

**ICT INTEGRATION IN TEACHING AND LEARNING:
A CASE OF SELECTED SECONDARY SCHOOLS IN
MOROGORO MUNICIPAL COUNCIL,
TANZANIA**

Vumilia Simbeye

**A Dissertation Submitted in Partial Fulfillment of the Requirements
for Award of Master of Arts in Education of the
Mzumbe University**

2020

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, the dissertation entitled; “***ICT Integration in Teaching and Learning : A Case of Selected Secondary Schools in Morogoro Municipal Council, Tanzania*** ” in partial fulfilment of the requirements for award of the degree of Master of Arts in Education of the Mzumbe University.

Major Supervisor

Internal Examiner

Accepted for the Board of Faculty of Social Sciences

CHAIRMAN, FACULTY OF SOCIAL SCIENCES

DECLARATION AND COPYRIGHT

I, Vumilia Simbeye, declare that this dissertation is my original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature:

Date:

©

This dissertation copyright material is protected under the Berne Convention, the Copyright Act of 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means in full or in part, except for short extracts in fair dealings, for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of Mzumbe University, on behalf of the author.

ACKNOWLEDGEMENTS

Institutions and individuals were highly involved in the process of writing this study, their contributions are acknowledged. My sincere gratitude goes to the almighty living GOD for the life courage and strength which helped me to accomplish this study.

I also wish to thank my supervisor Dr. Orest Masue for he worked tirelessly in making sure that I am well guided to complete my study as expected. I also thank the Head of Department, Department of educational foundations and teaching management Dr. Haruni Machumu for his guidance during my study.

My sincerely gratitude should also go to my employer, the Executive Director of Morogoro Municipal Council; for releasing me to pursue my study, and the District Educational Officer who allowed me to collect data for this report. I extend my sincere gratitude to the students and teachers from sampled schools for their valuable time during the data collection process. From the bottom of my heart, I would like to express my regards to my beloved wife Faustina Moses Kanyalupala, my children Denis and Davina for their tolerance and passionate throughout my study.

DEDICATION

This dissertation is dedicated to my beloved parents Mr. Julius Moses Simbeye and Betina Andongolile Mwakipesile who kindly initiated the journey of my academic life, may all Rest In eternal Peace. The dissertation is also dedicated to my beloved wife Faustina, my children Denis and Davina, my family members, my beloved sister Pili Ali Mwakipesile and all close friends of mine wherever they are for their prayers, moral and material throughout my study.

LIST OF ABBREVIATION

ADIS	African Digital Initiative Schools
DSEO	District Secondary Educational Officer
FGD	Focus Group Discussion
FTNA	Form Two National Assessment
GST	Goal Setting Theory
ICS	Information and Computer Studies
ICT	Information and Communication Technology
IDI	In-Depth Interviews
MGD's	Millenium Development Goals
MMC	Morogoro Municipal Council
MoEVT	Ministry of Education and Vocational Training
NECTA	National Examinations Council of Tanzania
NGO's	Non -Governmental Organizations
TV	Television
URT	United Republic of Tanzania
RPC	Regional Project Coordinator
REO	Regional Education Officer

ABSTRACT

The past few years witnessed a host of activities aimed at injecting ICT in Tanzania's education sector. Some schools especially the private schools in the urban centers, especially Dar es Salaam, are already using ICT facilities without a very clear formal setting or a policy framework. Tanzania like other countries in Africa adopted the use of ICT in education as ICT transforms many aspects of our lives as we live in an environment that is dominated by technology which itself is consumer-driven (Semenov, 2005). No matter how we perceive its presence, there is no denying that it is an important part of our lives and that it is here to stay.

This study assessed ICT integration in teaching and learning from selected secondary schools. The study specifically assessed the common aspects of teaching and learning where ICT is mostly used, assessed the availability of ICT facilities in the selected secondary schools and the ICT integration in teaching and learning, the achievements resulted from ICT integration in teaching and learning in secondary schools and identified the challenges of ICT integration in teaching and learning.

The study approach was qualitative. It employed in-depth interview, focused group discussion, observation and documentary analysis as a data collection tools from the sample of 163 respondents. Content analysis was found appropriate in the analysis of the collected data for the study.

The findings indicated that the level of ICT integration in secondary schools was low due to inadequate resources, inadequate ICT knowledge and skills among teachers, poor management support, and lack of motivation. The study recommended that more efforts should be employed to ensure that there is ICT integration in teaching and learning. In order to improve ICT integration level in secondary schools, the school owners including the government ought to provide more ICT facilities create supportive ICT infrastructure and conduct training to teachers on how to employ the technology. The policy should also clearly address the issues of ICT integration in schools for effective implementation.

TABLE OF CONTENT

CERTIFICATION	i
DECLARATION AND COPYRIGHT	ii
ACKNOWLEDGEMENTS	iii
DEDICATION	iv
LIST OF ABBREVIATION	v
ABSTRACT	vi
TABLE OF CONTENT	vii
LIST OF TABLES	xi
LIST OF FIGURE	xii
LIST OF APPENDICES	xiii
CHAPTER ONE	1
INTRODUCTION	1
1.0 An overview	1
1.2 Background of the study	1
1.3 Statement of the problem	2
1.4 Objectives	3
1.4.1 General objective	3
1.4.2 Specific objectives	3
1.5 Research questions	4
1.6 Significance of the study	4
1.7 Scope of the study	4
1.8 Organization of the dissertation	4
1.9 Summary of the chapter	5
CHAPTER TWO	7
LITERATURE REVIEW	7
2.0 Introduction	7
2.1 Definition of key terms	7
2.1.1 Information and Communication Technologies (ICT)	7
2.1.2 ICT integration in education	7

2.1.3 Teaching.....	7
2.1.4 Learning	8
2.2 Theoretical literature review	8
2.2.1 ICT policy in education.....	8
2.3 Theories underpin the study	9
2.3.1 The Goal Setting Theory (GST).....	9
2.3.2 Constructivism Learning Theory	10
2.4 Empirical literature review.....	10
2.4.1 ICT integration in teaching and learning	10
2.4.2 The ICT integration in school curriculum.....	12
2.4.3 Challenges hindering ICT integration in schools.....	14
2.5 Conceptual framework.....	16
2.6 Research Gap	17
2.7 Summary of the chapter	17
CHAPTER THREE	19
RESEARCH METHODOLOGY	19
3.0 Introduction	19
3.2 Research approach	19
3.3 Research design.....	19
3.4 Area of the study	19
3.5 Targeted population	20
3.6 Sample size.....	20
3.7 Sampling techniques	21
3.7.1 Purposive sampling technique	21
3.7.2 Convenience sampling technique.....	21
3.8 Data collection methods.....	21
3.8.1 In-Depth Interview (IDI).....	22
3.8.2 Focus Group Discussion (FGD).....	22
3.8.3 Observation	22
3.9 Data analysis and presentation	23
3.10 Reliability and validity.....	23

3.11 Ethical considerations	24
3.12 Summary of the chapter	24
CHAPTER FOUR.....	25
FINDINGS OF THE STUDY.....	25
4.1 Introduction	25
4.2 The common aspects of teaching and learning where ICT was used	25
4.2.1 Preparation of subject content	25
4.2.2 Classroom presentations.....	26
4.2.3 Preparation of assessment tools	27
4.2.4 Storage of students' important information	27
4.3 The ICT facilities available in selected secondary schools	29
4.4 Integration of ICT facilities the selected secondary schools	31
4.4.1 Integration of ICT facilities in classroom activities.....	31
4.4.2 Integration of ICT facilities for administrative activities.....	32
4.5 Achievements due to ICT integration in secondary schools.....	33
4.5.1 The influence of ICT in teaching and learning behaviour	33
4.5.2 The influence of ICT in general school performance	35
4.6 Challenges hindering effective integration of ICT in teaching and learning.....	36
4.6.1 Unstable electric power.....	36
4.6.2 Inadequate ICT facilities	37
4.6.3 Inadequate manpower	38
4.6.4 High costs in accessing internet services	39
4.6.5 Limited time in school timetable.....	39
4.6.6 Unclear view from the projector	41
4.6.7 Inadequate ICT skills	41
4.7 Summary chapter	42
CHAPTER FIVE.....	43
DISCUSSION OF THE FINDINGS.....	43
5.1 Introduction	43
5.2 The common aspects of teaching and learning where ICT was used	43

5.3 The ICT facilities available in selected secondary schools.....	44
5.4 Integration of ICT facilities in selected secondary schools	45
5.5 Achievements due to ICT integration in secondary schools.....	45
5.6 The influence of ICT in general school performance	46
5.7 Challenges hindering effective integration of ICT in teaching and learning	46
5.8 Summary of the chapter	47
CHAPTER SIX	49
SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	49
6.1 Introduction	49
6.2 Summary of the study	49
6.3 Summary of the key findings	49
6.4 Conclusion	51
6.5 Implication of the findings	52
6.5.1 Theoretical implication	52
6.5.2 Policy implication	53
6.6 Limitation of the study	54
6.7 Recommendations of the study	54
6.7.1 Recommendations for the government	54
6.7.2 Recommendations for teachers and school administrators	55
6.7.3 Recommendations for further studies	55
REFFERECE	56
APPENDICES	66

LIST OF TABLES

Table 3.1: Distribution of Respondents in Sample Size	21
Table 4.1: The number of ICT facilities used in classroom presentations.....	26
Table 4.2: Number of ICT tools used to prepare students assessment tools.....	27
Table 4.3: The number of ICT facilities available for storage of students' information	28
Table 4.4: The observation checklist on ICT facilities	29
Table 4.5 ICT services available in selected secondary schools.....	30
Table 4.6 Summarizes ICT facilities used for administrative activities:	33
Table 4.7: Number of computers available in each school	38

LIST OF FIGURE

Figure 2.1: Conceptual framework	16
--	----

LIST OF APPENDICES

Appendix 1: Interview guide for Education Officers.....	66
Appendix 2: Interview guide for School Administrators.....	68
Appendix 3: Interview guide for Teachers.....	71
Appendix 4: Interview guide for students.....	74
Appendix 5: Focused Group Discussion for Students	76
Appendix 6: Characters' Identities.....	77

CHAPTER ONE

INTRODUCTION

1.0 An overview

This chapter provides the background to the research problem; statement of the problem, objectives of the study, research questions and significance of the study.

1.2 Background of the study

The information and communication technology (ICT) refers to all kind of electronic system applied in processing and communicating information. The processing activities were including some ICT facilities like personal computers, smart phones, projectors, tablets, smart board (Chow 2015). The process of integration of ICT in education was adopted by several countries to employ in secondary schools (Hennessy et al, 2010; Mikre, 2011). The integration process was based on the need of the countries towards the development of different social-economic sectors including education itself (Mathevula & Uwizeyimana, 2014).

Among the values of ICT integration in schools was to engage learners to choose how to learn the planed curriculum content through collaboration with ICT facilities. The ICT integration could also enable learners to interact with subject content without the presence of teachers. The teacher could also integrate the technology as an assessment tool for what should be learnt and how should be learnt (UNESCO, 2002). Moreover, the benefit of ICT in education was from its ability of involving all learners in the classrooms regardless their physical difficulties. Students with special needs are no longer at a disadvantage as they have access to essential material and special ICT tools can be used by students to make use of ICT for their own educational needs. Despite this, it opens up new issues related to the 'digital divide' and providing access to ICT tools and resources for those who are less fortunate (Finger et al, 2007).

The process of integrating ICT was said to be more effective in schools with adequate ICT facilities like computers and projectors while the school with inadequacy facilities were less employed the technology. The schools were also blamed to fix the available few computers to the office use instead of using the technology for teaching and learning process. This was contrary to the Millennium Development Goals (MDGs) which emphasized the integration of ICT for the quality education at all levels (Smeets, 2005). The MDGs was in line with the Information and Communication Technology (ICT) policy of 2007 in Tanzania which aimed to offer new opportunities to enhance education by improving the quality of delivering education service at all levels from primary to university (URT, 2007).

The process was controlled by the current ICT policy which focused on introducing the clear strategies in integrating ICT in teaching and learning so as to encourage and enhance all teachers to use the ICT as among the strategy in transforming the old way of teaching (teacher centred) to the interactive learning (Ran, 2013; Rana, 2018). According to Ngeze (2017) teachers should have adequate ICT integration skills and knowledge on how to use ICT facilities to facilitate their lessons.

1.3 Statement of the problem

Although ICT integration was regarded as an important strategy for the countries to produce knowledgeable society in the industrial education, the adoption level of the technology was different from country to country and from school to school due to several reasons including availability of ICT facilities for the preparation of teaching and learning material, availability of ICT facilities for presentation process, and availability of ICT facilities for assessment and evaluations (Machumu et al, 2018; Sharma et al, 2011; Malekani, 2018).

A good level of ICT integration should enable education stakeholders to have ability of creating and developing students' intellectual growth as well as developing their thinking capacity when interacting with available school resources used in the teaching and learning process. The common ICT resources available in schools are computers, tablets, smart board, cellular phones, LCDs, radios and smart TV (Lari, 2014). Some researchers show the common ICT integration like the use of

PowerPoint presentation which allows teachers' flexibility during the presentation of subject content (Jones, 2003). On other hand, the poor ICT integration in teaching and learning could be caused by several challenges including inadequate ICT resources and inadequate ICT knowledge and skills among teachers (Maholwana-Sotashe, 2007). Other challenges include inadequate fund to run some important ICT services (websites), ineffective ICT infrastructure, poor pedagogy skills and little accessibility of internet (Malekani, 2018; Mwalongo, 2018; Lwoga, 2010). Since ICT integration challenges differ from one school to another, the level of ICT integration is also vary across schools (Ndibalema, 2014). Therefore, the variation that appears in ICT integration in the teaching and learning leads to luck of unique assessment of effectiveness of different methods used for ICT integration among schools and the lack of common assessment and evaluation process on students' performance and specific sources to be used by learners. Hence, there should be an equal level of ICT implementation to all schools. This assessed the ICT integration level in selected secondary schools in Morogoro municipality.

1.4 Objectives

1.4.1 General objective

Generally, the study assessed the ICT integration in teaching and learning in Tanzania, a case of selected secondary schools in Morogoro municipality,

1.4.2 Specific objectives

The study specifically intended to:-

- (i) Assess the common aspects of teaching and learning where ICT is mostly used.
- (ii) Assess the availability of ICT facilities in the selected secondary schools and the ICT integration in teaching and learning.
- (iii) Assess the achievements that resulted from ICT integration in teaching and learning in secondary schools.
- (iv) Identify the challenges of ICT integration in teaching and learning process.

1.5 Research questions

- (i) What are the common aspects of teaching and learning where ICT is used in selected secondary schools?
- (ii) What ICT facilities are available in selected secondary schools and how are they integrated in the teaching and learning process?
- (iii) What achievements are associated to ICT integration in secondary schools?
- (iv) What are challenges of effective integration of ICT in the teaching and learning process?

1.6 Significance of the study

This study on integration of ICT in teaching and learning process will help to raise awareness on effectiveness of ICT integration in the teaching and learning in secondary schools. In all levels of education, ICT is made use of to enrich the system of education. The study will help all educational stakeholders, including teachers, parents and students understand that when the individuals are making use of ICT, they are able to carry out their job duties in a manageable manner. Furthermore, its utilization has rendered a significant contribution in leading to progression in the implementation of tasks and functions. Before, the individuals make use of ICT, it is vital for them to possess adequate knowledge and information. One needs to be well-equipped with ICT, before, making use of it. Some of areas that have been taken into account in this research paper include policy of ICT in education, benefits of ICT in education and the role of ICT in bringing about changes in learning.

1.7 Scope of the study

The study focused on assessing ICT integration in teaching and learning in Tanzania, particularly in Morogoro Municipality. The study was conducted in ten (10) secondary schools from Morogoro Municipality out of which five (5) were government secondary schools and the other five (5) were private secondary schools.

1.8 Organization of the dissertation

This dissertation is organized in six chapters. The first chapter covers the introduction, which addresses the fundamental aspects of the study namely; background, statement of the problem, research objectives, research questions,

significance of the study, limitations and scope of the study. The second chapter articulates the reviewed related literature including the introductory part followed by definitions of operational terms, review of supporting theory, empirical analysis of the study and the conceptual framework. The third chapter focused on the methodology used in the study whereby, various methodological aspects have been highlighted including the introduction of the chapter, research approach, research design, study area, the study population, sample size, sampling techniques, data collection methods and techniques, data analysis procedures and ethical considerations. The fifth chapter presents the study findings with respect to the research objectives and questions as stated in the first chapter. Discussion of findings is mainly based on qualitative approach, trying to link the data to the theory and empirical evidence from related studies. The sixth chapter recapitulates the major findings in relation to the research problem. It provides the general conclusion and important information from the ICT integration in teaching and learning in Tanzania. The chapter also links the study findings to prior researches, the goal setting theory, constructivism learning theory and outlines some theoretical implications and suggestions for further studies.

1.9 Summary of the chapter

The background to the research problem, a statement of the problem, objectives of the study, research questions, purpose and significance of the study has been presented in chapter one. The background of the research emphasized much about the adoption and integration of the new technologies particularly ICT facilities integration in teaching and learning by both developed and developing countries as the only means of transforming from traditional to modern way of teaching. Whereby equipments like computers, tablets, white boards, routers, projectors and cellular phones have been used by teachers for delivering subjects content in secondary schools through the PowerPoint display so as to fulfill the targeted curriculum goals that made students' grow intellectually and improve their ways of communication, creativity, critical thinking and problem solving. The statement of the problem underpin that, ineffective use of the ICT facilities leads to ineffective integration by teachers to all aspects of teaching including preparation, presentation, assessment,

analyzing and evaluation of the delivered subject content. While, effective integration of ICT facilities leads to positive achievement to all teaching aspects. The chapter also assessed the ICT integration in teaching and learning from among Morogoro Municipal secondary schools as the main objective of the study which was supported by four specific objectives that assessed the common aspects of teaching, availability of ICT facilities, achievement resulted by ICT integration and the challenges faced in the integration of ICT in teaching and learning to both government and private secondary schools. The chapter was guided by four research questions based on the specific objectives. Significance of the study was clearly highlighted and ten secondary schools were selected from Morogoro Municipality.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the definition of key terms, theoretical and empirical literature reviews and conceptual framework.

2.1 Definition of key terms

2.1.1 Information and Communication Technologies (ICT)

Information and Communication Technologies refers to a powerful collection of elements which include computer hardware, software, telecommunication networks, workstations, robotics and smart chips. Information and Communication Technology includes telephone, audio-visual and computer, they all help organizations to reach their goals (Asafe, 2016). In this study, Information and Communication Technology refers to the use of computer and its peripherals in improving teaching and learning activities within the school environment.

2.1.2 ICT integration in education

The ICT integration in education refers to the ways of co-operating ICT equipments in teaching and learning methods to deliver curriculum contents (Warnick & Thompson, 2017). The study focus was to find out the extent to which ICT facilities were integrated for the purpose of enhancing the teaching and learning process.

2.1.3 Teaching

Teaching is the process of arranging situations that stimulate and guide the learning activity towards the goal that specify desired changes in the behaviour of a learner (Barron et al, 2015). In this study, Teaching is the process of attending to people's needs, experiences and feelings, and intervening so that they learn particular things, and go beyond the given.

2.1.4 Learning

Learning is a process of acquiring knowledge after being exposed to the material or environment in which all the elements necessary for learning are available (Hammond, 2014). In this study learning is a relatively permanent change in the behavior or attitude of a person over time, this is when a student has acquired what was intended to be imparted.

2.2 Theoretical literature review

2.2.1 ICT policy in education

The ICT policy promotes the acquisition and appropriate use of literary, social, scientific, vocational, technological, professional and other forms of knowledge, skills and understanding for the development and improvement of man and society (URT, 1995).

The use of ICT is also expected to enhance the acquisition and use of knowledge and skills to all learners, including those with special needs. ICT use will improve the efficiency and effectiveness of the management and administration of education at all levels. This policy is also expected to broaden the basis of education financing, while optimizing the use of education resources, through partnerships and stakeholder participation (URT, 2007).

The policy claimed that there should be efforts to provide adequate ICT infrastructure throughout the education sector, from computers, digital equipment, telecommunications and Internet access to radio and TV, as well as supportive infrastructure such as electricity. The infrastructures serve the needs of all stakeholders in education, including students, teachers, parents, local communities, administrators and managers. The policy added that ICT should be taught as a subject and integrated as a pedagogical tool for teaching and learning in other subject areas. The uses of ICT require adjustments to more learner-centered and interactive teaching methods, thus redefining the role of the teacher as a facilitator. In order to optimize the use of ICT in education, ICT should also form an integral part of efforts to improve the quality and relevance of the curriculum for all levels (URT, 2007).

In case of teachers' ability in integrating ICT in schools the policy explained that, the MoEVT recognizes the need for continuous training programmes to build sufficient capacity among staff and other stakeholders. ICT training ranges from ICT literacy and technical development skills to the use of ICT in management and administration. Special efforts were made to train teachers and educators in ICT content development, trouble-shooting, and pedagogical uses.

2.3 Theories underpin the study

The study was guided by two theories; the goal setting theory by Edwin Locke 1960's and constructivism learning theory by Jean Piaget (1896-1980):

2.3.1 The Goal Setting Theory (GST)

The study employed the Goal Setting Theory propounded by Edwin Locke 1960's. The theory indicates that there should be a relationship between goals that are set by an individual person or an organization and the actual performance. The most effective performance seems to result when goals are specific and challenging, when they are used to evaluate performance and linked to feedback on results, and create commitment and acceptance (Locke & Latham, 2002). The goal setting theory adds that, organizational members should perform tasks better if there is a clear-cut goal set, with specific objectives, scheduling, and feedback. People approach achievement tasks with qualitatively different types of goals depending on how they evaluate their competence and ability as assigned by the authority or the person in power.

The theory is useful in the study due to its emphasis on an individual's involvement in performing certain activities to reach the planned goal. In our case therefore, both teachers and students should be involved in the process of integrating ICT in learning as one of the ways of achieving the planned curriculum goal in schools. Cole (2004) in his study stated that, there should be clear and supportive goals to enhance the smooth implementation of the policy objectives. In a summary the goal has to be set in such a way that every stakeholder within the organization is involved in the implementation process.

2.3.2 Constructivism Learning Theory

Constructivism is a learning theory developed by Jean Piaget (1896-1980), he believed that children construct their own knowledge as they are actively engaged in activities that are hands on and the materials are age appropriate as children schema are developed in stages. He believed that students must grow through all these stages and those they do not skip over a stage. Constructivists believed learning to occur when one constructs both mechanisms for learning and his or her own unique version of the knowledge from his or experiences. Knowledge was therefore constructed and not transmitted and students generate new knowledge through activities, experiences, and experiments (Roblyer, 2006).

Using technology in the constructivist classroom can greatly enhance students learning, as this theory calls for hand on experiences. Here the students would not be allowed to sit passively while are instructed by their teacher, they would be guided to discover for themselves. Students in the constructivist classroom in which technology is infused would be collaborative, as they would be encouraged to work together to achieve higher learning. The use of constructivism theory in an environment with technology would help students reach their full potentials. Therefore, the theory is useful in this study due to its encouragements on the use of technological environment to construct new ideas related to the subject matter. For instance, after exposing students to the learning environment which involves the ICT integration, students would be able to communicate, collaborate and participate in problem solving as well as exploring different materials by using the technology.

2.4 Empirical literature review

2.4.1 ICT integration in teaching and learning

It has been noted that there is willingness among teachers on ICT integration in teaching and learning and most of them are aware of existence of ICT resources in schools. Teachers are also claiming on the lack of in-service training opportunities which lead to ineffective integration (Gulbahar & Guven, 2008)

Miima, Odingi and Mavisi (2013) affirmed that, most teachers of social sciences are willing to integrate the ICT technology in schools. They showed understanding on ICT integration in such subjects like Kiswahili as compared to science teachers although they were not willing to adopt various challenges associated with the use of the technology.

Mwendwa (2016) shows that; most of teachers have positive attitudes towards ICT integration in teaching and learning process. They also perceived ICT as an important tool in improving teaching and learning. Aslan and Zhu (2015) show that some learning institutions have more ICT facilities integrated in classroom teaching and learning as compared to other education institutions. In this regards more investment in ICT should be emphasizes to enable teachers to have access to the ICT resources. Teachers should be trained not only how to integrate ICT but also in integrating the technology in the school curriculum.

Challess and Isifu (2015) in students' perceptions for implementing ICT in learning in second-cycle institution concluded that, students had more expectations on the integrating ICT in teaching and learning compared to teachers though the blame was on the high cost of ICT facilities. It was also noted that female students in public schools valued the integration of ICT in classrooms more than girls in private schools.

Mann (2014) revealed science teachers' experiences in integrating Information and Communication Technology (ICT) into their Teaching Practices in Toronto, and concluded that, school infrastructures especially classrooms should be built in such a way that, teachers use the same infrastructure when using ICT in their facilitation of lessons. Hence, it is necessary that schools improve their classroom infrastructures to support the use of technology as well as improving manpower resources and material for effective utilization of time.

Buabeng-Andoh (2012) in the study on factors influencing teachers' adoption and integration of ICT in schools reveals that, the good environment for ICT integration with curriculum content should involve the availability of adequate ICT skilled

teachers and suitable educational software and flexible curricular that suits the regular changes of ICT technology worldwide.

Salehi and Saleh (2012) suggested that the school environment with the administration should support teachers for effective utilization of ICT. The study added that, the poor support to teachers contributed to poor utilization ICT in some schools. Gebremedhin & Fenta (2015), on assessment of teachers' perception in integrating ICT in teaching revealed positive awareness to teachers which indicated a strong relationship of teachers' perceptions towards ICT usage although shortage of resources as well as inadequate ICT knowledge among teachers was noted to be challenges in some schools.

Qasem and Viswanathappa (2016) in assessing teachers' perceptions towards ICT integration revealed different perceptions over ICT integration in teaching and learning. The differences on perception was due to the fact that there were teachers who had undergone training, these had high positive attitudes towards the integration than those who had not attended any training. This indicates a strong relationship between teachers' perceptions towards ICT usage with training on ICT to some teachers.

2.4.2 The ICT integration in school curriculum

The ICT as an interactive tool in teaching and learning simplifies and makes the learning process active. The adequate access of functioning computers in schools and sufficient technical support make the ICT integration become a useful method of shifting teaching pedagogy from traditional to modern way of teaching where learners are participate in the whole process of teaching and learning, (Sharma, 2018). Furthermore, the ICT integration in education should be redesigned for curriculum implementation and assessment to bring quality learning outcome (Meenakshi, 2013; Makrakis, 2014).

Hennessey et al (2010) and Springer (2009) contended that there are insufficient ICT facilities for creation, dissemination and sharing of e-learning content to improve the quality of teaching and learning in schools. Therefore, teachers as among the implementers of curriculum in the classroom should use their sound knowledge of ICT to achieve the curriculum goals and improve the standards of education.

A study on the integration of computers in the classroom in Morocco by Ziad (2016) founded that the integration of ICT is underused because teachers had inadequate skills to integrate ICT in their plans. The poor skills lead to poor attitudes in using ICT in classrooms which also occupies the increased number of students in school streams.

The teachers' attitudes towards the use of technology in education to their study which uses the method of descriptive survey that involves 380 teachers in the academic year of 2011-12 recommends that, teachers should use the ICT to involve students during teaching and learning rather than only relaying on the positive attitudes of teachers on the use of technology in teaching (Enayat, Modanloo & Kazemi, 2012). Therefore, the application of ICT in teaching should be of high value among teachers and students by encouraging learner centered compared to tradition way of teaching.

Murati and Ceka (2017) did the study on the use of technology in educational teaching in Tetovo. It showed that the best way of teaching children using ICT is to integrate the technology with curriculum from their early age which enabled children to grow while learning under ICT umbrella. It is obvious that the use of technology at early age among children helped them to develop their future professional careers. For instance, computers and the internet helped in improving the quality of works as well as creating opportunities for teachers and inspire curiosity, imagination and interest of students (Springer, 2019; Groff, 2013).

2.4.3 Challenges hindering ICT integration in schools

Inadequate ICT skills is among the challenge faced by subject teachers that reduces the ability of integrating ICT in teaching and learning in their daily teaching activities. Hence, the government should prepare in-service training for teachers in all schools to equip them with necessary skills as well as providing more funds to purchase ICT resources required for implementation process (Mwangi, 2014).

Inadequate number of teachers with ICT integration skills in teaching pedagogy led to the failure of using ICT facilities. Some studies shows that number of teachers who attended ICT integration training does not reach the teacher-student ratio in their schools for the effective implementation of curriculum in education (Siddiquah & Salim, 2017).

In terms of ICT policies within countries, it can be concluded that the education policies on ICT implementation was also a big challenge in schools which lead to inconsistency and less effective during the implementation due to unclear and poorly addressed on how it would be integrated in the school curriculum. This makes some schools to have poor or even no policy that supporting ICT integration plans (ibid).

Another challenge is for students to have little chance in using technologies apart from showing positive attitudes in using the technology (Mahmood, 2009). Other challenges like infrastructure, facilities and time constraint become the prominent obstacle in the implementation of ICT in classroom. Teachers needs award of their efforts so as to make more integration of ICT facilities in schools (Imon, 2017).

Apart from little chances students have in using ICT facilities some secondary schools in East Africa face some other challenges like lack of appropriate software, inaccessibility of ICT facilities and shortage of ICT technicians have gravely hindered the dissemination of ICT skills in education although some teachers were well prepared and competent in using the technology through ICT workshops and training (Maina, 2011).

The poor involvement of some teachers in the usage of ICT facilities due to inadequate training which had a minimal or no impact to their ability and confidence to use ICT in teaching is among the challenge in integration of ICT in education curriculum (Mathevula & Uwizeyimana, 2014). Afshari et al (2009) argued the involvement of education stakeholders like teachers; parents and students as an important education practice since it allow them to give their contributions in terms of knowledge, skills and positive attitudes towards a clear vision of integrating ICT in classrooms.

Mathevula and Uwizeyimana (2014) and Springer (2016) also added that, ICT integration in teaching and learning in rural schools experienced some challenges associated with accessibility of ICT equipments and teachers' training. Furthermore, the data collected from 146 respondents in twelve schools shows that some teachers have less confidence and ability in using ICT tools in teaching students. Hence, the integration of ICT in curriculum has less effective on teachers due to inadequate resources distributed in schools (Bahadur & Oogarah, 2013).

According to Badugela (2012) there were some problems facing educators that needs departments of education to prioritize some educational resources for schools and educator training for smooth implementation of national education curriculum statements. The study added that teachers were less motivated on the use of ICT in teaching process during the implementation of curriculum Statements due several problems including inadequate resources and overcrowded classes. Therefore, curriculum advisors and NGOs should work together to encourage teachers in using the available ICT equipments.

Nevertheless some factors like age, gender and experience had impacts on the use of ICT in the teaching process. The data collected added that among the challenge which hinder the application of ICT facilities in teaching and learning is an individual factor associated with gender. According to the study results there is a difference between male and female teachers in using ICT in their teaching subjects. Female and male teachers in secondary school do not appear to differ greatly in the extent of their pedagogical use of ICT (Mahdi & Al-Dera, 2013).

Mingaine (2013) on the challenges in the implementation of ICT in public secondary schools in Kenya found that, the conducive environment for their ICT implementation is accompanied with the high cost fully infrastructures which as among the obstacles to ICT implementers. For instance, the schools environment should have adequate power supplies that support the implementation process. The power supply should be assembled with high advanced skills.

2.5 Conceptual framework

A conceptual framework is an interconnected set of ideas (theories) about how a particular phenomenon functions or is related to its parts. It serves as the basis for understanding the causal or co relational patterns of interconnections across events, ideas, observations, concepts, knowledge, interpretations and other components or experience. It can be explained either graphically or through a narrative that explores main things to be studied in a given study (Svinicki & McKeachie, 2010) as in figure 2.1 below:

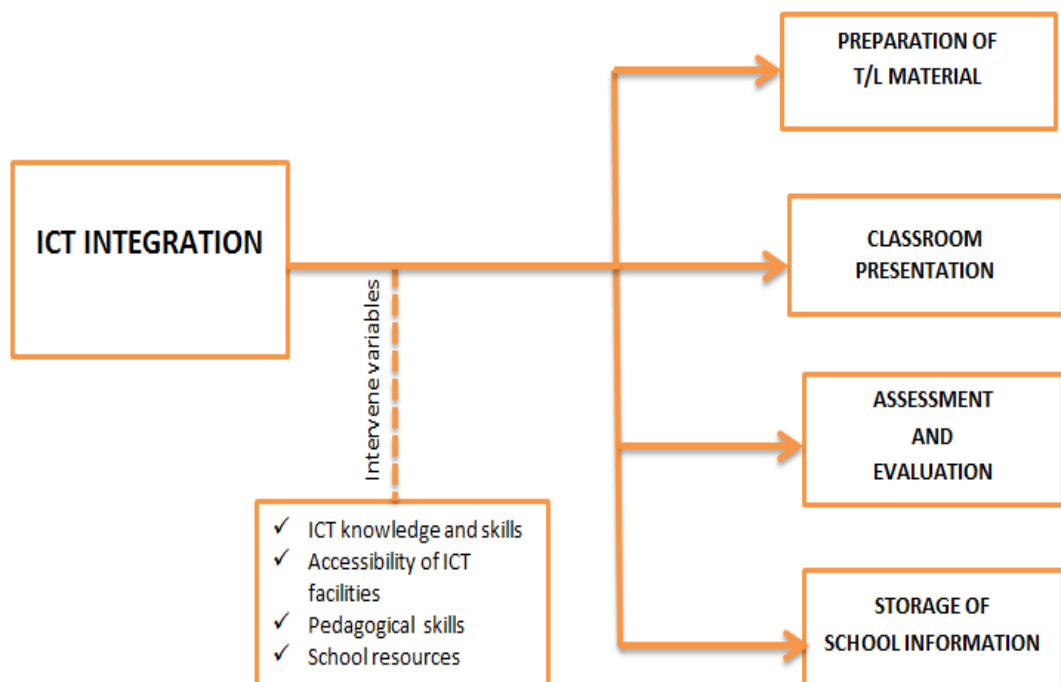


Figure 2.1: Conceptual framework

Source: Gurel (2017)

The diagram above shows the influence of ICT in the four aspects of preparation of teaching and learning material, integration of ICT in presentation of subject content, integration of ICT in assessment and evaluation as well as the storage of some important information. The conceptual framework had also shows the intervene variables which could either speed up or pull back the integration process. For example, if the school had manpower resource with adequate ICT knowledge and skills; accessibility of ICT facilities and; adequate pedagogical skills among teachers on how to integrate ICT then the school would have high integration compared to others. Hence, the ICT integration in teaching and learning (Ngeze, 2017) should consider the four criteria from the conceptual framework so as to prepare effective implementation. Lari (2014) emphasized that the use of technology should be prepared in order to enable teachers to improve the strategies to be used with respects to the available challenges. The study conducted by Koehler & Mishra, (2009) recommends that the technology integrated in teaching should be flexible depend on the level of knowledge (curriculum content) required to be imparted to the learners.

2.6 Research Gap

It can be learnt from the above literature review that ICT integration in teaching and learning in secondary schools whereby teachers were using ICT in preparation, presentation and storage of subject as well as students information. The reviewed material had further show that the integration level differ from one school to another due to several reasons including the availability of ICT resources, ICT skills and knowledge as well as the supportive environment for the integration of ICT in the curriculum. Hence, the study focused on the level of ICT integration in the selected secondary schools.

2.7 Summary of the chapter

Basically, the chapter two provided the clear concepts through defining the following key terms; Information and Communication Technology (ICT), ICT integration in education, teaching and learning. The theoretical literature review was used for gathering general or theoretical knowledge about phenomena from different scholars through their research papers and projects whereby, the following aspects was

discussed; the 2007 ICT policy in Tanzania that aimed to offer new opportunities towards the enhancement and of quality education through the improved pre-service and in-service ICT training as well as provision of adequacy ICT facilities for teaching and learning in schools, the ICT integration in teaching and learning contended about the teacher's and student's willingness, attitude and perception towards ICT integration in teaching and learning process, the goal setting theory as propounded by Edwin Locke and constructivism learning theory as it was developed by Jean Piaget. The theories clearly clarified and contended that there should be the relationship between goals that set by an individual person or organization with the actual performance whereby in the real sense; both teachers and students should be highly concerned in the whole process of integrating ICT in teaching and learning as the best way of achieving the planned curriculum goals in secondary schools.

The empirical literature review explained more about the willingness, attitudes and perception of both teachers and students towards ICT integration in teaching and learning, the role of ICT integration in school curriculum, the supportive school environment for ICT integration from administrators, donors, experts and other stakeholders as well as the challenges that hindered ICT integration in secondary schools. Furthermore, the chapter discussed about the conceptual framework presented diagrammatically that explored the four important aspects of preparation of teaching and learning material, integration of ICT in presentation of subject content, integration of ICT in assessment and evaluation towards an effective ICT integration in teaching and learning and integration of ICT in the storage of school information for secondary schools.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

Research methodology is defined as the way in which research problems are solved systematically (Kothari 2010). The chapter includes the research approach, study design, area of the study, population and sampling procedures, data collection method, data analysis and presentation and ethical consideration.

3.2 Research approach

The researcher used a qualitative research approach in order to find out in-depth information on ICT integration in teaching and learning process. The approach was helpful in finding detailed information on subjective assessment of attitudes, opinions and behavior. Moreover, the qualitative approach was used due to its ability of involving individuals in sharing feelings through in-depth interview and focused group discussion to get quality data of the study

3.3 Research design

Research design is the plan showing the approach and strategy of investigation aimed at obtaining relevant data, which accomplishes the research objectives (Cohen & Manion, 2007). Berg (2009) defined case study as a system that involves collecting sufficient information regarding a particular individual, social setting, event, activity or group to allow the researcher to clearly comprehend on how the subject works. The study employed a case study research design which allowed the researcher to generate an in-depth exploration on the detailed information (Kothari, 2004). The design was used because it allowed the researcher to get inner information about the level of ICT integration in teaching and learning process in the selected secondary schools.

3.4 Area of the study

The study was carried out in Morogoro Municipal Council located in Morogoro region in the Eastern Zone of Tanzania Mainland (Masue, 2010). The researcher decided to conduct the study in Morogoro Municipality because; the place had 23

public schools and 27 private schools which makes a total number of 50 secondary schools. The place had a number of public and private schools which use ICT facilities in teaching and learning process. Morogoro Municipality is also one of the lucky district in which 12 public schools are guided by the African Digital Schools Initiative (ADSI) project in building the teachers' capacity on the effective usage of ICT in teaching and learning process. The five public secondary schools were selected due to their active involvement in the ongoing ADSI project and the private secondary schools were selected regarding to good performance of students and the availability of ICT facilities into effective use. The schools were randomly selected due to the fact that they would provide relevant information needed in the study.

3.5 Targeted population

Population is the number of items or the entire group of people who have one thing in common (Kabir, 2016). The population of this study included 5 public and 5 private secondary schools in Morogoro Municipality. It consists of 50 secondary schools with 23 public schools and 27 private schools. Out of 50 secondary schools purposive random sampling were performed and sampled 5 public and 5 private schools for the study. From each of these schools data was collected from teachers, students, school administrators, educational officers as well as the regional project coordinator of the ADSI program. The population of the study was targeted because they share one thing in common which was struggling for integrating ICT facilities in teaching and learning process.

3.6 Sample size

Samples is a subset of the total number of individuals that could be studied in a given statistical setting. The study used a sample size of 163 because the researcher could not be able to involve the whole population of students, school administrators and teachers from all schools in Morogoro municipality due to the limited time of data collection. Hence, the distribution of respondents who were selected as a sample were as displayed in table 3.1 below;

Table 3.1: Distribution of Respondents in Sample Size

Students	Teachers	REO	DEO	School Administrators	RPC	Total
100	50	01	01	10	01	163

3.7 Sampling techniques

The study employed purposive and convenient sampling technique to obtain information from the entire population in which the specific data required in the study was obtained.

3.7.1 Purposive sampling technique

Purposive sampling is a type of non-probability sampling which was used in this study to collect specific information needed in the study (Majumdar, 2006). The data were collected from education officers, school administrators, teachers and students.

3.7.2 Convenience sampling technique

Convenience sampling technique refers to where subjects are selected according to their convenient and proximity to the researcher. In this case the researcher did not consider selecting subjects that are representative of the entire population (Msabila & Nalaila, 2013). The study used convenience sampling technique to collect information from respondents who was met accidentally to the targeted area during the day of data collection. It focused on researching subjects of the population that was easily accessible during data collection (Bhat, 2017). For instance, the researcher considered an easy accessibility of respondent (ADSI Regional Project Coordinator) who were not mentioned in the research proposal. The researcher also changed informants because of the eruption of Corona Viruses (COVID 19) where he used advanced level students instead of Ordinary level students from four selected schools, but the other six schools were investigated after the opening of ordinary level secondary school from Corona leave.

3.8 Data collection methods.

The study employed observation, in-depth interview and focused group discussion for collecting data:

3.8.1 In-Depth Interview (IDI)

The researcher used in-depth interview to collect data from educational officers, head of schools and teachers who provided the current ICT integration procedures to influence students' learning behaviour (UNESCO, 2014). The in-depth interview and questionnaires were used to collect information from 12 administrators, 50 teachers and 60 students from both public and private secondary schools who were purposefully randomly selected.

3.8.2 Focus Group Discussion (FGD)

Focusing group discussion is a data collection method which involves group of individuals about five or six, which gives room for everyone, to take part in the discussion (Morgan 1996). Bloor et al (2001) recommends group of 6 to 8 participants. With FGD all members in a group were given equal and enough opportunity to share their views. In the study, FGD was used for collecting data from the students whereby each school had less than five (5) participants which therefore made the researcher to manage them easily. This made FGD good means for obtaining data. In addition, the researcher decided to use individual interviews after the FGDs to give more room for individuals to capture the skipped information especially from those who might be unable to talk freely in the group.

3.8.3 Observation

Observation checklist was used to assess the availability of ICT facilities in each visited school. Observation checklist was employed by the researcher to examine whether the school environment was supportive for ICT integration as well as if students and teachers were allowed having free access to ICT services like school web and internet for the matter of learning. Creswell (2014) defines observation as when the researcher takes field notes on the behaviours and activities of individuals at the research sites. In the study, the observation was intended to capture the learning environment particularly looking at the availability of such facilities as computer laboratories and ICT facilities for teaching and learning.

3.9 Data analysis and presentation

The study is qualitative in nature whereby content analysis was employed on analysis on verbal and written information like reports from focus group discussion, direct observation and in-depth interviews and the presentation of data was done through narrations and tables (Masue, 2010). The study used to explore the information and put on written document.

3.10 Reliability and validity

Most measurements experts believed that every measurement device should possess certain qualities and the two common technical concepts in measurements are reliability and validity. Validity and reliability are the two most important quality control objects in research.

Reliability

Reliability is defined as the degree of consistency between two measures of the same thing (Mehrens & Lehman, 1987). It is the measure of how stable, dependable; trustworthy and consistent a test is in measuring the same thing each time (Worthen *et al.*, 1993). In this study, pilot study was conducted to see if the same instrument can give the same results when applied to the same group over the time.

Validity

According to Msabila and Nalaila (2013) validity determines whether the instruments will gather the expected data or not. It is the degree to which the instrument can provide accurate data as required by the research. This research (study) used the interviews, focused group discussion and observation checklist as tools of data collection to assess the ICT integration in teaching and learning in Tanzania. Creswell (2013a) describes the role of validation as a measure of accuracy of the study that can be achieved through triangulation. Triangulation is the process of corroborating evidence from more than two sources to expose a theme or common perspective (Creswell, 2013b). To ensure validity of the collected information, data was tested by pre-testing of data collection tools and triangulation methods for data collection was adopted as the researcher involved enough respondents to get enough relevant information.

3.11 Ethical considerations

The trustworthiness of the study was gauged through credibility, transferability, dependability, and confirmability. The ethical considerations included obtaining clearance letter, introduction letters and sought permission from Morogoro Municipal Council Director who allowed the collection of data and information from the selected secondary schools, obtaining informants' consent and ensuring confidentiality and privacy. At the time of the surveys, the informants were notified of their choice to participate or withdraw. They were assured of their anonymity throughout the study and all subsequent presentations and publications emanating from it. In brief, the importance of sound ethical practices is addressed in this research in order not only to protect the interest of the participants but also to allow disclosure of information to less constrain than might be possibly in less secure environment. Thus, adhering to these ethical concerns the researcher was able to obtain round and quality data for the study.

3.12 Summary of the chapter

The chapter has presented the research approach, study design, study area, population and sampling procedures, data collection method, data analysis, presentation of data and ethical consideration. The study employed the qualitative research approach find in-depth information on assessing the integration of ICT in teaching and learning. The study was carried out in Morogoro Municipal Council located in Morogoro region in Tanzania mainland whereby, ten secondary schools were selected. Targeted population, sample size, sampling techniques based on: purposive sampling techniques and convenience sampling techniques; data collection methods namely observation, in-depth interview and focus group discussion; data analysis and presentation as well as ethical considerations.

CHAPTER FOUR

FINDINGS OF THE STUDY

4.1 Introduction

This chapter presents the findings and data analysis of the study. The finding has been presented based on the four (4) specific research objectives. The specific objectives included to assess the common aspects of teaching and learning where ICT is mostly used; to assess the availability of ICT facilities in the selected secondary schools and the ICT integration in teaching and learning; assess the achievements of ICT integration in teaching and learning in secondary schools and identify the challenges of integration of ICT in teaching and learning.

4.2 The common aspects of teaching and learning where ICT was used

4.2.1 Preparation of subject content

This study was conducted in both public and private schools. The result showed that only few teachers used ICT facilities in the preparation of teaching and learning materials whereby from 50 interviewed teachers, only 22 teachers were regularly using ICT facilities to prepare and effectively use the facilities in classrooms; one of the participants had this to say:

To me ICT facilities have great importance when I am teaching Chemistry...I use the computer to retrieve the required instructional material to be presented to students... students are always exited, interested and shows high interaction during the lesson....S3T5

This implies that in the visited secondary schools, teachers were using ICT.

The other one said:

I normally integrate ICT particularly using my personal laptop in preparing the teaching and learning materials like schemes of work, lesson plan, lesson notes, assignments, teaching aids, quizzes and other related materials to the topic and sub topic...S1T1

The above statements show that ICT facilities effectively helped in preparing the teaching and learning material. Some of material prepared was the lesson tools and teaching aids.

4.2.2 Classroom presentation

The respondents (50 teachers) were also asked by the researcher if they were using ICT facilities in their classroom presentations. (19) Respondents out of 50 were found using ICT facilities for classroom presentation. Among the ICT facilities used during classroom presentation were LCDs, computers and whiteboards. One of the participants had the following to say:

I am usually comfortable in using ICT facilities like computers, projectors and whiteboards during my presentation when teaching my students in the classrooms because, they make easier for me to deliver the intended subject content and makes students actively follow the lessons ...S9T4

In the course of interview, one of the teachers' said:

I normally use projector to present my lessons. I prepare slides and display them via the power point ...S7T1

This shows that ICT facilities like computer and projectors were used in the lesson presentation though the level of using the facilities differed from one school to another, as it shown in table 4.1.

Table 4.1: The number of ICT facilities used in classroom presentations

The available ICT facilities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S1
Computer	20	07	24	39	25	28	31	14	40	14
White board	00	01	00	02	01	04	01	00	01	02
Projector	01	03	02	08	02	10	02	02	01	02

The table above shows the ICT facilities mostly used in classrooms. The table indicates S6 having 10 projectors, S1 with just few projectors while S9 is having 1 projector. This implies that only few teachers use projectors in classroom teaching depending on the available projectors.

4.2.3 Preparation of assessment tools

Out of 50 respondents, 38 respondents argued that they use ICT facilities such as computers, scanners, printers and photocopy machines to prepare assessment tools on their own. Among the assessment tools included classroom tests, internal examinations, group assignments and an individual students' tests. One of the participants said:

I wish all teachers were using ICT facilities in preparing assessment tools like oral presentation, concept tests, concept maps, class works, knowledge surveys and students' examinations. Because, all the listed assessment tools motivate and help students to learn well...S4H

The table 4.2 below shows the number of ICT facilities used in preparing students' assessment tools in selected secondary schools in Morogoro Municipal Council:

Table 4.2: Number of ICT tools used to prepare students assessment tools

The available ICT facilities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Computer	20	07	24	39	25	28	31	14	40	14
Printer	03	01	03	05	02	03	01	02	01	01
Scanner	01	00	00	01	00	02	00	00	01	01
Photocopier	01	02	03	01	01	02	01	01	01	01

This shows that computers, printers, scanners and photocopiers were the common ICT facilities used for preparation of assessment tools in the selected secondary schools.

4.2.4 Storage of students' important information

The data collected indicated that both teachers and administrators used ICT facilities to store students' information. Among the important information mentioned to be stored were included self-continuous assessment forms, registration for form two, form four and form six national examinations, all internal examinations, class lists and students' personal particulars. The study further revealed that majority of head of schools did not use phone memory as one of devices for storing school information except S4. The use of CDs was not applied by S2, S3 and S4. Moreover S4 missed external hard disc which was said by some respondents to be very important since

the phones and computers could be affected by viruses easier since they were used by many respondents. In regard to the interviewed teacher from S8 said:

Actually, there are several ways of storing information by using ICT facilities like computers, external hard disc, phone memory, flash disc and CDs but to my side I do prefer integrating computer, flash disc and phone memory in storing subject information as well as students personal particulars and their continuous assessments...S8T7

In addition the REO said that:

It is obvious that my office integrate ICT using facilities like computers and external hard disc for storing some crucial information including students' information from each schools...statically all students were involved regardless their gender and physical appearance....REO

To support the DSEO added:

In real sense, documentation tends to be more valuable to any governmental offices for future use...my office adhere the integration of ICT using several facilities like desktop computer and external hard disk in storing important information about students school wise and district wise...DSEO

In summary the experienced head of school concluded that:

Among the storage devices used in for storing necessary information were included desktop computers, laptops, flash disc and external hard disc...S6H

The statements above showed that the process of storing important information like students records were practiced by different education stakeholders at all education levels. The common ICT facilities used by respondents to store students' information were as shown in table 4.3.

Table 4.3: The number of ICT facilities available for storage of students' information

The available ICT facilities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
External hard disc	00	01	00	02	01	02	00	01	01	01
Flash disk	02	01	01	03	05	04	01	01	03	03
CDs	10	14	00	20	09	15	08	12	00	11
Phone memory	00	01	00	04	00	00	00	00	00	00

The data in the table 4.3 shows that all investigated schools had some or all ICT facilities such as external hard discs, flash discs, Compact Discs (CD's) and phone memory for storing students' important information for future documentation.

4.3 The ICT facilities available in selected secondary schools

The information on the question in the number of ICT facilities available in selected secondary schools was collected through the observation checklist as presented in table 4.4.

Table 4.4: The observation checklist on ICT facilities

S/N	EQUIPMENT	THE SELECTED SCHOOLS USED BY THE STUDY									
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
1	White board	-	01	-	02	01	04	01	-	01	02
2	Scanners	01	-	-	01	-	02	-	-	01	01
3	External hard disc	-	01	-	02	01	02	-	01	01	01
4	Computers	20	07	24	39	25	28	31	14	40	14
5	Flash disks	02	01	01	03	05	04	01	01	03	03
6	CDs	10	14	-	20	09	15	08	12	-	11
7	Phones' memory	-	01	-	04	00	-	-	-	-	-
8	Printers	03	01	03	05	02	03	01	02	01	01
9	Mobile Broadband	01	01	03	-	01	-	-	-	-	-
10	Smart TV's	-	01	02	03	-	02	-	-	-	-
11	Radios	-	01	01	-	01	02	-	-	-	-
12	LCDs/Projectors	01	03	02	08	02	10	02	02	01	02
13	Tablets	-	-	45	02	-	-	-	-	-	01
14	Satellite dishes	-	01	-	01	-	01	01	-	-	-
15	Routers	01	01	-	01	02	02	01	01	01	01
16	Loud speakers	-	02	-	04	02	03	-	-	02	04
	TOTAL	39	36	81	95	51	78	46	33	51	42

Table 4.4 shows that some ICT facilities such as computers, printers and LCDs/projectors were available in all ten secondary schools. The availability of other facilities varies. For instance S1 and S3 had computers and LCDs but had no white board to support the projection of the prepared Power point presentations. During the interview, one head of school said:

As you have seen and observed by your own eyes; actually, we really thank God that our school possess some of very important ICT facilities to be integrated by the teaching staffs during the teaching process whereby the facilities helps in the fulfillment of intended objectives related to curriculum goals towards students' learning...S2H

Another head of school during interview said:

Dear researcher, I would like to assure you that I and some of teaching staffs are trying for all of our efforts and power to integrate the available ICT facilities as you have seen in the whole process of teaching and learning in various subjects' content.... Actually we see that, there is a very high progress on ICT integration to both teachers and students to the presence of basic ICT facilities at our school...SIH

Some schools like S1 had neither radio nor TVs while the schools like S2, S3 and S6 had both radio and smart TVs but teachers were not using them as a part of teaching facilities. Some respondents (17) added that TVs were fixed to the teachers' staff offices and not used in classrooms. The study also interviewed some respondents to see if the available ICT facilities like Mobile Broadband, satellite dishes and routers enabled them to obtain ICT services. The result was as shown in table 4.5:

Table 4.5 ICT services available in selected secondary schools

SERVICES	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Internet	√	√	√	√	√	√	√	x	x	√
Electricity	√	√	√	√	√	√	√	√	√	√
Website	√	x	√	√	x	√	x	x	√	√
E-mail	√	√	√	√	√	√	√	√	√	√
Total	4	3	4	4	3	4	3	2	3	4

The responses as shown in table 4.5 indicated that all ten selected school use the available ICT facilities to access some ICT services like internet services, website and e-mails. The findings reveled that currently schools had no money to run the services hence teachers used their own mobile networks to search their subject information. S5 proved that formally the school had enjoyed the free bundle in accessing internet via Halotel company from 2018-2019 but from this year of 2020 the bundle of the school had to be paid by the school. For example some schools (S2 & S5) blamed concluded that the costs of running important ICT services such as website, internet and E-mail is high while schools had no money to pay for website which costs more than two hundred thousand (200,000) per year. To support one of the experienced head of school said:

We are extremely happy that Halotel Company enable us with internet services...they also supported our school with the bundle of ten (10) GB in each month since 2018 up to 2019...but for this 2020 has to provide the bundle for internet, website and e-mail services though up to now they have not done so...S5H

This implies that the presence of important ICT services such as internet, electricity, website and E-mail in secondary schools tends to be useful in performing individual and organizational activities related to effective teaching and learning.

4.4 Integration of ICT facilities the selected secondary schools

4.4.1 Integration of ICT facilities in classroom activities

The researcher observed some teachers who use LCDs during their lessons from the three schools (S1, S2 & S4). The data had further revealed that only 22 out of 50 respondents had regular tendencies of using ICT facilities for classroom activities. Some classroom activities mentioned by some respondents were the use of info graphics to stimulate students' critical thinking, the use of web quests to involve students in finding some solutions for difficult questions from the provided web addresses and the use of videos and short clips which carries subject information. Some of schools like S8 explained that the integration of ICT facilities in classrooms was very important especially to some classes whose some of students had ear impairments. For instance, teachers were using info graphics and videos.

In using the info graphics some of respondents (22 teachers) explained that some pictures with a trend of full information of the subject content to be taught were displayed through projectors and students were given a chance to sit in their groups to discuss and put down the full information. In other schools (S1 & S8) the respondents added that teachers were also using computer to practice web quest teaching technique whereby students were exposed to computer laboratory during the lesson and some questions and relevant address where the relevant material was available were poses and students use the address to find answers from the internet.

The short videos were usually used by some teachers (especially in literature subject) whereby students were watching the videos to reflect the true characters from their plays. When the researcher was exploring this information, one of the teachers responded as follows:

Frankly speaking, the available ICT facilities at our school are highly and accurately integrated by me and my fellow teaching staffs who are knowledgeable with computer skills when performing their teaching process towards facilitating students' learning in the classroom context...S4T3

To support another teacher explored that:

I do use several classroom activities like animation, graphics, videos and short educative clips to stimulate students' critical thinking by identifying and grasping crucial subject information related to their level of education...S10T8

This implies that both teachers from public and private schools use computers, projectors, routers, smart phones, white boards, external hard disc and flash disc when performing classroom activities during teaching and learning processes.

4.4.2 Integration of ICT facilities for administrative activities

The study found that both school administrators and educational officers integrate ICT facilities in their administrative activities. During interview one educational officer said:

Yes of course, as the head of school I concur with you that I am integrating the available ICT facilities in my office for administrative activities including printing, photocopying, storing information and emailing of necessary and the required reports or official information..S10H

This implies that administrators and education officers perform their organizational activities efficiently through integrating the ICT facilities for the better achievements of education and national curriculum goals.

Table 4.6 Summarizes ICT facilities used for administrative activities:

ADMINISTRATORS		ICT FACILITIES																	
		Printing					Photocopying						Storing						
	Exams & Tests	Class lists	Parents' reports	Seculars	Directives	Official letters	Teaching aids	Lesson notes	Teaching tools	Text books	Students'	Teachers' record	Facilities	Subjects record	Financial records	School calendar	School timetable	Meeting records	Past papers
Education Officers				✓	✓	✓						✓	✓		✓				
Head of Schools	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

From the data in the table above one can say that ICT facilities such as printers, photocopier machines, computers, external hard disc and flash disc are useful to administrative activities for better performance.

4.5 Achievements due to ICT integration in secondary schools

4.5.1 The influence of ICT in teaching and learning behaviour

In responding on the achievement of ICT integration in secondary schools teachers said that the integration of ICT facilities in teaching and learning had influence in students' learning behaviour. The information collected from the interviewed students who were 100 shows that the positive learning behaviour shown by students during the lesson were clearly revealed through the response of students in answering questions in their respective focus groups. For instance the lesson conducted from S8 schools in the libraries which involves students to search material direct from the computer had explained to make live class compared to lessons conducted in their normal classrooms. For example 87 students who participated in this study said they enjoy the lesson when teachers used ICT facilities to teach. To support this one teacher during interview said:

From the bottom of my hear, my positive attitudes in using ICT facilities in teaching has really changed my personal teaching behaviour as well as students' learning behaviour due to the actively use of modern way of teaching (participatory)...S2T8

Another teacher from S7 commented that:

I am excited to use ICT in teaching subject contents in my classes because, it gives me a room to involve students to search for necessary information with internet connection whereby they get relevant materials related to curriculum...S7T2

The interviewed teacher from S6 added that:

I am extremely comfortable using in using ICT facilities like computer projector and white board during my classroom lesson presentation because it makes easier for me to deliver the intended subject content and make students clearly understand the lesson by actively following the power point display...S6T6

Furthermore, the interviewed teacher from S7 proved that:

I normally use to present my intended topics and sub-topics in the classroom through the prepared slides by displaying them via the power point methodological approach for easier deliverance and clear understanding of the lesson that fulfills the learning outcomes...S7T1

African Digital Schools Initiative regional project coordinator summarized that:

For sure there are many achievements resulted by integrating ICT facilities in teaching and learning process to learners, teachers and administrators. This is because they make students critical thinker; creative and sharp to answer the asked question. It also simplifies works as the 21st century skills (communication, critical and creative thinking, problem solving, innovation and collaboration) are concerned for successful teaching and learning... RPC

One student from S4 has further added that:

I am always motivated to learn and understand more about the subject content from the teacher who use computer and projector to display the prepared lesson with graphics, pictures, real diagrams and short videos to follow. I find myself active and interactive to the lesson by asking questions and solving some problems raised from the teacher...S8S2

This implies that the student attitude and teacher attitude including self-efficacy, negative specific and general attitude on ICT use also affect the outcome of learning (Salehi & Salehi, 2012). Interview data was also supported by observation findings a researcher observed that teachers who use PowerPoint to present their subject content was more active compared to teachers who use chalkboards. Their interests was revealed when teachers showed their lesson tools including lesson plans, scheme of works, lesson notice, teaching aids, assessment tools, continuous assessment and students' worksheets. The less teaching behavior shown by some respondents were associated by several factors including inadequate ICT facilities as shown in table 4.4 in this chapter.

4.5.2 The influence of ICT in general school performance

The researcher had interviewed 10 heads of schools to give their experience on whether the integration of ICT facilities in teaching and learning had an influence on students' performance. The collected data from selected secondary schools shows that 8 respondents had positively argued the integration of ICT facilities to increase school performance while the remained 2 head of schools had less agreed. The schools which were strongly agreed to increase their performance due to integration of ICT facilities had gave their reasons including simplification of some school activities such as preparation of students' examinations, assessments and evaluation of students' performances. To support this one the interviewed teacher from S8 said:

Students' academic performance at our school is reflected from the enhancement of the current state of knowledge and skills related to ICT integration as practiced by both teachers and students...S8T10

This was also added by one of the student from S5 who said:

I am now becoming an improved student because, before teachers started to use computers and projectors while teaching us in our classroom my academic performance was poor but now I am becoming a competent student with good marks in my internal examinations just because of the modern way of teaching applied by some of the teachers...S5S4

The above statements showed that the level of ICT integration among schools was associated with ICT skills and knowledge possessed among teachers.

4.6 Challenges hindering effective integration of ICT in teaching and learning

The data collected shows that there were several challenges that hinder the integration of ICT in teaching and learning as discussed below:

4.6.1 Unstable electric power

The study revealed that unstable power supply was one of the challenge faced teacher in using ICT. During interview one teacher had this to say:

I always became totally confused when the electricity is cut off while I am in the classroom teaching my lesson...we always experienced unstable electric power... the situation makes me and my students to lose hope in continuing with the lesson...hence unnecessary noises in my class and wastage of time for waiting the electricity to come back...S2T2

Another interviewed teacher (T3) from S9 responded by saying that:

Dear researcher, unstable electric power is a big disturbing challenge to our school because most of the time there is an electricity cut off also most of the classrooms had no light to support the power point presentation...I normally use ICT in only few classes connected with the electricity...S9T3

Through focus group discussion, students were asked to identify the challenges that they face in using ICT. Responding to this question one student said:

Electricity problem is a big challenge because when the power is gone off I completely lose the learning morally ...and even fail to listen attentively from the teacher...S2T5

Another student (S1) from S6 said that:

Sometimes we may find that there is no power at our school for even one or two weeks because of financial problem whereby the administration fail to buy the electricity unit that normally support the ICT integration in our learning...S6S1

This implies that unstable electricity makes difficult to continue with the classroom activities when is cut off, because it is difficult to pull back the students' attention especially if the lesson was at the highpoint

4.6.2 Inadequate ICT facilities

The study revealed that most of schools did not have sufficient facilities for smooth integration of ICT in teaching and learning process. For instance, S2 had many ICT facilities compared to other schools involved in the study; however students complained for the school to have a small computer lab which could not carry even students from the single stream at once. As one teacher said this during interview:

The teaching and learning process becomes difficult and uncomfortable when integrating ICT due to inadequacy of ICT facilities because sometimes one computer is used by five to six students ...at the same time during the classroom session...S4T8

Through focus group discussion one of the student said:

The shortage of ICT facilities in our school makes us not to enjoy the learning environment ...this was because teachers may use computer and projector today in our class then tomorrow the computer and projector is used to another class while we are also having the period..S9S1

The interviewed teachers from some of schools said:

In our school we have shortage of ICT equipments which always discourage me to integrate ICT in teaching and learning. This is because when you go to look for projector and laptop you find that it has already been taken by another teacher...S10T2

Through in-depth interview to African Digital Schools Initiative (ADSI) project coordinator of Morogoro region, the process of changing schools into digital world was for all schools, as he said:

Through our program, we are trying all the best to make sure that all programmed schools move to ICT integration by action and performance even though, most of schools in Morogoro municipal have inadequate ICT resources to make move successfully...RPC

This implies that the few number of the provided ICT facilities in secondary schools is the challenge to the students, teachers and administrators towards the successful teaching and learning processes.

The following were the total number of students carried by selected secondary schools and the total number of computers available in each school.

Table 4.7: Number of computers available in each school

Schools	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Total Students in school	340	1230	1095	617	827	337	1014	1897	1703	318
Total Computer Available	16	39	12	30	10	08	31	14	40	14
Number of Computer room	01	01	01	01	01	01	01	01	01	01

The data presented in the table above shows that most of the investigated schools have more than three hundred pupils but they have between 10 to 40 computers. This is a problem because; there is no sufficient ratio between the total number of students with the available ICT facilities to be used in teaching and learning.

4.6.3 Inadequate manpower

The study revealed that most of the student said their school had shortage of manpower. The interviewed S3 from S2 openly said that:

What I have tried to investigate and prove from our teachers who teach us using ICT pedagogical approach are very few in number compared to those who completely do not integrate ICT facilities when teaching their subject contents in classroom...S2S3

Another S7 from S8 claimed that:

From my own point of view I think that, the little number of ICT teachers is one of the challenges which strictly caused by in adequacy skills and knowledge. That is why strongly I can comment by saying that; we are experiencing to have very little number teachers who are expert on integrating ICT facilities in teaching. For example to our class, only four teachers (English, Chemistry, Geography and Civics) do frequently teaching their subjects by integrating ICT facilities to make us clearly and simply understand the subject information...S8S7

The above statements shows that man power was among the challenge in the integration of ICT in teaching and learning because some teachers had no adequate ICT knowledge and skills to integrate ICT facilities available with teaching pedagogy they have.

4.6.4 High costs in accessing internet services

Another challenge mentioned by respondents was the high costs in accessing to internet services where teachers could search subject material to be used during the lesson. According to respondents, material found in the internet was including subject notices, images and info graphics. The interviewed head of school from S7 contended that;

It is cost fully to run the internet and website services for the purpose of teaching and learning as well as for official information in our school; simply because we do sometimes running bankrupt and completely fail even to buy the supportive GB for the online activities and services...S7H

Another teacher from S2 added by saying that;

Sometimes we find it so difficult to teach our students about internet services and how to search for the relevant materials related to subject content due to high cost in running the service. Because the bundle for internet is very expensive whereby, the school administration does sometimes fail to buy it even for some months. For example GB is highly needed for internet connection when searching for materials in different website...S2T6

The above statements show that some respondents were blaming on the cost of ICT equipment and services to be high in such a way that teachers could not afford for themselves.

4.6.5 Limited time in school timetable

The students explained that among the challenge faced them in integrating ICT facilities in learning was the limited timetable in accessing computers in studying. Some respondents added that their school timetable allow them to go to computer lab only when they were free because their school had not registered for taking computer

as a subject to be taught in their schools (S1, S4 & S6). The interviewed teachers from S1, S8 and students from S2 and S3 proclaimed that;

Actually the limited time for the students to practice and interact with ICT facilities like computers make so difficult for me to deliver the accurate subject information due to a lot of asked question from students related to technical errors...S1T4

I think that in order for the successful ICT integration to go very smoothly in teaching and learning there is great need for the curriculum consideration on the additional of time to all schools general timetables which will give more chance to students to interact with ICT facilities inside and outside the classroom context..S8T1

The time for using computer for the matter of studying was inadequate...our teachers need use to use computer during the break time or in free periods ...S2S4

We have been allowed to use computer available in computer lab for studying but we couldn't manage due to few minutes we get from the school timetable....the timetable need us to use 80 minutes in a week while the lesson was still new to us...S3S2

The interviewed head of school from S1 said that;

From my experience I have noted that, the little concentration with teachers and students in using ICT facilities is due to less consideration of the curriculum and NECTA. For example, NECTA reduced the number of subjects to be registered in FTNA from 13 to 12 subjects whereby students are dropping ICS as one of a subject in form two as a result the all find to have little time to concentrate in integrating ICT in teaching and learning...S1H

The above statements shows that even the schools which employed ICT as a teaching subject, the respondents were blaming to use only the period of computer for studying theories rather than making practices on how to apply the technology to enhance their learning in other subjects.

4.6.6 Unclear view from the projector

Other respondents who were students said that they had sight problem hence they could not see visual images presented by their subject teachers via projectors. The visual problem was also hindered them to undergo self-learning in computers or phones. This was supported by S9 from S2 who said:

We are almost eighty six students in our class. Sometimes I face sight problem in such a way I could not easily see all what are being viewed and presented by my subject teachers who were uses computer and projectors when teaching us in the classroom hence, I got very difficult to grasp the intended lesson information..S2S9

Another teacher from S7 concluded that:

'Sometimes it is very difficult for all students to understand the lesson especially to those large classes...this is because it made so difficult for students with sight problem to see all the visual images displayed by their teachers through projectors ...S7T3

The above statements show that some of students were blaming unclear view from projector due to either their difficulties or the large number of students available in their classrooms.

4.6.7 Inadequate ICT skills

Another challenge for integrating ICT facilities in learning was inadequate skills to use computers among students. During interview one teacher said: *Majority of us had no adequate knowledge to use computer in finding out the subject contents for curriculum coverage...S6T4*

In this one student said:

The computer application was difficulty because; it needs some skills from our teachers who did not finish teaching us all the supportive skills...S5S5

When asked the same question another student said that:

It was sometimes difficult to find out answers from computer without the help of the teacher...he teach use how to find key words of subject items from the computers...S3S2

From the three assertions one can say that teachers and ICT experts are smart in using software like word processor, excel, power point and internet in teaching and learning. They do not have adequate knowledge on how to deal with pedagogical approaches, maintenance and troubleshooting towards ICT facilities. This implies that most of teachers have no competent skills in using ICT when teaching their lessons in the classroom context that also lads to little skills/knowledge to students in searching relevant material to use them in their studies as they are being directed by their subject teachers.

4.7 Summary chapter

The chapter four has accordingly reflected the findings and data analysis from the respondents by assessing the common aspects of teaching and learning where ICT was used based on: the use of ICT facilities in preparation of subject content, the use of ICT classroom presentation, the use of ICT facilities in preparation of assessment tools, the use of ICT in storing students' important information; the ICT facilities available in selected secondary schools: the integration of ICT in selected secondary schools based on: integration of ICT facilities in classroom activities, integration of ICT facilities for administrative activities; the achievements due to ICT integration in selected secondary schools based on: the influence ICT in learning behaviour, the influence of teaching behaviour and the influence of ICT integration in general school performance; challenges hinder an effective integration of ICT in teaching and learning; un stable electric power, inadequate ICT facilities, inadequate man power, high cost in accessing internet services, limited time in the school timetable, unclear view from the projector, inadequate skills and indiscipline among students during the lesson.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Introduction

The chapter presents the findings of the study. It represents the four themes from specific objectives which were to; assess the common aspects of teaching and learning where ICT is mostly used, assess the availability of ICT facilities in the selected secondary schools and the ICT integration in teaching and learning, assess the achievements resulted by ICT integration in teaching and learning in secondary schools and identify the challenges of integration of ICT in teaching and learning in selected secondary schools in Morogoro Municipality.

5.2 The common aspects of teaching and learning where ICT was used

The study shows that ICT facilities are used in preparation of teaching and learning material. Very few teachers embraced the integration of ICT facilities in the teaching and learning process, they especially used computers, smart phones and tablets in the preparation of teaching material such as schemes of work, lesson plans and lesson notes. Most teachers had awareness on ICT integration in teaching and learning. The study revealed the differences on the use of ICT facilities in between the public and private secondary schools whereby teachers in private schools were observed using their personal computers to prepare their lessons as they thought it important, time serving, and impressive. The findings also show that teachers used computers, white boards and projectors in displaying their subject materials to learners when teaching in their respective classes. The study by Tanveer (2010) emphasized that more investment in ICT resources should be done to enable teachers have effective integration of ICT facilities.

The findings as obtained from interview sessions found that teachers used ICT in preparation of students' assessment tools, though few of them used ICT facilities in preparation of subject content and presentation. The study by Sharma et al (2011) concluded that ICT facilities should be employed to prepare the assessment mode and evaluation of students' performance. The increased number of teachers used ICT

tools in preparation of assessment tools because school administrators forced their teachers to submit their assessment tools in soft copy format ready to be saved and printed.

The findings also showed that both administrators and teachers used ICT facilities such as external hard disc, flash disc, CDs and phone memories to store students' important information namely: self-assessment forms, registration forms, past examination papers, class lists and personal particulars. The related study done by UNESCO (2014) revealed that ICT experts and the school heads were much responsible with the usage of ICT for the school administration issues.

The above discussion shows that the common aspects where ICT facilities was used was very important for students learning since it controls the whole process of students learning process from the preparation of the required content, deliverance, analysis and the final outcome (students' performance) as it was supported by Abdullahi (2014).The above explanations and quotation shows that inadequacy of storing devices leads to unsystematic teachers' and students' documentation.

5.3 The ICT facilities available in selected secondary schools

The findings show some schools with some ICT facilities while others without the facilities. The common facilities which were not available in some of schools were included the phone memories, mobile broadband, smart TVs, radios, tablets and satellite dishes. The study had also revealed that the availability of ICT facilities in secondary schools enabled the availability of some important services like internet, website and e-mails. The study had further found that some schools missing some ICT services such as websites, internet services. The issue on the ICT facilities available in schools was also explained by Chow (2015) who emphasized on the integration of ICT in the teaching and learning among schools regardless the technical hurdles they faced.

5.4 Integration of ICT facilities in selected secondary schools

The study shows that ICT facilities were highly integrated in classroom activities. The common facilities that were used by teachers included LCDs, TV's, computers and radios. Noor-Ul-Amin (2003) showed that the integration of ICT facilities enabled teachers in the preparation of animations, simulations and videos which made the learning very effective.

The findings further show that ICT facilities were integrated in administrative activities to enhance education achievements in schools. The administrative activities included printing, photocopying and storing of some important information. In order to facilitate the printing process ICT facilities like computers and printers were highly used. The finding aligns with ICT policy which calls for the use of ICT to improve efficiency in management and administration at all levels of education (URT 2007).

5.5 Achievements due to ICT integration in secondary schools

Among the achievements of the integration of ICT facilities in teaching and learning was the influence of learning behaviour among students. Students expressed their happiness and recommended their involvement in learning activities through ICT integration in the process of learning. The finding was similar to the 1995 ICT policy which aimed at using ICTs in schools to expand educational quality and relevance by enabling learners to acquire key competencies. Moreover, ICT was explained by Chitanana (2014) to have positive contribution in changing the teaching and learning behaviour among teachers and learners respectively.

The findings also showed teachers being interested in integration of ICT facilities in teaching and learning process. The good example is the positive teaching behaviour shown by the S2 schools which had many ICT facilities as shown in table 4.1 in chapter four. The findings was contrary to the study conducted by Badugela (2012) who showed that teachers were less motivated on the use of ICT in the teaching process due to inadequate resources and overcrowded classes.

5.6 The influence of ICT in general school performance

The findings show that from interviewed 10 head of schools on the relationship between the integration of ICT facilities and school performance. The respondents argued the use ICT facilities influenced the performance via ICT knowledge and skills possessed by school administrators, teachers and students. Ziad (2016) states that if the integration of ICT is underuse due to inadequate ICT skills and knowledge, both teachers and students will establish poor attitudes towards the use of ICT in classrooms.

5.7 Challenges hindering effective integration of ICT in teaching and learning

Unstable electric power was among the challenges of using of ICT facilities in teaching and learning process. The problem was more challenging to teachers who use school computers because most of computers in computer labs were desk tops which could not save energy when the electricity went off. It was also noted that inadequate ICT facilities was a challenge to effective integration of ICT facilities in teaching and learning. The number of ICT facilities in all schools could not accommodate the available population in a particular school. The study conducted by Malekani (2018) supports the same idea as it shows that inadequate ICT facilities contributed to the failure of some teachers to achieve the lesson objectives when integrating ICT with pedagogy.

The findings as through in-depth interview and focus group discussion showed inadequate manpower with knowledge and skills enough to use ICT facilities in teaching and learning. The argument is similar to the study conducted by Richard (2010) who contended that the numbers of teachers with ICT integration pedagogical skills in many schools were inadequate. This implies that there should be an effort of increasing manpower for the effective integration of ICT in teaching and learning in secondary schools.

Another challenge which was presented in chapter four was the high costs in buying ICT facilities and accessing internet services. For instance, the head of S2 confirmed that more than 20 projectors were needed to fulfill the desire for every teacher to use projectors; the school had only 2 projectors. The finding was similar to Mingaine (2013) who found that some schools remained with poor ICT infrastructure due to high costs for preparing the school infrastructures that support the integration of ICT.

The study also shows that majority of school timetables did not indicate the time when both teachers and learners could learn how to integrate the facilities to improve performance. There was no room for ICT learning in the time table because it was occupied by other sessions/subjects.

The study revealed that inadequate ICT skills as mentioned by respondents were among the challenges in the integration of ICT facilities in teaching and learning. Most students were struggling for skills to effectively use ICT facilities for searching material and other school activities. This finding was similar to Isaacs (2007) whose findings showed the importance of students and teachers to have specific ICT skills for effective utilization of available school resources.

5.8 Summary of the chapter

The chapter four reflected the findings as collected, observed and analyzed from the field by the researcher. The result showed that ICT integration was very important because it has influenced the teaching and learning behaviour to both teachers and students. The findings have revealed that students and teachers appreciate the roles ICT play in enhancing teaching and learning process with inclusion of administrative work. Secondary school teachers and students are much enjoying ICT in teaching and learning as they are highly motivated by the Tanzanian ICT policy which allows ICT to be a part of teaching and learning in both public and private secondary schools in Morogoro Municipal Council. The findings revealed that teachers were aware with the availability of ICT facilities and its importance in the teaching process that has made students to acquire quality education to be applied worldwide.

The researcher's personal observation from the field revealed that although teachers suffered from various challenges including inadequate ICT facilities and poor supported infrastructures, some of them even used their own devices particularly computers and smart phones in the preparation, presentation and storage of subject material for future use. The study revealed that students have been enjoying using ICT facilities computers in particular to search the relevant material to cover the taught topics and subtopics. Furthermore, students used the twenty first (21st) century skills which call for them to be creative, critical thinkers, able to solve problems and communicate effectively when they are in their classrooms.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary,, conclusion, and recommendations of the study. The chapter also highlights the theoretical implications of the study, its limitations and suggests potential areas for further researches.

6.2 Summary of the study

The study assessed the ICT integration in teaching and learning in Tanzania. It specifically sought to: assess the common aspects of teaching and learning where ICT is mostly used, assess the availability of ICT facilities in the selected secondary schools and the ICT integration in teaching and learning, assess the achievements resulted from ICT integration in teaching and learning in secondary schools and identify the challenges of integration of ICT in teaching and learning.

The study mainly employed case study design complemented by qualitative approach. The methods for data collection were in-depth interview, focus group discussion and observation. The key informants of the study were students, teachers, school administrators (head of schools, educational officers) and ADIS Project Coordinator.

6.3 Summary of the key findings

The study has been an attempt to assess the Information and Communication Technologies (ICT) integration in teaching and learning in Secondary Schools in Tanzania.

The research questions that guided this study were: what were the common aspects of teaching and learning where ICT is used in selected secondary schools?, what ICT facilities were available in selected secondary schools and how they were integrated in teaching and learning?, what achievements were the results of ICT integration in secondary schools?, what challenges hindered the effective integration of ICT in teaching and learning? The findings of the study show that ICT facilities were used

by teachers in preparation of lesson tools such as scheme of works, lesson plans, and lesson notice. It was also noted that the use of ICT higher in private schools than the government schools and this was because of inadequate ICT facilities in government schools. The ICT facilities were also useful in presentation of subject contents during teaching and learning process. It was also noted that the schools used similar ICT facilities and most common ones were flash disc, CDs, external hard disc and phone memories.

The second research question investigated on the availability of ICT facilities in selected secondary schools and the ICT integration in teaching and learning among secondary schools in Morogoro Municipality and the findings showed that there were several ICT facilities available in selected schools. Among the facilities available were categorized into three groups of preparations, presentation and storage. The common used facilities were included computers, projectors and photocopiers. It was further revealed that the higher number of ICT facilities in a school showed the higher teachers' interests in integrating ICT in teaching and learning process. The schools that did not have sufficient ICT facilities had little access to some important ICT facilities like internet, websites and e-mails. The ICT facilities was also of benefit to school administrators and education officers as they needed them for various activities such as storing or printing important official documents.

The third research question inquired on the achievements resulted from ICT integration in teaching and learning in secondary schools in Morogoro Municipality. The findings showed some achievements as result of ICT integration in teaching and learning process. Among the achievements included positive influence in teaching and learning behaviour of teachers and students as well as the general school performance. Both teachers and students showed high interests towards the use of ICT facilities teaching and learning.

The fourth research question investigated on the challenges of ICT integration in teaching and learning among selected secondary schools in Morogoro Municipality.

The findings showed that there were several challenges faced by teachers and students as a result of the integration of ICT facilities in the teaching and learning process. The challenges included unstable electricity, inadequate ICT facilities in schools, inadequate manpower from schools, high costs in running internet services, limited time in the schools timetable and overcrowded classes.

6.4 Conclusion

From the major study findings, the following conclusions have been made:

The integration of ICT facilities in teaching and learning was applied in all secondary schools in Morogoro Municipal Council whereby most of staffs were highly using ICT devices like computers, tablets and their own smart phone to prepare lessons, to present, to store students' necessary information and during the preparation of assessment tools. The study also found that in private schools the ICT integration was higher than the public schools.

The finding through observation checklist from head of schools indicates that some schools managed to have some facilities while in others there were completely no facilities. The common facilities found in schools included computers, projectors, printers, routers as well as flash disc. The facilities that could not be found in schools included phone memories, mobile broadband, smart TVs, radios, tablets and satellite dishes. The study showed several achievements of a result of ICT integration which included positive attitudes from teachers and students over ICT, the improvement of school and students' performance as S2 had acknowledged the ADSI program which contributed to the increase of number of teachers entering classes with ICT facilities making the classes more interactive than before.

The findings revealed that the efforts for integrating ICT facilities among teachers, students and school managements were hindered by several challenges such as inadequate ICT facilities among schools, unstable electric power, high costs for running internet services, indiscipline among students, and inadequate ICT

knowledge and skills. Despite the challenges some teachers were found using their personal laptops for preparation of materials for their classes.

6.5 Implication of the findings

6.5.1 Theoretical implication

The theories used in this study are the constructivism theory which was developed by Jean Piaget and the goal setting theory by Locke 1960s which needed an individual person or organization to set a clear goal which would lead to actual performance. The theory added that even though the goal could be challenging in towards the end results, a person should have commitments and accept the planned strategies employed to get the expected feedback.

The implication of the goal setting theory in this study was that the selected schools had put forward the teaching and learning process as their individual and organization goal to be focused on by all members within their schools. The theory has emphasized on the availability of supportive material to meet the clear goal. This was also shown in the study when some schools had made a great effort for buying many ICT facilities, though in other schools, it was not possible. The facilities bought were not only used by teachers and students but with the school management for storage of important official information.

The theories also encourage individuals and organizations to cope with the challenging situation in finding better results for their planed goal. This was also clearly seen from the study when some respondents (teachers and students) faced some challenges such as inadequate ICT facilities as well as inadequate ICT skills and knowledge to be integrated with teaching pedagogy. Though the challenge was high but they always tried to use the technology to improve their teaching and learning process.

Finally the theories emphasized on reaching the planned goal. The idea was similar to what happened in the study whereby some schools had acknowledged performing better due to the integration of ICT in teaching and learning. This implies that the

objective of applying new technology in education to improve performance has been highly achieved.

6.5.2 Policy implication

The study employed the ICT policy of 2007 which aimed at improving and providing quality education to all Tanzanian secondary school students. The policy was focused to the ICT usage in schools being a powerful tool in achieving the curriculum goals. However, the findings of this study revealed some weaknesses of the 2007 ICT policy which did not show a clear policy statement(s) on the following area;

- (i) The policy did not put clear explanations on who will be responsible for providing ICT facilities in schools? (Parents, teachers, the school managements or the government?
- (ii) What modes should be used in enhancing teachers and students to be aware on the proper application of ICT?
- (iii) Who could be responsible for covering costs associated with ICT services to enable teachers and students acquire free online materials?
- (iv) For how long would the ICT integration have reached to all secondary schools in Tanzanian mainland to improve the school and students performance?

The following should be done to improve the mentioned weaknesses of the 2007 ICT policy;

- a) The government should create clear source of income which could help schools to buy the required teaching and learning ICT facilities for effective implementation rather than relying on private projects like ADIS.
- b) The government should provide an official training for teachers and students on how to employ ICT facilities in their classrooms.
- c) The costs to cover some ICT services like internet bundles should be provided to school administrators

- d) The government through its policy should put a time bound/ specific time frame which shows the exactly period in which ICT would be spread all over the country.

6.6 Limitation of the study

The researcher encountered some limitations in the course of data collection; some of them were respondents reluctance in filling in the questionnaire on time, the researcher had to go to some schools more than once to pick up the questionnaires. This was a problem because some schools were very far from the researcher's residence. In the interview sessions some teachers were refusing to be interviewed, so the researcher had to use much time convincing the respondents to accept the interview. Some respondents were not confident enough to accept being recorded in interview sessions, therefore, the researcher had to use much of his time to write what has been said by the interviewees. Despite these challenges or rather limitations, the researcher managed to collect sufficient and reliable data for this study.

There were cases of hearing impairments. But this limitation was solved as other respondents were there to provide data for the study. Another limitation was the different between the data provided by some school administrators and the actual observations. Here the researcher opted to use the observation check lists.

6.7 Recommendations of the study

6.7.1 Recommendations for the government

The recommends to the government for effective ICT integration in secondary schools:

- (i) The government should reduce the running costs of the electricity bills to the institutions like schools. Besides the government can also implement the solar electricity for solving the problem of electricity cutoff during classroom lesson presentation.
- (ii) The government should increase the number of ICT devices like computers, tablets, laptops, projectors, routers and whiteboards to suit the number of teachers and students. It should also put more efforts on building better

infrastructure particularly classes, satellite dishes and electricity in all schools to effectively support the use of ICT facilities during the teaching and learning process.

- (iii) The government has to allocate special source of income to monthly capitation grant for provision of internet bundles to government secondary schools even once in a term to support effective ICT integration to administrators, teachers and learners for enhancement of quality education. The government should provide in schools well equipped ICT facilities like big whiteboards, quality projectors to support all students including the sight impaired students to see all the displayed material, pictures, video clips, animation and other subject relevant material. By so doing the ICT integration in teaching and learning could be easily achieved.

6.7.2 Recommendations for teachers and school administrators

Teaching process should be controlled and directed through a well-designed directives and seculars to support the use of ICT facilities for all teachers and school administrators towards the effective learning related to the current curriculum in use for secondary schools in Tanzania.

6.7.3 Recommendations for further studies

The study assessed the ICT integration in teaching and learning in Tanzania, a case of selected secondary schools in Morogoro municipality, specifically assessed the common aspects of teaching and learning where ICT is mostly used, the availability of ICT facilities in the selected secondary schools and the ICT integration in teaching and learning, the achievements that resulted from ICT integration in teaching and learning in secondary schools, and identify the challenges of ICT integration in teaching and learning process. Further studies may be on effectiveness of teaching techniques in the integration of ICT to suit the curriculum content and the effectiveness of integrating ICT facilities to students with short sighted impairments.

REFERENCES

- Abdullahi, H. (2014). The role of ICT in teaching science education schools. *International letters of social and humanistic science*, 8(2), 217-223.
- Afshari, M., Bakar, K. A., Luan, W.S., Samah B. A., & Fooi, F. S. (2009). *Factors affecting teachers' use of Information and Communication Technology*, 2(1). 77-104.
- Alkahtani, A. (2017). The challenges facing the integration of ICT in teaching in Saudi Arabia secondary schools. *International Journal of Education and Development using ICT*, 13(1), 13-28.
- Al-Sulaimani, A. (2010). The importance of teachers in integrating ICT into science teaching in intermediate schools in Saudi Arabia. A mixed methods study. Unpublished Doctoral dissertation, RMIT University.
- Asafe, N. Y., Igbanugo C. I., & Kenneth, O. (2016). Spillover effect of US unconventional monetary policy on Nigerian economy. *International Journal of Research in Management, Economics and Commerce*, 6(5), 113-266.
- Aslan, A., & Zhu, C. (2016). Influencing factors and integration of ICT into teaching practices of pre-service and starting teachers. *International Journal of Research in Education and Science*, 2(2), 359-370.
- Badugela, M. T. (2012). Problems facing educators in implementing the national curriculum statement: The case Of Tshifhena secondary school, Vhembe District, Limpopo Province, South Africa. Unpublished MEd dissertation. Pretoria: University of South Africa.
- Bagenda, P. (2010). The role of Information and Communication Technology on market performance of Bank: The case of Barclays Bank Tanzania. Unpublished Master dissertation, Mzumbe University.

- Bahadur, G. K., & Oogarah, D. (2013). Interactive whiteboard for primary schools in Mauritius: An effective tool or just another trend. *International Journal of Education and Development using ICT*, 9(1), 19–35.
- Barron, A. B., Eileen, A. H., Thomas, A. C., Courtney, L. F., Mark, E. H., & Jeffrey, R. S. (2015). Embracing multiple definitions of learning. *Trends in neurosciences*, 38(7), 405-407.
- Berg, B. L., & Lune, H. (2009). *Qualitative research method for the social science* (3rd ed). Boston, MA: Allyn & Bacon.
- Bhat, S. A., Hassan, T., Majid, S., Ashraf, R., & Kuchy, S. (2017). Environmental pollution as causative agent for cancer-A review. *Cancer clinical research report*, 1(1), 03-19.
- Bloor, M., Frankland, J., Thomas, M., & Robson, K. (2001). Focus groups in social research. *In forum qualitative sozialforschung/forum: Qualitative social research*, 3(4), 143-206.
- Brandstrom, C. (2011). *Using the internet in education-strengths and weaknesses: A qualitative study of teachers' opinions on the use of internet in planning and instructions*. France: Hogskolan.
- Brett, E. A. (2003). Participation and accountability in development management. *Journal of Development Studies*, 40(2), 1-29.
- Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *Journal of Education and Development using ICT*, 8(1), 179-293.
- Charles, B.A., & Isifu, Y. (2015). Innovation in education: Students' perceptions of implementing ICT in learning in second-cycle institutions in Ghana. *Procedia-social and behavioral sciences*, 197(4), 1512-1519.

- Chow, P. (2015). *Teacher's attitudes towards technology in the classroom*. U.S: PKP Publishing Services Network.
- Cohen, L. S. & Manion, L. (2007). Experiments, quasi-experiments, single-case research and meta-analysis. *Research methods in education* (6th ed). London: Routledge.
- Cole, M. A. (2004). Trade, the pollution haven hypothesis and the environmental Kuznets curve: examining the linkages. *Ecological economics*, 48(1), 71-81.
- Creswell, J. W., & Creswell, J. D. (2014). *Research design: Qualitative, quantitative, and mixed method approaches*, (4th ed), London: SAGE Publications.
- Denscombe, M. (2007). *The good research guide: for small-scale social research projects*. Maidenhead, UK: Open University Press.
- Enayat, T., Modanlo, Y., & Kazemi, F. (2012). Teachers attitudes towards the use of technology in education. *Journal of Basic and Applied Research*, 2(11), 10958-10963.
- Finger, F., & Krenn, E. (2007). Three metamorphic monazite generations in a high pressure rock from the Bohemian Massif and the potentially important role of apatite in stimulating polyphase monazite growth along a PT loop. *Lithos* 95, 1(2), 103–115.
- Flick, U. (2013). *The SAGE handbook of Qualitative data analysis*. India: New Delhi International (P) Limited.
- Galabawa, C. J. (1990). *Implementing educational policies in Tanzania (English)*. World Bank discussion paper's No. 86. African technical department series. Washington, D.C: The World Bank.

- Gebremedhin, M., & Fenta, A. (2015). Assessing teachers' perception on integrating ICT in teaching learning process: The case of Adwa College. *Journal of Education and Practice*, 6(4). 114-124.
- Gulbahar, Y., & Guven, I. (2008). A survey on ICT usage and the perceptions of social studies teachers in Turkey. *Journal of Educational Technology & Society*, 11(3). 37-51.
- Hammond, M. (2014). Introducing ICT in schools in England: Rationale and consequences. *British Journal of Educational Technology*, 45(2). 191-20.
- Hennessy, S., Onguko, B., Harrison, D., Ang'ondi, E. K., Namalefe, S., Naseem, A., & Wamakote, L. (2010). Developing the use of Information and Communication Technology to enhance teaching and learning in East African schools: Review of the literature. *Centre for Commonwealth Education & Aga Khan University Institute for Educational Development—Eastern Africa Research Report*, 1.
- Hjalrmasson, H., & Amneslarar programmet. (2014). *The effects of ICT on effective factors and teaching practices in the EFL and ESL classroom*. Hogskolan.
- Imon, M. (2017). ICT integration in secondary education in Bangladesh: A study of policy and practice. Unpublished Master dissertation. Retrived on 4/72020 from: <http://www.duo.uio.no>.
- Isaacs, S. (2007). *Survey of ICT in education in Botswana*. Washington, DC: Information Development World Bank.
- Ivy, D. K., & Backlund, P. (2004). *Gender speak: Personal effectiveness in gender communication (3rd ed)*. New York: McGraw Hill Humanities/Social Sciences/Languages.
- Jones, M. A. (2003). The use and abuse of PowerPoint in teaching and learning in the life sciences: A personal overview. *Bioscience education*, 2(1), 1-13.

- Kabir, S. M. (2016). Use of quantitative molecular diagnostic methods to identify causes of diarrhea in children: a reanalysis of the GEMS case-control study. *The Lancet*, 388(10051), 1291-1301.
- Kafyulilo, A., & Keengwe, J. (2013). Teachers' perspectives on their use of ICT in teaching and learning: A case study. *Education and Information Technologies*, 19(4). 913-923.
- Kamba, M. A. (2009). The changing role of researchers in Nigeria: The Internet as an alternative future to modernity: *Library philosophy and practice*. Retrived on 12/4/2020 from: <http://unllib.unl.edu/LPP/kamba.htm>.
- Kavisha, T. K. (2016). Implementation of learner centered methods within the constraints of shortage of instructional resources and facilities: A case of Itigi District Council. Unpublished Doctoral dissertation, Mzumbe University Morogoro.
- Kayombo, J., & Mlyakado, B. (2015). The paradox of ICT integration in secondary education in Tanzania: Assessment of teachers' ICT knowledge and skills in Tanga and Mwanza regions. *International Journal of Research Studies in Educational Technology*, 5(1), 17-27.
- Kenna, D. C. (2014). A study of the effect flipped classroom model on student self efficacy. Published Doctoral dissertation, North Dakota: State University.
- Khalid, A., Maliha, Z., Sydney D. F., Julia, K. B., Neeraj, K., Nuzhat, A., William, R. B., Steven, A. E., Robert H. H., & Kevin M. (2009). Pancreatic cyst fluid DNA analysis in evaluating pancreatic cysts: a report of the PANDA study. *Gastrointestinal endoscopy*, 69(6), 1095-1102.
- Kothari, C.R. (2004). *Research methodology: methods and techniques* (2nd ed). New Delhi: New Age International (P) Limited.

- Kothari, S. P., Ramanna, K., & Skinner, D. J. (2010). Implications for GAAP from an analysis of positive research in accounting. *Journal of Accounting and Economics*, 50(2-3), 246-286.
- Lari, S. F. (2014). The impact of using PowerPoint presentations on students' learning and motivation in Secondary Schools. *Procedia-social and behavioral sciences*, 98(3), 1672-1677.
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American psychologist*, 57(9), 705-714.
- Lwoga, E. T. (2010). Bridging agricultural knowledge and information divide: The case of selected telecasters and rural radio in Tanzania. *The Electronic Journal of Information Systems in developing countries*, 43(1), 1-14.
- Machumu, H., Rabieli, A., & Almasi, M. (2018). ICT as a pedagogical tool in secondary schools teaching and learning: Policy and practices interplays. *EdMedia + Innovative Learning*, 8(4), 1827-1832.
- Mahdi, S. H., & Al-Dera S. A. (2013). The impact of teachers' age, gender and experience on the use of Information and Communication Technology in EFL Teaching. *English Language Teaching*, 6(6), 57-67.
- Maina J. M. (2011). *Integration of Information Communication and Technology in teaching English in secondary schools*. Kenya: Kirinyaga Country.
- Majumdar, S. (2006). Of diamond and desires: Understanding conspicuous consumption from a contemporary marketing perspective: *Academic Marketing Review*, 2006. 1.
- Malekani, A. A. (2018). Access to use and challenges of ICTs in secondary schools in Tanzania: a study of selected secondary schools in Morogoro Municipality. *Journal of Information and Knowledge Management*, 9(2), 44-57.

- Mann, S. A. (2014). *Science teachers' experiences in integrating Information and Communication Technology (ICT) into their teaching practices*. Ontario: Institute for Studies in Education of the University of Toronto.
- Masue, S. O. (2010). *Empowerment and effectiveness of school committees in Tanzania*. Master dissertation. Bergen: Norway.
- Mathevula, D. M., & Uwizeyimana E. D. (2014), The challenges facing the integration of ICT in teaching and learning activities in South African rural secondary schools. *Mediterranean Journal of Social Sciences*, 5(20), 1087-1087.
- McKeachie, W. J., Lopez, E., & Svinicki, M. D. (2010). McKeachie's teaching tips: strategies, research, and theory for College and University teachers. *The Review of Higher Education*, 27(2), 283-284.
- Meenakshi, S. (2013). Importance of ICT in education: *Journal of Research and Method in Education (IOSR-JRME)*, 1(4), 3-8.
- Miima, F., Ondigi, S., & Mavisi, R. (2013). Teachers perception about integration of ICT inteaching and learning of Kiswahili language in secondary schools in Kenya: *International Journal of Arts and Commerce*, 2(3), 27-31.
- Mikre, F. (2011). The roles of Information Communication Technologies in education: Review article with emphasis to computer and internet. *Ethiopian Journal of Education and Sciences*, 6(2). 109-126.
- Mingaine, L. (2013). Leadership challenges in the implementation of ICT in public secondary schools, Kenya. *Journal of education and learning*, 2(1). 32-43.
- Mishra, P., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.

- Monela, C. G. (2014). *Information and Communication Technology Policy*, Morogoro: SUA.
- Morgan, D. L. (1996). *Focus groups as qualitative research*. Los Angeles: SAGE Publications.
- Msabila, D.T., & Nalaila S.G. (2013). *Proposal and dissertation writing: Principles and practice*. Tanzania: Nyambari Nyangwine Publishers.
- Murati, R. P., & Ceka, A. (2017). The use of technology in educational teaching. *Journal of Education and Practice*, 8(6), 197-199.
- Muriithi, M. M. (2017). Influence of teachers instructional supervision strategies on curriculum implementation in public primary schools in Imenti South District, Kenya. Unpublished Doctoral dissertation, University of Nairobi.
- Mwalongo, A. I. (2011). Teacher's perceptions about ICT for teaching, professional development, administration and personal use. *International Journal of Education and Development using ICT*, 7(3), 36-49.
- Mwangi, A., & Karsenti, T. (2009). Kenya report. in (Ed.): *The Pan African research agenda on the pedagogical integration of Information and Communications Technologies*: Phase 1 National Report. Ottawa: IDCR.
- Mwendwa, N.K. (2016). *Availability of resource materials and facilities for ICT integration in the public primary school curriculum in kitui*. Kenya: Middle East Publishers.
- Ndibalema, P. (2014). Teacher's attitudes towards the use of Information Communication Technology (ICT) as a pedagogical tool in secondary schools in Tanzania: The case of Kondoa District. *International Journal of Education and Research*, 2(2), 1-16.

- Ngeze, L. V. (2017). *ICT integration in teaching and learning in secondary schools in Tanzania: Readiness and way forward. International Journal of Information and Education Technology*, 7(6), 102-123.
- Noor- Ul- Amin, S. (2013). An effective use of ICT for education and learning by drawing on worldwide knowledge, research, and experience. *ICT as a change agent for education*, 8(4), 1-13.
- Nwigbo, S., & Madhu B. K (2016). Impact on the ICT teaching and learning process, *Journal of mobile computing and application (IOSR-JIMCA)*, 3(2), 1-7.
- Onwuegbuzie, A. J., Dickinson, W. B., Leech, N. L., & Zoran, A. G. (2010). A qualitative framework for collecting and analyzing data in focus group research. *International Journal of Qualitative Methods*, 8(3), 1-21.
- Pale, P. (2005). *Objectives to integration of ICT use in primary education, information and intelligent systems*. Varazdin: Sage Publications.
- Panen, P. (2014). *Integrating technology in teaching and learning Mathematics*. Indonesia: Ministry of Education and Culture.
- Qasem, A. A., & Viswanathappa, G. (2016). Teacher perceptions towards ICT integration: Professional development through blended learning. *Journal of Information Technology Education: Research*, 15(3), 561-575.
- Roblyer, M. D. (2006). Virtually successful: Defeating the dropout problem through online school programs. *Phi Delta Kappan*, 88(1). 30-35.
- Salehi.H. & Aleh, Z. (2012). *Challenges for using ICT in education: Teachers' insights*. Iran: Islamic Azad University.
- Sharma, A., Gandhar, K., & Sharma, S. (2011). Role of ICT in the process of teaching and learning: *Journal of Education and Practice*, 2(5), 1-6.
- Siddiqui, A., & Salim, Z. (2017). *The ICT facilities, skills, usage and the problem faced by students of high education*. Pakistani: Lahore.

- Smeets, E. (2005). Does ICT contribute to powerful learning environments in primary education? *Computers and education*, 44(3), 343-355.
- Taherdoost, H. (2016). *Sampling method in research methodology: How to choose a sampling technique for research*. Switzerland: State University.
- Tanver, A. (2010). *Integration of ICT in curriculum: Expected achievements and challenges*. Pakistani: Lahore.
- UNESCO, (2014). *Education strategy 2014-2021*. France: Paris.
- URT, (2007). *Information and Communication Technology Policy for Basic Education*. Dar es Salaam: Ministry of Education and Vocational Training.
- Warnick, K. B., & Thompson, W. G. (2017). Barriers, support, and collaboration: A comparison of science and agriculture teachers' perceptions regarding integration of science into the agricultural education curriculum. *Journal of Agricultural Education*, 48(1), 75-85.
- Zandvliet, D. B. (1999). The physical and psychological environment associated with classroom using new information technologies: A cross-national study. Unpublished Doctoral Dissertation, Curtin University of Technology.
- Zyad, H. (2016). Integrating computers in the classroom: Barriers and teachers' attitudes. *International Journal of Instruction*, 9(1), 65-78.

APPENDICES

Appendix 1: Interview guide for Education Officers

MZUMBE UNIVERSITY

OBSERVATION CHECKLIST

Gender _____

Education level _____

Position _____

Part A

1	Equipments	Provision of computers in secondary Schools	
		Provision of projectors in secondary schools	
		Provision of sound devices in secondary schools	
		Provision of flip charts in secondary schools	
		Provision of modern in secondary schools	
		Provision of printers in secondary schools	
		Provision of scanners in secondary schools	
		Provision of tablets in secondary schools	
		Provision of satellite dishes in secondary schools	
		Provision of routers in secondary schools	
		Provision of radios in secondary schools	
2	School Environment	Supporting availability of electricity in schools	
		Supporting wiring services in schools	
		Initiation of computer lab in secondary schools	
3	Pedagogical skills	Provision of ICT training for secondary school teachers	
		Monitoring of ICT use in secondary schools	
4	Education Policy/Seculars Vs ICT integration	Directions on integrating ICT in curriculum Content	
		Recommendations on ICT integration in schools curriculum	
		If the policy mentioned stakeholders who should provide ICT equipments in secondary schools	
		If the integration of ICT fulfill the current educational policy objectives.	

Part B

In your opinion, what should be done to improve the use of ICT in secondary schools?

Appendix 2: Interview guide for School Administrators

MZUMBE UNIVERSITY

INTERVIEW GUIDE FOR SCHOOL ADMINISTRATORS

Section A: Personal Information

1. Working station _____
2. Education Level _____
3. Number of ICT teachers in your school _____
4. Number of students in your school _____
5. Average number of students in each stream/class

Section B: The Achievements for integrating ICT in teaching and learning

What achievements do think have been obtained by school stakeholders due to the integration of ICT in teaching and learning?

(a) The achievements by Heads of schools

(i) Which of the items in the checklist of ICT facilities is available in your school?

s/n	Equipments	
1	White board	
2	Scanners	
3	External hard disc	
4	Computers	
5	Flash disks	
6	CDs	
7	Phones' memory	
8	Printers	
9	Mobile Broadband	
10	Smart TV's	
11	Radios	
12	LCDs (Projectors)	
13	Tablets	
14	Satellite dishes	
15	Routers	
16	Loud speakers	

(ii) Which of the following supportive ICT services are available in your school?

1	Internet services	
2	Electricity	
3	Website	
4	E-mail	

(iii) What installation equipment(s) do you use to keep the school information?

(iv) What are the specific school information stored in the abovementioned ICT devices?

Which devices are mostly used for official communication in your school?

(v) Which official information is communicated through the use of ICT devices in your school?

(vi) To whom does the official information is always sent?

(b) What are the added values that your school gains from the ICT integration of?

(i) _____

(ii) _____

(iii) _____

Section C: Challenges hindering effective integration of ICT in teaching and learning.

(a) What are the internal school challenges that hinder the ICT implementation process?

(c) What are the external challenges hindering the integration of ICT in teaching and learning.

(d) How does your current school environment favor the integration of ICT in classrooms situations?

(i) _____

(ii) _____

(iii) _____

Appendix 3: Interview guide for Teachers

MZUMBE UNIVERSITY

INTERVIEW GUIDE FOR TEACHERS

Section A: Personal Information

1. Working station _____
2. Education Level _____
3. Number of students in your school _____
4. Number of periods that ICT is integrated per week in single stream _____
5. Number of classes/streams you teach _____
6. The ICT training attended in past three years

7. Do you own your own computer? _____

Section B: The strategies for integrating ICT in curriculum contents in your subject content

(Speak whether the statement is TRUE or FALSE)

SN	Statement	True/False
(i)	The strategies used by ICT teachers in presenting curriculum content differ from that used by non ICT teachers.	
(ii)	Resources used by ICT teachers to prepare the lesson are the same to those used by non ICT teachers.	
(iii)	The administrative supports given to ICT teachers in preparation of teaching media are the same to those given to non ICT teachers.	
(iv)	The knowledge and skills used by both ICT and non ICT teachers in preparation of teaching aids are the same.	

Section C: The common aspects of teaching and learning where ICT is used in selected secondary schools.

(v) What aspects of teaching are used in preparation of ICT teaching and learning materials?

1.
2.
3.
4.

(vi) What aspects of teaching and learning are used for delivering subject content through ICT facilities?

1.
2.
3.

Section D: The Achievements due to the use of ICT in teaching

(i) Which ICT facilities do you mostly use for preparation of your lesson?

(ii) Which lesson tools do you mostly prepare by using ICT facilities mentioned above?

(iii) Which ICT facilities do you mostly use for classroom lesson presentation?

(iv) Which ICT facilities do you mostly use for storage of subject information?

(v) What subject information can you remember that was gained as result of the use of ICT facilities available in schools?

(vi) How do you secure subject information (typed exams and tests) stored in ICT facilities?

(vii) What are other achievements that you have gained due to the integration of ICT in teaching and learning process at your school?

(viii) Mention some challenges you mostly experience due to ICT integration in teaching and learning.

Appendix 4: Interview guide for students

MZUMBE UNIVERSITY

INTERVIEW GUIDE FOR STUDENTS

Section A: Personal Information

1. School _____
2. Class _____
3. Number of students in your class _____
4. Number of ICT periods used per week in your class _____
5. Number of teachers who use computers during the lesson _____
6. Does your parent own a computer? _____ if yes, do you have a chance to access learning material through it?

Section B: The strategies, participation and technological environment for integrating ICT

- 1) What is your attitude towards teachers who use ICT in presenting subject contents?
 - a) Good
 - b) Bad
 - c) Average

☐
- 2) What is your suggestion on the methods used by teachers in integrating ICT in subject content during the lesson?
 - a) Good
 - b) Bad
 - c) Average

☐

- 3) What level of participation can tell during the lesson when a teacher uses ICT in teaching subject content?
- a) High
b) Low
c) Average
- 4) What is your interest to the subjects whose teachers integrate ICT?
- a) High
b) Low
c) Average
- 5) Does your teachers' integration of ICT in curriculum content contribute to the increase of your performance?
- a) Yes
b) No
- 6) Mention the challenges you face in your classroom when a teacher is integrating ICT?
- a) _____
b) _____
c) _____

Section C: The achievements by Secondary School Students

- (i) Do ICT facilities increase your understanding of subject content?
- _____
- (ii) Which ICT facilities do you mostly use in learning at school?
- _____

- (iii) Which ICT facilities do you mostly use in learning at home?
- _____

- (iv) How do you use ICT facilities for learning purpose?
- _____

Appendix 5: Focused Group Discussion for Students

MZUMBE UNIVERSITY

FOCUSSED GROUP DISCUSSION FOR STUDENTS

Name of School

District

Number of participantsmales.....females.....

Level of education/class

1. What do you understand by the term ICT?

.....
.....
.....

2. How do subject teachers guide you in searching online materials to facilitate your understanding for the subject material?

.....
.....
.....
.....

3. What challenges do you face when using ICT in learning?

.....
.....
.....
.....

4. How is ICT used by teachers to influence your learning process?

.....
.....
.....

Appendix 6: Characters' Identities

S/N	Characters	Explanations
1	S1	Represent the first school visited by the researcher
2	S2	Represent the second school visited by the researcher
3	S3	Represent the third school visited by the researcher
4	S4	Represent the fourth school visited by the researcher
5	S5	Represent the fifth school visited by the researcher
6	S6	Represent the sixth school visited by the researcher
7	S7	Represent the seventh school visited by the researcher
8	S8	Represent the eighth school visited by the researcher
9	S9	Represent the ninth school visited by the researcher
10	S10	Represent the tenth school visited by the researcher
11	H1	The head of school from the first school investigated
12	H2	The head of school from the second school investigated
13	H3	The head of school from the third school investigated
14	H4	The head of school from the forth school investigated
15	H5	The head of school from the fifth school investigated
16	H6	The head of school from the sixth school investigated
17	H7	The head of school from the seventh school investigated
18	H8	The head of school from the eighth school investigated
19	H9	The head of school from the ninth school investigated
20	H10	The head of school from the tenth school investigated
21	S1T1	The first teacher from the first school investigated
22	S1T2	The second teacher from the first school investigated
23	S1T3	The third teacher from the first school investigated
24	S1S1	The first student from the first school investigated
25	S1S2	The second student from the first school investigated
26	S1S3	The third student from the first school investigated
27	REO	The Regional Education Officer investigated
28	DEO	The District Education Officer investigated
29	RAC	The Regional Program Coordinator investigated