning</td>
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</tbody>
</table>
Appendix IV: Observation checklist

Upon visiting the schools the researcher will seek to make the following observations in the schools

1. Presence of a computer laboratory
   Yes ☐  No ☐

2. The number of computers in the school
   Below 5 ☐  5 – 9 ☐  10 – 14 ☐  15 – 19 ☐  20 and above ☐

3. The main location of computers
   Computer laboratory ☐  staff room ☐  office ☐  other ☐

4. Presence of other telecommunication facilities

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Radio</th>
<th>TV</th>
<th>DVD</th>
<th>VCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
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</table>

5. If there is electricity supply and a generation for power back-up

Yes ☐  No ☐  ☐
Appendix V: Research authorization letter

NCST/RCD/13/013/57

Date: 11th June 2013

Maurice Odhiambo Ondiegi
University of Nairobi
P.O Box 92-0902
Kikuyu.

RE: RESEARCH AUTHORIZATION

Following your application dated 27th May, 2013 for authority to carry out research on “School factors influencing integration of information communication technology in teaching and learning in public secondary schools in Homa-Bay District, Kenya.” I am pleased to inform you that you have been authorized to undertake research in Homa-Bay District for a period ending 31st July, 2013.

You are advised to report to the District Commissioner and District Education Officer, Homa-Bay 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.

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

Copy to:
The District Commissioner
The District Education Officer
Homa-Bay District.

"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development."
Appendix VI: Research permit

THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Maurice Odhiambo Ondiegi
of [Address] University of Nairobi
P.O.BOX 92-0902, Kikuyu,
has been permitted to conduct research in
Homa Bay
Nyanza
Location
District
Province
on the topic: School factors influencing integration of information communication technology in teaching and learning in public secondary schools in Homa-Bay District, Kenya.

Research Permit No. NCST/RC/13/012/57
Date of issue 11th June, 2013
Fee received KSH. 1000

Applicant’s Signature
For Secretary
National Council for Science & Technology

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 without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, flooding 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-Kenyan 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

CPR 6055/34m/110/2011

(CONDITIONS——see back page)