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Factors Influencing the Implementation of Information Communication Technology Projects In public Secondary Schools in Jimma Town

A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Degree of Masters of Art in Project Management and Finance (MAPMF)

BY:

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MA IN PROJECT MANAGEMENT AND FINANCE PROGRAM

JULAY 25, 2020

JIMMA, ETHIOPIA

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DECLARATION

I hereby declare that this thesis entitled "*Factors Influencing the Implementation of Information Communication Technology Projects In public Secondary Schools in Jimma Town*", has been carried out by me under the guidance and supervision of Eshetu Yadecha(Assistant professor) And Weizero Gelila Eshetu .

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

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Certificate

This is to certify that the thesis entitles "Factors Influencing the Implementation of Information Communication Technology Projects In public Secondary Schools in Jimma Town", submitted to Jimma University for the award of the Degree of Master Of Art In Project Management And Finance and is a record of bonfire research work carried out by Mr. Arifa Abdela Jarra, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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ABSTRACT

The integration ICT projects in schools have the capacity to enhance the learning process and facilitate communications within education institutions and between educators and learners. However, although schools have had computers for almost two decades and some with ICT projects underway, ways to use and implement them effectively have evolved slowly and patchily. Research has revealed that projects involving ICT use and integration in the Jimma town secondary schools have both internal and external challenging factors leading to weak implementation of these ICT projects. The study was done in secondary schools in Jimma town Ethiopia. The purpose of the study was to establish the factors influencing the Implementation of Information Communication Technology (ICT) in public secondary schools in Jimma town. This study was adopted the descriptive research design to establish the factors that influence the implementation of ICT projects in secondary schools in Jimma town. Six secondary schools made up the target population. All of schools of the total population were used in the study. Census was used to allow full participation of the schools. There are 299 teachers in secondary schools that made up the target population. 90 teachers were randomly sampled in each sample school to fill the questionnaire. Three principals were interviewed to represent each category of schools. Questionnaires, observation schedule and interview enabled the researcher collect data. The data collected was analyzed using statistical package for social sciences (SPSS). Descriptive statistics was used to present the results of the study and the general trends; this involved tabulating and describing data. In generally, the study found that unavailability and inappropriate ICT infrastructures, Lack of sufficient finances, school having no ICT policy, and Limited ICT knowledge and skills. Therefore, to solve this limitation, the government should collaborate with private sector and other stakeholders in the process of implementing ICT project in schools. In addition, schools management should allocate funds for repair and maintenance of the available ICT tools in schools and Schools should review their strategic plans to include ICT policies with clear goals and objectives.

***Keywords**: ICT Implementation; ICT Infrastructure; ICT project; Schools' Visions; Teachers' skills, Public Secondary Schools*

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ACRONYMS AND ABBREVIATIONS

DSA: Development Strategy Agency

EEDR: Ethiopian Education Development Roadmap

EICTDA: Ethiopian ICT Development Authority

ESAA: Education Statistics Annual Abstract

ESDP: Education Sector Development Program

EthERNet: Ethiopian Education and Research Network

EtHERNEt: Ethiopian Higher Education and Research Network

HIV: Human Immunity Virus

ICT: Information and Communication Technology

ICT4D: Information and Communication Technology for development

IDI: International Development index

ITU: International Telecommunications Union

LDCs: Less Developed Countries

MCIT: Ministry of Communication and Information Technology

NCA: Normative Continuous Assessments

NICTPS: National Information and Communication Technology policy and strategy

NGOs: Non-Government Organizations

PKI: Public Key Infrastructure

SPSS: Statistical Package for Social Scientists

STEM: Science, Engineering and Mathematics

STI: Science, Technology and Innovation

UNESCO: The United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

1. INTRODUCTION

This chapter provides information on historical background of trends of ICT application in Education, ICT project in Ethiopia and the motivation to do the research on Factors Influencing the Implementation of Information Communication Technology Projects In public Secondary Schools in Jimma Town, statement of the problem, research questions and other related introductory issues.

1.1 Background of the Study

ICTs stand for information and communication technologies and are defined, for the purposes of this primer, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony (Dr phiri W, 2016). It consists of the hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information i.e.; voices, data, text, images as well as related services (KaushlendraPathak, 2018). An ICT tool includes computers, the Internet, and electronic delivery systems such as radios, televisions, and projectors among others, and is widely used in today's education field.

Education is a powerful instrument that unlocks the door to prosperity of a nation. Information and communication technologies (ICTs) are among the main enabling tools of modern civilization. These days, it is an integral part of our lives. Globally, the economy needs ICT infrastructure for its activities such as the facilitation of trade and commerce. In addition to that, human welfare and poverty eradication programs need proper ICT to enable several humanitarian efforts (Sasmita.M.2019, p.1). Correspondingly, the role of ICT in schools is increasing. All the same, with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and

develop in the 21st century. The adoption and use of ICTs in education have a positive impact on teaching, learning, and research. ICT can affect the delivery of education and enable wider access to the same (Syed Noor-Ul-Amin 2013, p.43).

In additionally, KaushlendraPathak (2018) argues that in the context of educational institutions ICT has a major impact on teaching, learning, research and management. During last twenty years, many educational institutions have heavily invested across the globe on ICT Application and its infrastructure development. Therefore, in the modern world, thanks to ICT, we are faced with a new civilization based on which we can integrate our learning and teaching procedures while respecting cultural issues and objectives as well as approaches. Thus, attain new forms acknowledge production in more innovative forms by placing learners and instructors in the face of a large part of empowerment, innovations and upgraded information along using limited classroom times optimally (Jamalahdin, M, Sayed, A. Pari, S, Maryam, B. 2017).

The development of ICTs in developed and developing countries are different. The nature of infrastructure, connectivity, human resource and organization made a difference between the developed countries and developing countries. On the other hand, the developing countries are taking steps to narrow these digital gaps. Most of the developed countries in their ICT policies focus on the development of infrastructure, training, and cooperation with various parties, and develop clear educational policies translated into action. In Singapore, the results of the country's ICT master plan show great achievement, which include students' computer ratio of 4:1 in secondary schools (Twinomujuni, 2011). The development of ICTs in North America and Europe is different from Asia, Latin America and Africa. The best examples to our experience are those in South East Asia and our African counterparts. Asian country gives great attention to information communication technology to inculcate among students the importance of lifelong learning, that is, constantly seek new information to think critically and to take initiative has become ever more pressing in our fast changing world. Countries in Asia and the Pacific have responding to challenges in different forms and at varying levels to enable their people to adapt to change, inspire creativity and innovation,

and enhance their ability to apply knowledge& skill to solve emerging problems with confidence.

When we come to Africa ICT distribution and application is also not uniform. There is a great deal of variance in ICT policies in education among the African countries. However, South Africa is better in this case, which clearly unique in terms of being able to move its ICT agenda forward through establishing school Set (South Africa School Net, 2013). Besides, to South Africa some of North Africa countries, which have both resources (software & hardware) and high bandwidth connectivity with Europe, have also been able to make excellent progress in integrating and implementing the information communication technology in their educational plans. In east Africa, access to ICTs in schools is commonly associated with having computer labs, which are often single rooms with between 1 and 20 networked computers, although some are standalone PCs (Farrell, 2007,cited by Sara H, and Brown O. 2010). According to survey of Hare, (2007) found that only 40% of schools in Ethiopia having computers, this may be a discouraging task. Moreover, of the schools that do have computers, most of them are in Addis Ababa.

The Educational sector development program (ESDP-III, IV and V) in Ethiopia emphasize on the integration of information communication Technology in the curriculum by deploying infrastructures, connectivity, human resource and organization in to education to support country's education system with technology in order to bring quality education.

In view of this, Information Communication Technology infrastructures, connectivity, human resource and organization are provided to secondary schools to receive educational satellite plasma transmission broad casted from one center to enhance quality education since 2004. Although the program lasted for more than fourteen (14) years, there is a disparity between the objectives it intended to address and what the program practically providing (Berhanu, 2013).

According to The national information and communication technology policy and strategy (2009, p.14) the Government acknowledges education and training as the

cornerstone of social progress and economic development. Thus, the human resource development should be supported and accelerated by applying ICT. ICT facilitates the development of education and enables both individuals and countries to meet the challenges presented by the knowledge and information age. As the vast majority of Ethiopian population lives in remote areas and gets low quality of education, ICT is crucial in addressing access and quality of education. Due to ICT's importance in the society and possibly in the future of education, identifying the possible obstacles and enablers to integration of these ICT projects in schools would be an important step in improving the quality of teaching, learning and management (Tezci, E. 2011 cited in Rechard 2014).

Currently, Ethiopia has achieved some growth and development in the ICT sector over the last couple of decades. As of 2018, fifty-four million people use cell phones in Ethiopia. However, it is still far behind several African countries. It is one the countries with very low Internet penetration. Every year, the International Telecommunications Union (ITU) analyzes the growth and development of ICT services across the world. Based on this analysis, they rank the ICT services of the countries. This is quantified as ICT development index (IDI). In terms of IDI, Ethiopia is ranked at 170 out of total 176 countries for which IDI ranks are available in 2017. Even its neighboring countries Kenya, Djibouti, and Sudan are ahead of Ethiopia in IDI. Thus, the human resource development should support and accelerated by applying ICT in education (Sasmita M. 2019, p.1). ICT would be implementing in schools with the appropriate knowledge, skills and competencies needed in the world of work, moving Ethiopia closer to the standards and productivity of the other countries competing in the global economy.

Furthermore, According to Report on document IST-Africa D2.1 Report on ICT Initiatives, Research and Innovation Priorities, (2017 ,p. 144) stated that SchoolNet is a satellite-based network that provides Internet connectivity as well as TV-broadcast educational content to secondary schools across Ethiopia. SchoolNet aims to provide students in rural schools with access to equal learning opportunities to those in urban schools. The Ministry of Education of Ethiopia launched the SchoolNet Project in 2003

with support from UNDP. In 2017, around 1530 schools that connected through this project. The SchoolNet project is ongoing to connect more schools and to provide Internet access.

In continuation of this, the Ethiopia Education Sector Development Program ESDP V (2015/16 - 2019/20, p.70) have to included that more schools will gain access to free or low-cost Internet connectivity and networked, inclusive computer laboratories (with e-Braille readers). In pastoral and rural secondary schools, in which there is no access to electricity, solar powered tablets and mobiles, with preloaded educational materials, will be provided. To overcome challenges of a reliable maintenance and repair scheme, ICT equipment maintenance workshops/centers will be established in all regions. While ICT policies are becoming common, the integration of an ICT policy for secondary school education to enhance the quality and effectiveness of the learning process is still somewhat limited (Alenezi, 2015).

In addition, the implementation process of the policy for ICT in education, which is referred as Ethiopian Education Development Roadmap (2018-30), ICT, is not well utilized mainly due to inaccessibility of ICT facilities and poor infrastructure; and inadequate preparation of teacher candidates to use ICT in secondary schools. At no times, technology develops apart from the society, rather it moves along with society's development, and unless necessary infrastructures are made available for expanding technology, one cannot expect it to grow. In all educational institutions, Educational stakeholders must have access to necessary technologies, Necessary motives, opportunities and sources must be available so that technologies are incorporated into curricula (Jamalahdin,M, Sayed, A. Pari, S, Maryam, B. 2017). In Ethiopia ICT projects implementation in schools therefore requires investment in equipment, professional development and teacher training, technical support, connectivity and digital learning process. Therefore, this research is attempted to establish the factors influencing the implementation of Information and Communication Technology projects in public secondary Schools in Jimma city, Oromia Region.

1.2 Statement of the Problem

ICT projects and their relevance in education are spreading rapidly in schools not just in wealthy countries, but increasingly in developing ones as well. ICT at present is influencing every aspect of human life. They are playing salient roles in work places, business, education, and entertainment (Birhanu 2014, p.246). ICT has the capacity to enhance the learning process and facilitate communications within education institutions and between educators and learners. Currently ICT was a best method of teaching and learning process. Because most education institutions have closed schools due to coronavirus pandemic diseases, teachers, and students have stayed at home on overall the world. To solve happened problem most of teachers, and students continued through ICT teaching and learning. Therefore, ICT implementation in schools has most advantage for both educators and learners to exchange information. However, it must be used in education institutions under the supervision of qualified well-trained professionals with the expertise in pedagogy and in education to ensure that, its impact does not damage or undermine the learning process or the development of learners (Srivastava, 2016). Hence, every government recognizes the benefit of ICT for education. Some remarkable efforts are made to integrate ICT in education by training their staff with basic computer courses, provides computers, and creating internet access.

The Ethiopian Government has made the development of Information and communications technology as one of its priorities to enhance the country‘s overall socio -economic growth and its educational system (EICTDA, 2009). Among the big national ICT projects undertaken by the Federal government of Ethiopia are the WorldNet and the School Net. WoredaNet stands for ―network of district (woreda) administrations.

Despite such efforts, the contribution of ICT in addressing real educational problems in the school is not promising and the implementation of technology is still not a vital part of teachers' daily practice. The hindrances associated with the use of ICT in quality education such as insufficient ICT facilities, epileptic electricity power supply, teachers' lack of ICT knowledge/skills, difficult to integrate ICT to instruction, insufficient teacher time, not enough simultaneous access, not enough supervision staff and lack of technical

assistance (Birhanu M. 2014). Similarly, the implementation process of the policy for ICT in education, which is mentioned as EEDR (2018-30), ICT, is not well utilized mainly due to inaccessibility of ICT facilities and poor infrastructure; lack of awareness and inadequate preparation of teacher candidates to use ICT in secondary schools.

Additionally, the most challenging condition to implement ICT strategy in Ethiopian schools is inadequacy of existing infrastructures. Even though integrating ICT use in the teaching-learning process was given due recognition in the implementation strategy, only about 40 percent of schools in the country had computers, and most of which are in Addis Ababa. Moreover, those schools, which had computers experienced limited or low access to internet connection (Mikre, 2011). According to Adam (2008), one of the challenges observed was Ethiopia‘s lack of adequate human resource capacity to deal with complex ICT market, regulation and policy issues, and to implement large socio-technical projects like SchoolNet.

There are several studies was done in the last several years on implementation, benefits and challenges of ICT in education. However, those studies done in other foreign countries and are area specific. Literature addressing ICT implementation in Ethiopia is very limited and almost entirely focuses on ICT implementation in higher education, not in secondary schools. Particularly ‘factors influencing the implementation ICT in secondary schools’ were not treated as a topic relating to Ethiopia and there was no literature as such found. Although ICT implementation is still very limited in education and schools, the personal use of the computers, the internet and other ICT innovations like space satellite has recently become increasingly observable in Ethiopia society. Particularly, it was researcher motivation to study the factors influencing the implementation of ICT projects based on early demonstration that ICT service is not working properly in Jimma town secondary schools. The researcher was the expert of Jimma Town Education Office Department of Inspection. During schools’ inspection, the researcher has seen many secondary schools that had ICT’s service below the standard. Most of the computers in ICT labs don‘t give service for students. Three and four computers are serving for more than 20 students in ICT labs in each school. Most of the

issues come from infrastructure facilities, financial resource, schools' visions and technical aspects. The factors influencing implementation of ICT in the secondary schools are not studied yet. Therefore, the researcher have focused on investigating the main factors influencing the implementation of ICT project in secondary schools and proposes the possible solution to overcome this issue.

1.3 Research Questions

The study was guided by the following research questions:

I. What is the influence of infrastructural facilities in the implementation of ICT project implementation in public secondary schools in Jimma town?
II. What is the influence of financial resource in ICT project implementation in public secondary schools in Jimma town?
III. How do schools' visions influence the ICT project implementation in public secondary schools in Jimma town?
IV. In what ways do the level of teachers' ICT knowledge and skills influence the ICT project implementation in public secondary schools in Jimma town?

1.4. Objective of the study

1.4.1. General objective

The main objective of the study was to examine the factors influencing the implementation of Information Communication Technology projects in secondary schools in Jimma town, Ethiopia.

1.4.2 Specific Objectives

This study was guided by the following specific objectives:

I. To establish how infrastructure facilities influence the implementation of ICT projects in public secondary schools in Jimma town.

II. To determine how financial resource influence the implementation of ICT projects in public secondary schools in Jimma town.

III. To assess how schools' visions influence the implementation of ICT projects in public secondary schools in Jimma town.

IV. To determine the level of teachers' ICT knowledge and skills influence the ICT project implementation in public secondary schools in Jimma town.

1.5 Research Hypothesis

The study was guided by the following research hypothesis:

I. **Ha1:** An infrastructural facility has statistically significant effect on implementation of ICT projects in public secondary schools in Jimma town.

II. **Ha2:** A financial resource has statistically significant effect on implementation of ICT projects in public secondary schools in Jimma town.

III. **Ha3:** Schools' vision has statistically significant effect on implementation of ICT projects in public secondary schools in Jimma town.

IV. **Ha4:** Teachers' ICT knowledge and skills has statistically significant effect on implementation of ICT projects in public secondary schools in Jimma town.

1.6 Significance of the Study

Contemporary education involves widespread use of ICT for quick and effective communication, which leads to improved operation. The existence of ICT projects in secondary schools increases the sustainable socio-economic development. Therefore, this study is demonstrated how and what the factors influencing of implementation ICT projects in secondary schools. The study was important because it would assist the government to assess the challenges in implementation of ICT projects in Secondary Schools in Jimma town so that the decision to continue or stop it can be made. Another, the study will provide valuable information to government and other interested parties like the NGOs; Civic organizations who would like to come on board to help poor children get their ICT education. In addition, the study was important because the findings would provide information that would be essential to a number of stakeholders

such as the school administrators, teachers, pupils, Jimma town education office, the Oromia education bureau, the Ministry of education and the governments at large to initiate measures. Therefore, that will help implement ICT projects in future and come up with strategies to help schools. Furthermore, the study would offer some insights to other researchers wishing to engage in further studies and contribute to the improvement of the quality of ICT education in Ethiopia.

1.7 Delimitation of the Study

This study on factors influencing implementation of ICT in public secondary schools was conducted in Jimma town between January and May 2020. Most of the schools are accessible due to the available means of transport and communication. The researcher is familiar with the area of study since he works from there. For the purpose of this study, the researcher limited the study to only teachers, and school directors of the selected public secondary schools in Jimma town. The researcher was administered both questionnaire and key informant guide to the respondents in order to obtain both quantitative and qualitative information and this would be improved the research findings in terms of quality.

1.8. Limitations of the Study

The researcher encountered scanty similar research work and literature on the issue in Ethiopia in general and Jimma in particular. As a result, the researcher was obliged to rely to foreign related materials. The researcher faces scarcity of well-documented project materials and conducted research report on the issue. However, the researcher overcame this strictly following the period, proper planning and use appropriate materials or documents. The researcher was also being devoted and uses extra time to accomplish the research project on time.

1.10 Operational definition of terms

The terms used in this study may convey a different interpretation in a different context. Therefore, to avoid some possible confusion, the following are operational definitions of some of the terms used in this study.

Information Communication Technology - in this paper refers to the computer and internet connections used to handle and communicate information for learning purpose.

Implementation of ICT in education -Adopt or execute or take action has officially planned, or Interest in and use of ICT in education appears to be growing.

Public Secondary Schools -State funded educational institution.

ICT Infrastructure: tools requirements for ICT/hardware and software/ that enable a network to function, e.g. electricity, rooms, computer laboratories, computers, internets and plasma TV.

Financial Resources- All the money, either liquid or solid that is needed to meet all the expenses that are geared towards seeing ICT projects become a reality.

School vision- Planning, organizing and funding, Staff development and ICT infrastructure, Implementation, improving access and equity, Maintenance and sustainability of ICT infrastructure in schools, Legal and moral issues of ICT in school, Education theory, pedagogy and curriculum improvement and General School administration.

Teachers ICT skill- having- knowledge of ICT or understanding of internet use, computer use and application ICT in education.

1. 11 Organization of the study

This thesis was organized in five chapters. The first chapter has provided the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, and statement of the problem, purpose of the study, objectives of the study, research questions, research hypothesis, and significance of the study, delimitations of the study, basic assumptions and the definition of significant terms. In addition, chapter two has introduced the literature review with information from other articles, which are relevant to the researcher. Then chapter three has clearly specified the research design, target population, sampling procedures and sample size, methods of data

collection, data validity, data reliability, and data analysis techniques, ethical considerations and operational definition of variables. Chapter four has contains key findings which include profile of the respondents, tables of descriptive statistics of variables and analysis of factors influencing ICT projects implementation in schools. Chapter five is on summary of findings, discussions, conclusions, recommendations and suggested areas for further reading.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 Introduction

The aim of this chapter is to review the literature on the issues and topic of the factors influencing the implementation of ICT projects in secondary schools. Based on the findings and the analysis of the Ethiopian context, this is combined to formulate a conceptual framework for this study. This section presents the Concept of ICT, ICT implementation at national level, ICT for the education sector, Role of Infrastructure in ICT Projects Implementation, and Computers in schools, the role of electricity in ICT Projects Implementation and School vision role and responsibilities in ICT.

2.2 The Concept of Information and Communication Technology (ICT)

Information and Communication Technologies (ICTs) referred to as the varied collection of technological gear and resources that made use of to communicate. They are also made use of to generate, distribute, collect and administer information. ICT is a force that has changed many aspects of the way we live. Information and Communication Technologies (ICTs) consist of the hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services. ICTs can be divided into two components, Information and Communication Infrastructure (ICI) which refers to physical telecommunications systems and networks (cellular, broadcast, cable, satellite, postal) and the services that utilize those (Internet, voice, mail, radio, and television), and Information Technology (IT) that refers to the hardware and software of information collection, storage, processing and presentation. Information Technology (IT) is concerned with managing and processing information using electronics, computers and computer software to convert, store, protect, process, transmit and retrieve information (Mogas 2014, p.248).

Alemu (2017, p.13) argues that aspects which are related to ICTs for Education and ICTs in Education. ICTs for education refers to the development of information and communications technology specifically for teaching/learning purposes, while the ICTs in education involves the adoption of general components of information and communication technologies in the teaching learning process. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on ICT and teaching learning process; quality and accessibility of education; learning motivation, learning environment and ICT usage and academic performance.

2.3 ICT implementation for the Education Sector and Benefits of implementing ICT in schools

The Ministry of Education of Ethiopia launched the School Net Project in 2003 with support from UNDP. ICT networks currently connect educational institutions across the country. SchoolNet is a satellite-based network that provides Internet connectivity as well as TV-broadcast educational content to secondary schools across Ethiopia. SchoolNet aims to provide students in rural schools with access to equal learning opportunities to those in urban schools. In 2017, around 1530 schools were connected through this project. The SchoolNet project is ongoing to connect more schools and to provide Internet access.

An Instructional Satellite TV (Plasma) has been beamed to most secondary and preparatory schools with an aim of standardized delivery of school subjects (the effectiveness of this innovation still remains controversial) and for alleviating shortage of qualified teachers (Ethiopian Education Development Roadmap, 2018-30). According to U.S. National Education Technology Plan Update, (2017) stated that technology offers the opportunity for teachers to become more collaborative and extend learning beyond the classroom. Educators can create learning communities composed of students; fellow educators in schools, museums, libraries, and after-school programs; experts in various

disciplines around the world; members of community organizations; and families. This enhanced collaboration, enabled by technology offers access to instructional materials as well as the resources and tools to create, manage, and assess their quality and usefulness.

The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning and research (Yusuf, 2005). ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Yusuf, 2005). In a rapidly changing world, basic education is essential for an individual be able to access and apply information. Such ability must find include ICTs in the global village. The continued use and development of ICTs within education will have a strong impact on what is learned; how it is learned; when and where learning takes place; and who is learning and who is teaching (Alamu, B. 2017).

By implementing ICT, schools can present high quality teaching and learning. According to Keengwe, & Onchwari, (cited in Laaria M, in 2013) identify four different ways schools can offer quality education supported by ICT: real time conversation, learning by doing, directed instruction and delayed time conversation. In addition, Jamalahdin,M, Sayed, A. Pari, S, Maryam, B. (2017) described that ICT can play roles in increasing learning among learners through interactive and flexible tools: color, pictures, forms, voice, quality, quantity of information, upgrading information, participatory learning and communication with the farthest points across the worlds is taken for granted. Thus, the precondition for this is to eliminate the instructors' theoretical and practical knowledge as regards applying classrooms, building culture of teaching and learning factors in the field of education for an intelligent facing of this phenomenon.

The ICT has been essential requirement in educational institution for learning and teaching in the present day of digital environment. The learners are using, accessing, capturing videos lectures, digital notes through electronic gadgets and researchers, teachers uploading their article, videos, class lectures through ICT tools and techniques.

Similarly, educational institutions also adopting the ICT tools and techniques for better teaching, administration and management in the schools. The advantages of ICT tools for educational institutions are Creation of Independent Learning environment, Cost Effective, Unaffected by Distance and Climate, Versatility, Speedy and Instant availability of information and Remove social and economic barriers (KaushlendraPathak, 2018).

National Information and Communication Technology Policy and Strategy of FDRE, (2009) indicated that the Ethiopian Government acknowledges education and training as the cornerstone of social progress and economic development. Thus, the human resource development should be supported and accelerated by applying ICT. Information Communication Technology in Education facilitates the development of education and enables both individuals and countries to meet the challenges presented by the knowledge and information age. As the vast majority of Ethiopian population lives in remote areas and gets low quality of education, ICT is crucial in addressing access and quality of education. Therefore, the Government commits itself to the exploitation and application of ICT for educational development.

2.4 Factors that Hinder Implementation of ICT in Secondary Schools

There are factors that affect the implementation of ICT policy in schools. These factors are categorized as external and internal factors (Bo Hu, 2012). The external factors can affect the implementation of any type of policies. They include lack of equipment, unreliable equipment and lack of technical support (Bo Hu, 2012). Additionally, Jo Shan Fu (2013) identifies other external factor and notes that they influence effective implementation of technology in schools. They include technology availability, accessibility to ICT equipment, time to plan for instruction, school vision on ICT and administrative support. Stakeholders feel the ICT policy in secondary schools is too theoretical and difficult to implement due to external factors such as the role of the government (Yahya Ibrahim Al Mofarreh, 2016.) The internal factors, which influence ICT implementation, relate to the teachers (Khan & Hossain, 2012). They include

understanding of ICT use, beliefs and attitude towards ICT integration, teachers' intention and motive to use ICT, technological skills and readiness to use ICT.

Most of the developed countries in their ICT policies focus on the development of infrastructure, training, and cooperation with various parties, and develop clear educational policies translated into action. In Singapore, the results of the country's ICT master plan show great achievement, which include students' computer ratio of 4:1 in secondary schools (Twinomujuni, 2011). This is a very high ratio given that developing countries are struggling with ICT implementation. Dzidonu (2010) says that the spread of the use of ICT to support education in most African countries is limited. This is because the student to computer ratio in educational institutions in some of these countries is as low as 20:1. In east Africa, access to ICTs in schools is commonly associated with having computer labs, which are often single rooms with between 1 and 20 networked computers, although some are standalone PCs (Farrell, 2007,cited by Sara H, and Brown O. 2010).

According to survey of Hare, (2007) found that only 40% of schools in Ethiopia having computers, this may be a daunting task. Moreover, of the schools that do have computers, most of them are in Addis Ababa. According to Adam (2008), one of the challenges observed was Ethiopia's lack of adequate human resource capacity to deal with complex ICT market, regulation and policy issues, and to implement large socio-technical projects like SchoolNet. Yonas Aklog, (2019) argued that most secondary schools don't meet schools ICT standard due to infrastructure issue and lack of ICT expert at national level. Experts also argued lack of accountability, low awareness of the community on ICT service, technology frustration, less technical support, lack of clear guidelines & policy and lack of responsiveness are the major issues on the implementation of the schoolNet project in secondary schools.

Hailye, T. (2018) indicated lacks of ICTs infrastructure and power interruption within secondary schools are a major hindrance to ICTs in a developing country like Ethiopia.

Lack of computers and other ICT-supported tools in the classroom can seriously limit the use of ICTs by a teacher and students.

Hussien, Said (2018) identified factors that limited ICT use which unavailability and inappropriate ICT infrastructure, teachers training and educational plasma contents in the secondary schools. And also limited ICT knowledge and skills for both the teachers and the students characterized by inadequate time for in-service courses for teachers; limited technical support during teaching and learning process, and restrictive administrative practices mainly limited budgetary allocations and lack of proper ICT policies in the secondary schools. Therefore, there has been limited use of ICTs in class presentation in secondary school. In Ethiopia, according to Fisseha Mikre, (2011) study found that the integration of ICTs in education systems may face various challenges with respect to policy, planning, infrastructure, learning content and language, capacity building and financing ICT integration in education should parallel with teachers professional development. The school leadership also plays a key role in the integration of ICT in education. Lack of support from the school administration is also a big challenge. Thus, for the effectiveness of ICT integration, administrators must be competent and have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education. Furthermore, learning content and language also challenge the integration of ICT in education. Content development is a critical area that educators overlook. In integrating ICT in education, we have to care for the relevance of the learning content to the target groups. With respect to language, English is the dominant language in many of educational software, while English language proficiency is not high in many of the developing countries, and this is one barrier in the integration of ICT to education. Another great challenge is the financing. ICTs in education programs require large capital investment and developing countries need to predict the benefit of ICT use to balance the cost relative to the existing alternatives.

Study of Al Mofarreh, Y. (2016), revealed that several factors which hindered the implementation of ICT policies in secondary schools in Kingdom of Saudi Arabia. Those were including bureaucracy, scarcity of ICT policy planning and development processes,

inadequate infrastructure and resources, poor training (skills, knowledge) and support (specialized personnel), time restraints, limited financial support, lack of leadership (coordination and management), the role of the individual (feedback), subjective norms, and change the process.

In Kenya, integration and use of ICTs in the secondary schools have hindered by so many factors. Those are inadequate infrastructure: this includes inadequate number of computers in the schools, inadequate power supply, limited internet connectivity and inappropriate hardware and software. The administrative practices include financing computer programmes in school and facilitating in-service training of the teachers as well as employing teachers to teach computer skills. Most schools lack ICT policies that would enable proper integration of ICTs in teaching and learning. High cost of ICT maintenance pushes the principals to cut down on the use of ICTs in teaching and learning process (Goko Alice Karimi, 2012). Goko, A. K. (2012) concludes that the interplay of factors have negatively influenced and slowed the use of ICTs in teaching and learning in secondary schools. This includes unavailability and inappropriate ICT infrastructure in the secondary schools; limited ICT knowledge and skills for both the teachers and the students characterized by inadequate time for in-service courses for teachers; limited technical support during teaching and learning process and restrictive administrative practices mainly limited budgetary allocations and lack of proper ICT policies in the secondary schools.

2.5 Role of Infrastructure in ICT Projects Implementation

ICT infrastructures in schools can serve as a factor in integrating ICT in to teaching learning process as a way to improve the quality of education by using e learning. Instructors frequently list obstacles such as inconsistent technology usage, number of computers in a classroom, computer network, internet (access and speed). Thus, perceived adequacy of support (e.g. technical, pedagogical, personnel, resources), as facilitating circumstance has an important impact on applying e learning to improve

quality of education (Belay Ejigu 2015, p.75). According to KaushlendraPathac,(2018,p.46) indicated the advantages of ICT tools for educational institutions are: Creation of Independent Learning environment, Cost Effective, Unaffected by Distance and Climate, Versatility, Speedy and Instant availability of information, Remove social and economic barriers . Access to ict facilities and materials and teachers perceptions are highly influenced teachers' ICT use for instruction purpose (kebede and Getnet 2018).

National Education Technology Plan Update, (2017) included that "Preparing students to be successful for the future requires a healthy and flexible learning infrastructure capable of supporting new types of engagement and providing ubiquitous access to the technology tools that allow students to create, design, and explore". The government is committed to the expansion of ICT use in education in order to improve the quality of teaching and learning. In the plan period of ESDP V integration of pedagogy, content and technology will take priority. The draft policy for ICT in education will approved and implemented through a strategy that will include provision of equipment, for access at the school level. Central to the strategy will be the 'School NET Cloud-Computing' infrastructure, which will be the portal through which students and teachers have access to a range of centrally stored, digital content. For this, a fully functional and well-equipped data center and network operation center, supported by a learning content management system, will establish. In addition, more schools will gain access to free or low-cost Internet connectivity and networked, inclusive computer laboratories (with e-Braille readers). In pastoral and rural secondary schools, in which there is no access to electricity, solar powered tablets and mobiles, with preloaded educational materials, will provide. To overcome challenges of a reliable maintenance and repair scheme, ICT equipment maintenance workshops/centers will established in all regions (ESDP V, 2015/16 - 2019/20, p.70).

The implementation of ICT project in schools is demand resources such as computers, printers, multimedia projectors, scanners and other accessories. These tools are not available in all the educational institutions. Besides, ICT requires up-to-date hardware

and software and high-speed Internet connection (Gulbahar, 2007 cited in Francis, Ngugi, and Kinzi 2017, p.75). These are key features in implementation of technology but they are not available in most public schools. In view of this, Mumtaz (2000) cited in Francis, Ngugi, and Kinzi 2017, p.75) observed that lack of funds to obtain the necessary hardware and software is one of the reasons why teachers do not use technology in their schools.

2.5.1 Role of Computer in ICT Projects Implementation

As a classroom tool, the computer has captured the attention of the education community. This versatile instrument can store, manipulate, and retrieve information, and it has the capability not only of engaging students in instructional activities to increase their learning, but of helping them to solve complex problems to enhance their cognitive skills (Jonassen & Reeves, 1996, as cited in Belay Ejigu 2015, p, 26). Furthermore KaushlendraPathak, (2018) indicated that Computer technologies and other aspects of digital culture have changed the ways of people to live, work, play, and learn, impacting the construction and distribution of knowledge and power around the world. In many countries, digital literacy is being built through the incorporation of information and communication technology (ICT) into schools. For that reason, Percentage of schools with access to computer-assisted instruction will increase from 6% to 50% and Percentage of secondary schools using television-assisted instruction will increase from 69% to 10 %. In this situation, establishing fully functional and well-equipped data center and network operation center service as a national digital educational resources repository supported with learning management system and learning content management system (ESDP V, 2015/16 - 2019/20 PP 70-71).

With the existing infrastructure, there are obvious challenges to the proposed strategy. For instance, the strategy envisages the integration of ICT into the learning, teaching, and administration of the school system through Education Information Management Systems. Nevertheless, with only 40% of schools in Ethiopia having computers, this may be a daunting task. Moreover, of the schools that do have computers, most of them are in

Addis Ababa, thereby creating a major rural-urban divide should the strategy be implemented within the current context. A related challenge is that most schools have limited or low access to the Internet. Those schools that are connected generally use e-mail only, and it is available only to the administration. Access to ICTs by teachers is also limited, especially to computers and the Internet, which makes it difficult to assume that educators can integrate ICT into their teaching (Hare, 2007).

2.5.2 Role of electricity Infrastructure in ICT Projects Implementation

According to Haverila, M. (2011), African Ministries of Education have begun to be more proactive in co-coordinating and leading the development of ICT infrastructure in school systems as their ICT policies and implementation plans have taken shape. This is accrued to the major role of played by infrastructure such as electricity in ICT projects implementation. It is common knowledge that computers, phones, radios, projectors, televisions and even video players cannot work without power that is in the form of electricity. According to Ndukwe (2007) all ICT equipment, infrastructure and terminals depend on electricity to energize. In Ethiopia, electricity power supply is irregular this affect most of the ICT operations in her universities, schools and at homes thus causing frequent damages of the existing ICT equipment which hinder ICT uses in enhancing quality education.

According to Chandra and Patkar (2007) all ICT equipment, infrastructure and terminals depend on electricity to energize, unless this vital source is always available and reliable, Ethiopians will not be able to fully enjoy the benefits that the digital revolution offers and that overcoming the energy crises is a major pre-requisite for Ethiopia to achieve its Vision of national transformation.

2.6 The Role of Financial Resources in ICT Projects Implementation

World Bank (2013) defines financial resources as the money available to a business for spending in the form of cash, liquid securities and credit lines. Before going into business, an entrepreneur needs to secure sufficient financial resources in order to be able to operate efficiently and sufficiently well to promote success. Computers for schools and

related ICT projects, are considered to be a form of business undertaking whose benefits are hidden in the long run achievements in efficiency and effectiveness management, teaching, administration and planning processes of school projects. In most developing countries, it is very hard when it comes to implementing technology into education systems because it involves substantial funding by the government. The teaching aids for ICT demands a lot of funds and setting up the infrastructure, maintenance and support of ICT facilities are some of the problems that the schools are having (NomsaMndzebele, 2013).

Despite a typical claim that investing in IC is cost-effective, as well as the continuous decline in ICT prices, the entire cost of possession of ICT including software, hardware, upgrading, maintenance, development and acquiring right skills remains high. Investing in ICT for schools might be perceived as an additional cost, and supporting significant ICT implementation is a problem experienced by many schools in developing countries, mainly those that rely on donor support (Laaria Mingaine, 2013).

Public financing of the education sector has been high in Ethiopia. According to ESDP V (MoE, 2015) from 1996–2004, education accounted for roughly 20% of total government spending (MoE, 2015). However, the required budget to the sector needed additional financial and in-kind contributions from international partners, NGOs and community contributions. The analyses of relevant documents suggest visible achievements in financing the education sector. Yet, a high quality education demands more resources than that (Ethiopian Education Development Roadmap, 2018-30)

The article of The Essence of ICT Restructuring in Ethiopia by Sasmita Mohanty, (2019) indicated, “ICT is also instrumental in curbing corruption and financial frauds”. For instance, in India the public welfare system and public financial systems had corrupt practices at different levels. The current government in 2014 centralized these schemes using ICT. Now, the money directly goes from the welfare departments to the beneficiaries using the ICT facilities. It has brought down the corruption significantly. Similar practices are available in several countries. It is expected that Ethiopia would

follow ICT enabled techniques to eradicate corruption from its public financial systems. Prime Minister Abiy Ahmed's initiatives to make Ethiopia corruption free are very much dependent on an effective ICT system. ICT can play a very constructive role.

2.7. The role of School vision of ICT in its implementation

A school vision for ICT describes a point in time when ICT systems electronic materials, teaching and learning methods and curriculum organization will reach a level where significant learning outcome for students will have been achieved (Gareth, 2008 cited in Francis, Ngugi, and Kinzi 2017). Due to lack of school vision on ICT, many schools have no guidelines to support school's curriculum like teaching and learning. Where technology is available without ICT vision, teachers using these technologies in their teaching process do so in what is described as 'standard and guideline" nothingness (Dzidonu 2010). Most of schools in Australia recognize the potential of ICT in transforming all aspects of school education and contribute to achieving all learning goals (Galatis, & Williams, 2009). These schools have therefore adopted some action plan for ICT. The main objective of the action plan is to implement the National ICT policy. Schools have achieved these by putting in place their own ICT policy commitment to deliver and support ICT infrastructure, support teachers' professional development and provide ICT educational tools. Examining the school policy with respect to ICT integration from principals' perspective in Ireland, Jo Tondeur, et al, (2008) found out that school- related policy, such as ICT plan, ICT support and ICT training have a significant effect on use of ICT in schools. Their findings indicate that failure of ICT implementation is often underdeveloped and underutilized of school policy on ICT.

Effectively promote ICT in the classroom; leaders should develop a vision of effective technology use that is shared by teachers. This vision should be modelled in all aspects of school life. For example, making available the needed financial and human resources may have great impact on the implementation of ICT. Successful ICT implementation into the classroom also requires the school to alter its structure to foster the use of technology across disciplines, divisions and school boundaries (Sharratt, 2009). There is the need to develop structures that allow assimilation of technology into the teachers'

daily work. Such structures include team teaching, shared decision-making, common planning time, and opportunities to learn from colleagues. This is important because in this era of technology the teacher's role needs to change from that of primary information source to one who provides students with structure, monitors their progress, and assesses their accomplishments (Kozma, 2003). Thus, administrators need to recognise this change, particularly concerning teachers' knowledge, experience, and understanding of the teaching and learning process.

Inadequate and inappropriate ICT training was found to be one of the common problems hampering teachers and students from using the technology in their classroom teaching learning activities , teachers are critical (good teachers) to use ICT in schools so the schools should give high emphasis in developing skills and attitudes by giving training. For effective ICT usage in the classroom instruction, teachers must have knowledge of how to use the technology challenges in using the technology, drawback of the technology and knowledge of showing other alternative ways of using the technology and skills of guiding and supporting their students Abrham 2016). This indicates that access to technology to use ICT in education alone, never bring the quality education that we need to provide unless teachers and students know how to use the technology in their teaching-learning system. The success of educational innovations depends largely on the skills and knowledge of teachers about the technology. Teachers' lack of knowledge and skills in applying ICT in the classroom is one of the main hindrances to use technology in education both in developed and in developing countries. Redesigning (restructuring) the curriculum requires knowledge of national ICT policy, understanding of the level of students learning and understanding of the technology in the classroom, level of technical expertise of teachers to solve the problems they faced during learning-teaching process and school structure whether it is organized in a way it is suitable to use the technology in education.

The success of implementation at school level is in preparing a good foundation of ICT studies among the school stakeholders (Muriithi, et al, 2013). This can be achieved through creating a shared vision. All stakeholders must have a common understanding of

ICT instructions and ICT plan in the school (El Abhouri, Hildebrandt, Puckett, 2014). The selected factors of the schools' visions on ICT were strong indicators of effective implementation of ICT policy in public secondary schools. Factors like schools having elaborate plan for ICT implementation, the need for regular training of teachers in ICT and commitment to acquiring ICT tools should be addressed to increase implementation of ICT policy in public secondary schools (Francis, Ngugi, and Kinzi 2017).

Taking full advantage of technology to transform learning requires strong leadership capable of creating a shared vision of which all members of the community feel a part. Leaders who believe they can delegate the articulation of a vision for how technology can support their learning goals to a chief information officer or chief technology officer fundamentally misunderstand how technology can influence learning. Technology alone does not transform learning; rather, technology helps enable transformative learning. The vision begins with a discussion of how and why a community wants to transform learning. Once these goals are clear, technology can be used to open new possibilities for accomplishing the vision that would otherwise be out of reach. Moving to learning enabled by technology can mean a shift in the specific skills and competencies required of leaders. Education leaders need personal experience with learning technologies, an understanding of how to deploy these resources effectively, and a community-wide vision for how technology can improve learning (National Education Technology Plan Update, 2017).

2.8. Role of ICT technical support influence ICT implementation in public secondary schools

ICTs have demonstrated potential to increase the options, access, participation, and achievement for all students (Haddad, 2003 cited in Wachiye, 2012) with knowledge as the crucial input for productive processes within today's economy, the efficiency by which knowledge is acquired and applied determines economies success. Effective use of ICTs can only contribute to the timely transmission of information and knowledge when the personnel involved are aware of its availability.

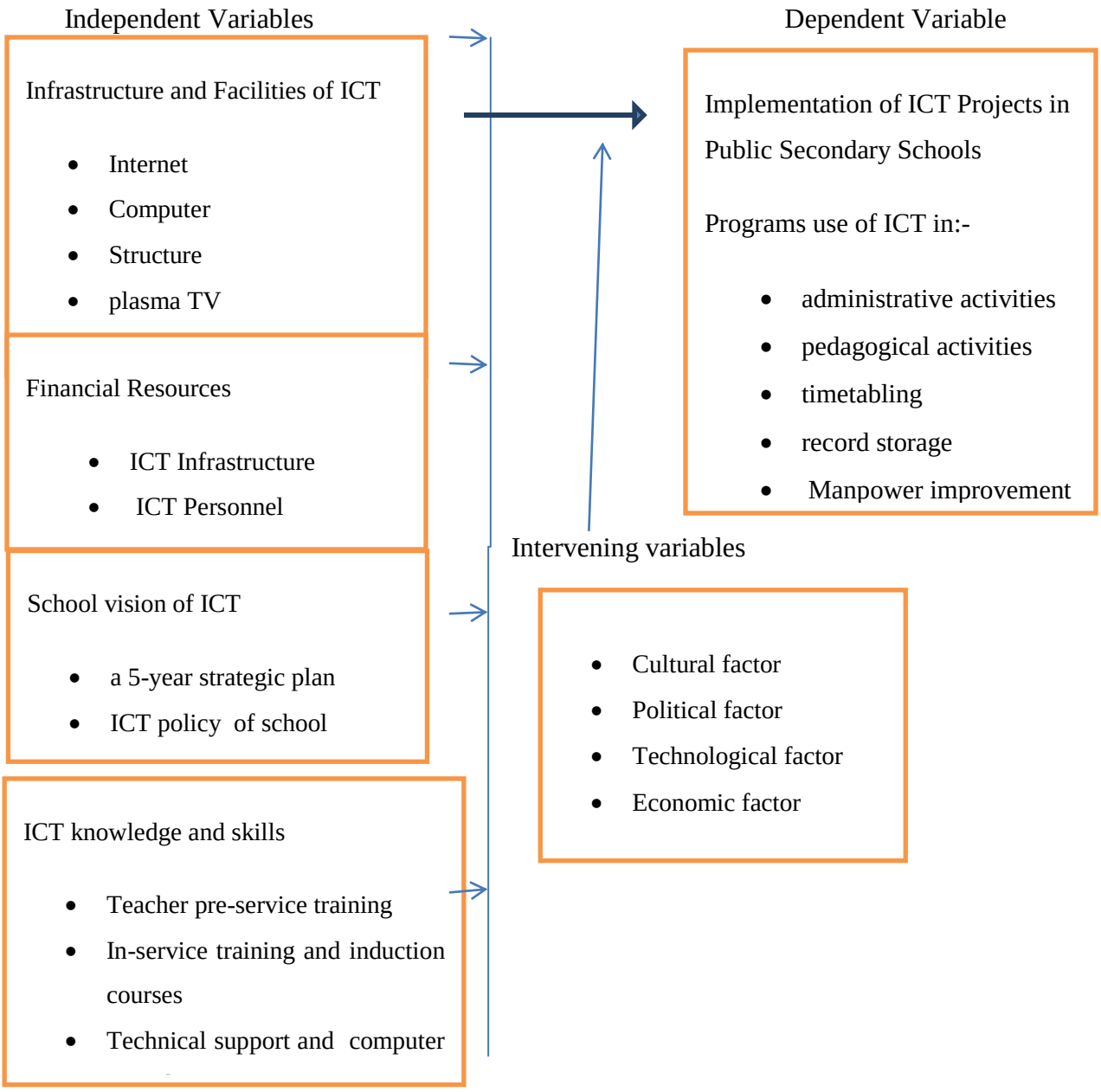
The National ICT Education, Training and Awareness initiative promotes ICT awareness and literacy, lifelong and adult education, and distance and virtual education and learning. The strategy also identifies strategic goals and draws up a program and activities for each initiative. Both the national ICT4D 2010 Plan and the ICT in Education Implementation Strategy recognize ICT as an enabler for widening access to education for the Ethiopian population, for supporting literacy education, and for facilitating educational delivery and training at all levels Hare , 2007).

Teachers ICT skills and knowledge to professional development play a significant part in effective use of ICT. Hennessy (2010) stated that teachers' attitudes, beliefs, adequacy, and skills " influence effective use of ICT in schools. Unfortunately, in many African countries, lack of well-trained teachers and low levels teachers ICT skills and knowledge have been recognized as one " of the major obstacles to the use of ICT in schools (Dzidonu, 2010). For effective use of ICT in schools, there should be adequately trained personnel that have correct ICT skills and knowledge. Where such skills and knowledge are lacking, it would be difficult to effectively ICT the technology in schools. Effectively use ICT, there should have comprehensive pre-service courses on ICT that equips teacher trainees with the right skills and knowledge. Mogas (2014, p.256) commended that the adoption of ICT international standards and its inclusion in the Ethiopian education system. Continuous training and retraining of teachers, others supporting staff and academia on computers and ICT skill acquisition should be provided.

2.9. Conceptual Framework

The conceptual framework outlines the dependent, independent, intervene variables as discussed in the literature review, and elaborated in the Figure 1 below. It helps one to understand the relationship between the variables of the study.

Figure 1 conceptual framework



Source: (Own development 2020)

In the above conceptual framework, the study focused on the interaction between the variables that influence the implementation of ICT projects in secondary schools in

Jimma Town. The independent variables are the variables the researcher cannot manipulate or change which include the ICT Facilities and Infrastructure, Financial Resource, Schools' Vision of ICT and ICT knowledge and skills. ICT projects implementation is the dependent variable on the other hand, while Cultural factors, Technological factors and Economic factors act as intervening variables as illustrated in the figure of conceptual framework. The ICT infrastructures in schools include structures like computer laboratories, electrification, and computers themself. The kinds of infrastructure available in schools depend on the availability of financial resources, which mainly determine the kind of infrastructural facilities to be given priority. The kind of infrastructure available in schools depends on the users and their knowledge and skills which that pre-service and the in-service training. For effective implementation of ICT projects, there has to be adequate technical support and computer consultants to help solve technical problems for the teachers and the students to minimize time waste because of technical problems.

The school vision should formulate ICT policies and plans as well as set ICT budget. These would influence innovations purchase in the schools in terms of quality and quantity. A school's ICT vision is essential to effective ICT implementation. It plays a major role of providing financial, moral and leadership support that creates a favorable climate for ICT. The school administration should give that kindly welcomes ICT in the learning environment and should not be seen as a threat. The result of all these relationships is effective implementation of newly will be adopted ICT projects in education resulting into successful ICT projects implementation in Jimma town secondary schools.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introduction

This chapter discusses the methodology that was used to conduct the study, focusing on research design, description of the study area, target population, sampling procedures and sample size, research instruments, questionnaires, data collection procedure and methods of data analysis.

3.2. Description of the study area

The study was carried out in Jimma Town, regional state of Oromia, Ethiopia. Jimma town is around 353 kilometers far from Addis Ababa. It is an economically productive area with coffee as the major cash crop. According to statistics 2011 EC (2018-2019 GC) in Jimma City there are about six (six) public secondary schools grade 9-12 with 299 teachers and 10628 students. Gay (1996) argues that factors such as familiarity with an area, time limitations, and money may influence the researcher's choice locale. The researcher will find it convenient doing the research since he is coming from Jimma town educational office, school inspection department and is familiar with most of the secondary schools in this area and this would make it easier for him to obtain the required data from the schools. These made the setting easily accessible and permitted instant rapport with the respondents. No similar study has been carried out in the setting.

Table 3.1 the name schools and total population

No.	Name of schools	Grade 9-12					
		Number of Teachers			Number of principals		
		male	female	Total	male	female	total
1	Abba Buna	28	12	40	1	0	1
2	Jimma secondary schools	22	10	32	1	0	1
3	Jimma secondary and preparatory schools	57	7	64	1	0	1

4	Jiren secondary	47	39	86	1	0	1
5	Mole Mandara	21	7	28	1	0	1
6	Sato Samaro	33	16	49	1	0	1
	Total	208	91	299	6	0	6

Source: (Jimma Town Educational Office Annual Abstract 2011 E.C)

3.3 Research Design and Approach

The object of descriptive research is 'to portray an accurate profile of persons, events, or situations' (Robson 2002:59). In order to achieve the objectives of this research, Non-experimental descriptive survey research design was applied. A survey is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. The researcher of this study used this design for two main reasons: firstly, descriptive survey research design helps the researcher to establish the factors that are influencing the implementation of ICT projects in secondary schools. Secondly, it allows the researcher to use both the quantitative and qualitative approaches, which provide rich data that lead to important recommendations and to get a holistic view of the topic under study (Kothari, 2005).

The study aimed at collecting opinions from the teachers and the principals about factors influencing adoption of ICT in teaching and learning. The secondary data was collected from literature review from the internet, journals and relevant books while questionnaires, observation, and interview schedules enabled the researcher collect the primary data.

3.4. Target Population

Target population is the population to which the researcher plans to generalize his/her findings (Orodho 2008). The teachers, and school principals found in all public secondary schools of Jimma town are the target population. The study population was involved of six schools in Jimma City, according to the latest records with the Jimma City

educational office accessed on 2012 EC (2020 GC). Each school has one principal. The schools under study have six principals, and teachers 299 potential respondents. All the teachers and the principals made the study population.

3.5. Sample Design and Sampling Procedure

Sample design is a definite plan determined before any data actually collected for obtaining a sample from a given population, the statement about the sample should be true in relation to the population (Orodho, 2009, cited by Rechard, 2014). To determine the sample size, the researcher uses 30% of the secondary schools teachers' population as the sample size. According to Nelly (2015), also 30% of the target population is a good representation for descriptive study.

299 Teachers gives

30/100x299=90 Teachers to be chosen randomly from different schools

and 50% of the principals will be

50/100x6=3 principals. These principals were chosen purposely to accommodate the one top, one medium and one less ICT performing Secondary Schools. This gives 93 respondents.

As mentioned earlier, this study conducted using both qualitative and quantitative data collection technique. In order to present a wide range of data, both primary and secondary data sources were used in the study. Primary data was collected by using both qualitative and quantitative data collection method such as, questionnaires, and semi-structured interviews. Both techniques enable the researcher to present numerical as well as qualitative in-depth information. In order to select respondents, both random and purposive sampling techniques are used.

Table 3.2 sample size of study

NO	Schools name	Population size of Teachers (N)			Precent (%) for both gender	Sample size (n)		
		Male	female	total		male	female	total
1	Sato samaro	33	16	49	30	10	5	15
2	Jimma secondary schools	22	10	32		7	3	10
3	Jiren secondary	47	39	86		14	12	26
4	Jimma secondary and preparatory school	57	7	64		17	2	19
5	Aba Buna secondary school	28	12	40		8	4	12
6	Mole secondary	21	8	29		6	2	8
	Total	208	91	299		62	28	90

Source: (own field survey, 2020)

The sample for this study, therefore, comprised 6 secondary schools, 90 teachers, and 3 Schools leadership. Hence, the total sample consisted of 6 secondary schools and 93 individual respondents. Among the 93 respondents, 90(95.7%) ware teachers and were four (4.3%) schools leadership. On the other hand, sample schools, teachers, and School leadership (principals) selected differently. Sample schools selected census because it help fact-finding. Teachers randomly stratified in gender and subject to teach. In addition, indeed, in order to provide an equal chance of being represented in the sample, stratified random sampling technique was employed. Besides, purposive sampling technique was employed to select sample school principals and interview those 3 School leadership who is very responsible to the project. The study was organized using surveying of six Secondary Schools taking into account the government school, in Jimma town. The samples of teachers were proportional to total study population of teachers, in six sample schools. It was also consider the grades and subjects teachers teach in sampling. Here the researcher was used random sampling.

While purposive samplings were used to take three principals from sample schools and the researcher took sample purposely from each three Secondary Schools.

Table 3.3 sampling methods of sample participants

No	Sample participant	Sampling method	Sampling size
1	Teachers	Stratified random sampling	90
2	Principals/school leadership	purposive	3
3	Schools	census	6
4	Town	purposive	1

Source: (Source: own field survey, 2020)

3.6. Research Instruments or Methods of Data Collection

Instruments are tools that are used by the researcher to collect data from the sampled respondents in a study (Kombo and Tromp, 2006, cited by Rechard, 2014). Both the adopted and developed questionnaires were designed and make to include both closed-ended and open-ended items and they were distributed to teachers. The questionnaires were used to collect data from the teachers while the supervisor and principals were interviewed. Observation helped to gather crucial information that could not be obtained through interviews and questionnaires. The questionnaires were used to collect bio-data of the teachers, background information of the schools and gather information on the ICT projects status in the schools. Interview guide was used to gather information from the principals to establish the ICT projects, resources allocation, and their influence in ICT projects in their schools. Questionnaires collect data by asking people to respond to exactly the same set of questions. They are often used as part of a survey strategy to collect descriptive data about opinions, behaviors and attributes and In descriptive studies, structured interviews can be used as a means to identify general patterns (Saunders, Lewis, Thornhill, 2009). The questionnaires were used entailed open and closed items. Open-ended questions provided detailed information and were ideal for obtaining data from a large number of respondents, while closed ended questions provided structured responses, which assisted in tabulation and analysis.

3.7. Validity and Reliability of the Instrument

3.7.1 Reliability

Reliability is the degree to which the research instrument yields consistent results or data after repeated trials (Mugenda & Mugenda, 2008). Reliability of the questionnaire was tested through a pilot survey by collecting data from subjects not included in the sample, which was carried out two weeks before the data collection. A coefficient of reliability was determined in order to reduce errors, which might compromise the reliability of the collected data.

3.7.2 Validity

Validity is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study (Mugenda & Mugenda, 2008). This study therefore carried out a content related validity test (content and format of the instrument) in order to assess the clarity of the instruments items so that those items found inadequate in measuring variables could be modified to improve the quality of the research instrument as well as increase its validity.

3.7.3 Reliability Test

The study performed a pilot test on a school of 10 respondents from the target to test the reliability of the research instruments. Cronbach's Alpha was used to test the internal consistency of the questionnaires. The alpha value ranges between 0 and 1 with reliability increasing with the increase in value. Mugenda & Mugenda, (2008) indicates that coefficient of 0.6-0.7 indicates acceptable reliability, and 0.8 or higher indicates good reliability.

	Table 3.4 the study's Reliability Statistics result	
Name of variables	Cronbach's Alpha	N of Items
ICT infrastructures	0.723	9
Financial resource	0.625	3
ICT school vision	0.712	9
ICT knowledge and skills	0.523	7
The over al cronbach Alpha	.796	23

Source: Own Survey result (2020) SPSS Output

3.8. Data Collection Procedure

The researcher was got permit from the graduate school and the relevant authorities to undertake research. The researcher was visited the sampled schools and administered the questionnaires and conducted the interviews. Appointments to the sampled schools were arranged prior to the visits to avoid any inconveniences to the respondents. The researcher was emphasized that the information given is specifically for the study and it is private and confidential and that names are not be necessary.

3.9. Data processing and Analysis

Quantitative and qualitative methods of data analysis were employed in order to answer the research questions and to attach to the objectives. Quantitative data were collected then were entered into the computer, and were analyzed using descriptive analysis mainly; Statistical Package for Social Scientists -SPSS (Orodho, 2009, cited by Rechard, 2014).Qualitative data ware analyzed using content analysis method and opinion of majority was summarized. The quantitative data was collected, coded, tabulated, analyzed, described and interpreted in a manner that it supports finding of the study in terms of frequency, percentage and mean value (to compute the proportionality of individual responses of the items by assessing the scale value to each of the 5(five) scale responses. Descriptive analysis was done using frequency distribution tables. Finally, the findings were summarized and presented by using different tools and was supported with further descriptions.

CHAPTER FOUR

4. Data Presentation, Analysis and Interpretation

4.1. Introduction

This chapter deals with data presentation, analysis, and interpretation. The data collected was keyed and analyzed by simple descriptive analysis using Statistical Package for Social Scientists (SPSS) version 23 software. The data was then presented through tables, charts, and narrative analysis. Three different tools were used in order to come up with the data presented, namely interviews, observations and questionnaires. The questionnaires were prepared for 90 teachers, across in the all-public secondary schools in the Jimma Town. The analysis and interpretation of data were carried out by merging two parts. The first part deals with a quantitative analysis of data based on the results of the questionnaire (were organized and analyzed in tabular form and interpreted using percentage, frequency).The second part is a qualitative about based on the results of the interview and observation. The qualitative information gathered through open-ended questions, interviews and observation were narrated and interpreted in a manner to support the quantitative information. Observations were also made in data center (server), the students, and teachers ICT labs.

4.2 Response Rate

The study targeted to collect a total of 90 respondents response whereas, from them all 90 respondents filled in, and returned the questionnaires. One on one interview was done with the three principals. Total response rate for the questionnaires was 100% while that of the interview guide was 100%. According to Mugenda (1999), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Therefore, based on the statement, the response rate was excellent.

4.3 Demographic characteristics and Basic information of the respondents

The study wanted to find out the bio data of respondents, age, and educational level as shown in the tables below.

4.3.1 Bio-data of the Respondents

The study found out the sex arrangement of the respondents as shown in the table 4.1 below.

Table 4.1 Sex Distribution of Respondents

Sex		Frequency	Percent	Valid Percept	Cumulative Percent
Valid	male	62	68.9	68.9	68.9
	female	28	31.1	31.1	100.0
	Total	90	100.0	100.0	

Source: Own Survey result (2020)

From the table above, in the questionnaire, teacher participants were asked to indicate their gender, i.e. male or female. The study results from data analysis showed that 68.9%of the respondents were males while 31.1% of the respondents were females from public secondary school teachers. Hence, male respondents made majority of the respondents.

4.3.2 Age Distribution of Respondents

The study sought to find out the age brackets of the respondents in the study and the results were as shown in table 4.2 below.

Table 4-2 Number of respondents based on age range (years).

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	3	3.3	3.3	3.3
	31-40	33	36.7	36.7	40.0
	41-50	53	58.9	58.9	98.9
	above 50	1	1.1	1.1	100.0
	Total	90	100.0	100.0	

Source: Own Survey result (2020)

Table 4.2 illustrates the number of respondents based on the age range across six schools. Generally, the majority of the sample was aged between 31 to 50 years. There were a small number below 30 years and over 50 years.

4.3.3 Educational Level of Respondents

The study required establishing the level of education of the respondents since teachers and administrators were part of the population.

Table 4.3 Academic Qualification of Respondents

Qualification		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	0	0	0	0
	BA/BSC degree	60	66.7	67.4	67.4
	MA/MSC master	29	32.2	32.6	100.0
	Total	89	98.9	100.0	
Missing	System	1	1.1		
Total		90	100.0		

Source: Own Survey result (2020)

Table 4.3 illustrates that the majority of respondents' educational qualification is a minimum of a Bachelor degree. It can be assumed that most teachers have attained higher education. 66.7% of the respondents mentioned that most teachers in the study schools had a bachelor degree in education with 5% indicating a master's degree. .Qualification and working experience of principals are important to support and create favorable condition for ICT implementation.

4.4 Infrastructural Facilities' Influence on ICT Projects Implementation in Schools

Usage of ICT in education is directly dependent on the availability of essential infrastructural facilities, which include number of computers, computer rooms/laboratories, and electricity grid and internet connectivity.

4.4.1 Schools with Computer Projects

Data was gathered and analyzed from respondents on the question of whether their schools had computers or not and the response was as shown in the table 4.4 below.

Table 4.4 school with computers					
Computers		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	83	92.2	92.2	92.2
	NO	7	7.8	7.8	100.0
	Total	90	100.0	100.0	

Source: Own Survey result (2020) SPSS Output

The tables above shows that 92.2 % of the schools sampled have computers in their schools While 7.8% have almost none .This was in a way tied to the fact that ICT4ED program has pushed the evolution and integration of ICT in most secondary schools recently. The first thing to do to have a good ICT implementation is to build go infrastructure to facilitate successful ICT implementation. Therefore, every authority, region and institutions had to come up with strategic plans of how they were going to solve the problem of infrastructure to help the government implement ICT successfully.

4.4.2 Number of Computers in Schools

Still of ICT infrastructural facilities, the informants and respondents were asked a question of the number of computers in their schools in order to establish whether most schools in town had computers corresponding to the national requirement of at least 20 computers.

Table 4.5 number of computers in schools

Number of computers	Frequency	Percent	Valid Percent	Cumulative Percent
0-5	8	8.9	9.0	9.0
5-10	9	10.0	10.1	19.1
10-15	13	14.4	14.6	33.7
15-20	35	38.9	39.3	73.0
above 20	24	26.7	27.0	100.0

Missing	System	1	1.1	
Total	89	98.9	100.0	Total

Source: Own Survey result (2020) SPSS Output

From the above table shows that 8.9% of the respondents said that their schools have almost none/less than 5 computers, 10.0% have between 5 to 10 computers, 14.4% have between 10-15 computers, 38.9% have between 15-20 while those having the normal recommended number of computers by ICT4ED (2010) of above 20 were at 26.7%. This was a symbol that most of the schools lacked the computers, which greatly facilitated the ICT integration and implementation projects in their schools. Only 26.7% of the respondents said that their schools had above the recommended number of 20 computers in their schools while the rest were not reaching the standard limit set; a clear indication that computer scarcity have greatly limited the implementation of ICT projects in Jimma Town. This makes them inadequate and inaccessible for use by the teachers and the students because most of them are found in the office. Therefore, infrastructural development has to be taken into account when implementing ICT projects in schools because they are closely tied.

Table 4.6 Internet connectivity in schools

Internet Connectivity	Frequency	Percent	Valid Percent	Cumulative Percent
Prepaid modem/Wi-Fi	5	5.6	5.6	5.6
internet server	2	2.2	2.2	7.8
not connected	83	92.2	92.2	100.0
Total	90	100.0	100.0	

Source: Own Survey result (2020) SPSS Output

According to the findings of the study, only 5.6% ratings of schools have a local connected internet. The 2.2% are able to access internet server. Over 92.2% of teachers

not witness the availability of internet connectivity that there is problem of connection in Jimma town schools. This implies that most of the students and teachers never access the e-learning materials. According to the respondents, this was a challenge that put most of the schools far away from achieving the reality of ICT integration in most secondary schools in the Town.

4.4.4 Location of Computers in the Schools

The location of the computers in the school determines if they are accessible for use in the teaching and learning and whether the school has fully implemented ICT projects as set by ICT4ED and computer for schools program. The respondents were asked the question in order to ascertain the schools with well-equipped computer laboratories and the results shown in the table below were found.

Table 4.7 Location of computers in the schools

Location		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer laboratory	14	15.6	15.7	15.7
	Offices	30	33.3	33.7	49.4
	Converted classes	43	47.8	48.3	97.8
	Other places	2	2.2	2.2	100.0
	Total	89	98.9	100.0	
Missing	System	1	1.1		
Total		90	100.0		

Source: Own Survey result (2020) SPSS Output

The study found out that most of the computers in the school are found in the converted classrooms and was represented by 47.8%, 33.3% have their computers in the offices while 15.6% have their computers placed in fully equipped computer laboratories. Only

2.2% have their computers in other places. This implied that the planned ICT projects for secondary schools have not been fully implemented in Jimma town. The observation schedule revealed that most of the schools have less than five computers most of which are used for office work in the school. Most of the schools did not have computers in the staffroom. This limits the teachers' use of computers in preparation for their class presentation. In addition, only two schools had a projector. This meant that even presenting the work prepared by the teachers could only be done through hard copies.

A question that pursued to know why the number of computers were as shown above found out that most of the schools had many students and teachers due to the free secondary education with included structures/buildings, forcing the administration favor classes building and offices to computer laboratories that were viewed as not very crucial and very important. This has always had an overall negative impact in implementing ICT projects in schools in the region since most of the computers were not accessed from the best points for better learning and integration.

4.4.5 Power Supply Infrastructure

The respondents were requested to identify the major source of power in their schools and the response given was shown in the table below.

Table 4.8 power type in the schools

Power Type in Schools		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Electricity	13	14.4	14.4	14.4
	Electricity and generators	72	80.0	80.0	94.4
	Generators	2	2.2	2.2	96.7
	Solar	3	3.3	3.3	100.0
	Total	90	100.0	100.0	

Source: Own Survey result (2020) SPSS Output

The research found out that 14.8% of the schools have electricity and electrical power connections, 80% have both standby generators & electricity, and 2.2% have generators as their power source, while 3.3% use solar power. However, when asked to give reasons for their response in the question that related to the source of power, the study found out that there were sometimes power black outs that could last up to about two days. School with generators also they had scarcity of benzyl. This had a very great negative effect to the point of some schools not able to use the computers in their schools at all since they had no immediate predictable electrical power to enable their operations. The insufficient power supply in most of the secondary schools in Africa had contributed to the slow integration of ICTs in the schools. This was because most of the secondary schools where there is inadequate electricity supply coupled with inadequate power backup. Conradie (2003) as cited in (Karimi, 2012) had observed that many areas in Africa do not yet form part of the national electricity grid. This is particularly an acute problem since technology and internet can only be effective if it is generated by electricity.

4.4.6 Teachers' Views on infrastructural facilities and ICT projects

Table 4.9 teacher's views on computers are great tools to improve quality of education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	84	93.3	94.4	94.4
	no	5	5.6	5.6	100.0
	Total	89	98.9	100.0	
Missing	System	1	1.1		
Total		90	100.0		

Source: Own Survey result (2020) SPSS Output

The tables above shows that 93.3 % of the respondents indicated that computers are great tools to improve quality of education While 5.6% have almost none .This was in a way

tied to the fact that ICT4ED program has pushed the evolution and integration of ICT in most secondary schools recently. Thus, policy makers and project leaders should think in terms of input factors that can work together to observe the right impact of ICT in education. Matching the introduction of computers with national policies and programs related to changes in curriculum, pedagogy, assessment, and teacher training is more likely to result in greater learning of students and other out comes (Kozma, 2005).

Teachers and students were asked to indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows.(SA-Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree).

Table 4.10 Teachers' Views on infrastructural facilities and ICT projects

Factors	SA	A	U	D	SD
There is adequate Number of Computers in Schools for ICT implementation	2(2.2%)	4(4.4%)	6(6.7%)	3(3.3%)	75(83.3%)
The schools have Internet Connection for Computers	1(1.1%)	2(2.2%)	2(2.2%)	6(6.7%)	79(87.8%)
The school has well-equipped computer laboratories	2(2.2%)	4(4.4%)	4(4.4%)	2(2.2%)	78(86.7%)
The school has an e-mail address and is on a website	11(12.2%)	20(22.2%)	13(14.4%)	27(30%)	19(21.1%)
Majority of the offices are equipped with ICT equipment	11(12.2%)	19(21.1%)	18(20.0%)	21(23.3%)	21(23.3%)

Source: Own Survey result (2020) SPSS Output

From the table, the researcher found out that 83.3% of the respondents strongly disagreed with the view that there is adequate Number of Computers in Schools for ICT implementation, 3.3% disagreed, 6.7% were uncertain, 4.4% agreed and 2.2% strongly agree. The statement on the schools have Internet Connection for Computers was supported by majority at 87.8% who strongly disagreed, 6.7% disagreed, 2.2% were uncertain while 2.2% disagreed and 1.1% strongly disagreed. Most schools were found to be the school has no well-equipped computer laboratories to implement ICT projects

where; 86.7 % of respondents strongly disagreed, 2.2 % disagreed, 4.4 % were uncertain, 4.4 agreed while those strongly agreeing being at 2.2%. Interviewee described that Most of the secondary schools don‘t have good network infrastructure, lack of physical infrastructures like computer furniture and there is a problem with accessing of accessories for damaged and lost ICT infrastructures. Therefore, all educational stakeholders contribute infrastructural facilities like those that construction of computer laboratories should be provided to facilitate the implementation ICT projects in the town.

4.5 Financial Resources

Teachers were asked indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows. (SA Strongly agrees, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree).

Table 4.11 Financial Resources Role

Factors	Valid				
	SA	A	U	D	SD
There is adequate financial resources allocated for ICT implementation	2(2.2%)	5(5.6%)	7(7.8%)	35(38.9%)	41(45.6%)
The school is capable economically to implement ICT	1 (1.1%)	3(3.3%)	1(1.1%)	35(38.9%)	50(55.6%)
The school spends a reasonable amount of money on ICT implementation	1(1.1%)	4(4.4%)	3(3.3%)	29(32.2%)	53(58.9%)

Source: Own Survey result (2020) SPSS Output

From the table, the researcher found out that 45.6% of the respondents strongly disagreed with the view that there is adequate financial resources for ICT projects in their schools, 38.9% disagreed, 7.8% were uncertain, 5.6% agreed and there were 2.2% responded who strongly agree with the statement. Most schools were found to be capable economically to implement ICT projects where; 55.6% of respondents strongly disagreed, 38.9% disagreed, 1.1% were uncertain, 3.3% agreed while those strongly agreeing being at 1.1%. The statement on schools spending a reasonable amount of money on ICT

implementation was supported by 58.9% who strongly agreed, 32.2% disagreed, 3.3% were uncertain while majority at 4.4% disagreed and 1.1% strongly disagreed. Lack of enough financial resources was therefore found to be a central challenge that faced most the management and other well-wishers in schools' ICT projects implementation. This was because of strained and constrained school budgets during these high inflation times.

4.6 Effects of Schools' Visions on Implementation of ICT project

Teachers were asked indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows. (SA Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree)

Table 4.12 Effects of Schools' Visions on Implementation of ICT project

Factors		Valid				
		SA	A	U	D	SD
The school has a 5-year strategic plan	f	3	10	14	26	37
	%	3.3	11.1	15.6	28.9	41.1
The 5-year strategic plan has clear vision of ICT implementation in the school	f	5	6	7	30	42
	%	4.5	5.6	6.7	27.0	37.8
The school has an existing school ICT policy which is in line with National ICT policy	f	4	11	8	17	50
	%	4.4	12.2	8.9	18.9	55.6
The school has in place clear goals and objectives for implementation of ICT	f	6	10	11	33	30
	%	6.7	11.1	12.2	36.7	33.3
The school envisions the need for regular training of teachers in ICT as a staff development programme	f	11	17	16	21	25
	%	12.2	18.9	17.8	23.3	27.8
The school management is committed to the acquisition of ICT tool within a given duration	f	5	7	13	31	34
	%	5.6	7.8	14.4	34.4	37.8
The school has plans for the installation of ICT infrastructure	f	2	3	9	9	67
	%	2.2	3.3	10.0	10.0	74.4

Source: Njoroge Ngugi Francis, Margaret Ngugi and Joab Kinzi (2017)

A look at the data in this table, tell that out of seven selected factors related to schools' visions on implementation of ICT project. Most schools were found to be having the 5-year strategic plan where 41.1% of respondents strongly disagreed, 28.9% disagreed, 15.6% were uncertain, 11.1% agreed while those strongly agreeing being at 3.3%. This was supported by the schools having the 5-year strategic plan and that the strategic plan had clear vision of ICT policy implementation where 4.5% strongly agreed, 5.6% agreed, 6.7% were uncertain while 27.0% disagreed and 37.3 % strongly disagreed.

There was commitment of the management to the acquisition of ICT tools where 5.6% strongly agreed, 7.8% agreed, 14.4% were uncertain while 34.4% disagreed and 37.8 % strongly disagreed.

The school managements envisioned the need for regular training of teacher in ICT where 12.2% strongly agreed, 18.9% agreed, 17.8% were uncertain while 23.3 % disagreed and 27.8 % strongly disagreed. However most respondent indicated that schools had no timeframe for implementing ICT policy where 2.2% strongly agreed, 3.3% agreed, 10.0% were uncertain while 10.0 % disagreed and 74.4 % strongly disagreed. This was further indicated by continued drop in the respondents on whether the schools had existing ICT policy, which is in line with national ICT policy were 17.8% strongly agreed, 23.3% agreed, 15.6% were uncertain while 16.7 % disagreed and 26.7 % strongly disagreed. Schools should review their strategic plans to include ICT policies with clear goals and objectives. The schools should plan for the installation of ICT infrastructure as well as envisioning the need for regular training of teachers in ICT as a staff development program.

4.7 Technical support in teaching and learning

ICT knowledge, skills, and technical support in ICTs are crucial as established in the literature review because it would reduce anxieties associated with new technologies. The research revealed the following in relation to ICTs technical support in schools. The table below indicates percentages of how the teachers agreed or disagreed to the technical

related factors in use of ICTs in schools. SA- strongly agreed, A-agreed, u-uncertain, D-disagreed and SD-strongly disagreed.

Table 4.13 ICT Technical support to teachers

Factors		Valid				
		SA	A	U	D	SD
Lack of finance to train on use of ICT programs	f	6	66	7	5	6
	%	6.7	73.3	7.8	5.6	6.7
Lack of time for in-servicing staff on ICT	f	6	75	3	4	2
	%	6.7	83.3	3.3	4.4	2.2
Insufficient amount of pre-service training on ICT	f	7	66	9	4	4
	%	7.8	73.3	10.0	4.4	4.4
Lack of technician to help teachers with the computer hardware or the software	f	1	77	6	2	4
	%	1.1	85.6	6.7	2.2	4.4
High cost of computer maintenance and upgrading	f	3	73	5	6	3
	%	3.3	81.1	5.6	6.7	3.3
Fear of computer and technology breakdown during teaching process	f	1	77	6	3	3
	%	1.1	85.6	6.7	3.3	3.3
Frequent breakdown of computer and other digital equipment	f	3	79	2	1	5
	%	3.3	87.8	2.2	1.1	5.6

Source: Hailye (2018) and results were own SPSS output.

Access to technical support by the teachers on hardware and software was a big challenge. 1.1% strongly agreed, 85.6% agreed that there was lack of technical support, 6.7% were uncertain, 2.2% disagreed, and 4.4% strongly disagreed. High cost of the computer maintenance and upgrading limited teachers where 45.8% agreed, 29.2% strongly agreed, 4.2% were uncertain while 12.5% disagreed and 8.3% strongly disagreed. The teachers also felt that there were high costs of staff training on simple basic skills of computer maintenance; where 3.3% strongly agreed, 81.1% agreed, 5.6% were uncertain while 6.7 % disagreed and 3.3 % strongly disagreed.

There was mixed responses on the assumption that teachers feared computer and technological breakdown as they use. Where 1.1% strongly agreed and 85.6% agreed, 6.7% were uncertain while 3.3 % disagreed and 3.3% strongly disagreed. Frequent

breakdown of computers and other digital equipment during teaching and learning had the following results; 3.3% strongly agreed, 87.8% agreed, 2.2% were uncertain while 1.1 % disagreed and 5.6 %strongly disagreed. The focus of developing countries should be on how they use ICTs to compensate for the factors that are lacking in education, namely, well-trained teachers and the resources to pay for expensive equipment. The task is to concentrate on technological alternatives that, at low cost, bring to students the imagination and creativity of a few excellent teachers. One can conclude that teachers have computer and ICT training gaps. Policies must take into account the retraining of teachers incorporating use of ICTs in education. Teachers should skillfully redesign learning environments so that students can transfer their newly gained ICT skills to other applications to use in an ICT rich environment.

None of the principals interviewed had benefitted from the government economic stimulus program of providing ICTs in secondary schools. The principals also noted out that they did not have specialized ICT teachers in their schools and employing teachers was an additional strain to already an over stretched budget. This was very common in the public schools, which did not ask for extra money from the parents apart from the fees as guided by the ministry of education.

4.8 Testing of Hypotheses Using Chi-Square

4.8.1Testing of the First Hypothesis

Ha1: Infrastructural facilities have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in Jimma Town.

Table 4.14 Showing Observed and Expected Responses on Role of Infrastructural Facilities.

	SA	A	U	D	SD	Total
Observed N	2	4	6	3	75	90
Expected N	18.0	18.0	18.0	18.0	18.0	
Residual	-16.0	-14.0	-12.0	-15.0	57.0	

Source: Own Survey result (2020) SPSS Output

Table 4.15 Showing Chi-Square Testing for the First Hypothesis

factor	Chi-Square	df	Asymp. Sig.
there is adequate Number of Computers in Schools for CIT implementation	226.111[a]	4	.000
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 18.0.			

$\chi 2C = 226.11 > \chi 2_{\alpha\ 0.05} = 9.488$ at 4 degrees of freedom and 5% level of confidence. Since the calculated chi-square value of 226.111 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus Infrastructural facilities have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in in Jimma town, Ethiopia.

4.8.2 Testing of the second Hypothesis

Ha2: Financial resources have a significant influence in Information Communication Technology projects implementation in public secondary schools in Jimma town.

Table 4.16 Showing Observed and Expected Responses on Role of Financial Resources.

	SA	A	U	D	SD	Total
Observed N	2	5	7	35	41	90
Expected N	18.0	18.0	18.0	18.0	18.0	
Residual	-16.0	-13.0	-11.0	17.0	23.0	

Source: Own Survey result (2020) SPSS Output

Table 4.17 Showing Chi-Square Testing for the second Hypothesis

	Chi-Square	df	Asymp. Sig.
There is adequate financial resources allocated for ICT implementation	75.778[a]	4	.000
0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 18.0.			

Source: Own Survey result (2020) SPSS Output

$\chi 2C = 75.778 > \chi^2_{\alpha\ 0.05} = 9.488$ at 4 degrees of freedom and 5% level of confidence. Since the calculated chi-square value of 75.778 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus financial resources have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in Jimma town, Ethiopia.

4.8.3 Testing of the Third Hypothesis

Ha3: Schools' visions have a significance influence in the implementation of ICT projects in public secondary schools in Jimma town.

Table 4.20 Showing Observed and Expected Responses on Role of schools vision

	SA	A	U	D	SD	Total
Observed N	3	10	14	26	37	90
Expected N	18.0	18.0	18.0	18.0	18.0	
Residual	-15.0	-8.0	-4.0	8.0	19.0	

Source: Own Survey result (2020) SPSS Output

Table 4.21 Showing Chi-Square Testing for the Third Hypothesis

	Chi-Square	df	Asymp. Sig.
The school has a 5-year strategic plan	40.556[a]	4	.000
0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 18.0.			

Source: Own Survey result (2020) SPSS Output

$\chi 2C = 40.556 > \chi 2_{\ \alpha\ 0.05} = 9.488$ at 4 degrees of freedom and 5% level of confidence. Since the calculated chi-square value of 40.556 is greater than the critical chi-square value at

5% level of confidence, we accept the alternative hypothesis thus schools vision have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in in Jimma town, Ethiopia.

4.8.4 Testing of the Four Hypothesis

Ha4: Teachers' ICT knowledge and skills have a significance influence in the implementation of ICT projects in public secondary schools in Jimma town.

Table 4.22 Showing Observed and Expected Responses on Role of Stakeholders

	SA	A	U	D	SD	Total
Observed N	1	77	6	2	4	90
Expected N	18.0	18.0	18.0	18.0	18.0	
Residual	-17.0	59.0	-12.0	-16.0	-14.0	

Source: Own Survey result (2020) SPSS Output

Table 4.23 Showing Chi-Square Testing for the Fourth Hypothesis

	Chi-Square	df	Asymp. Sig.
Lack of technician to help teachers with the computer hardware or the software	242.556[a]	4	.000
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 18.0.			

$\chi 2C = 242.556 > \chi 2_{\alpha\ 0.05} = 9.488$ at 4 degrees of freedom and 5% level of confidence. Since the calculated chi-square value of 242.556 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus Teachers' ICT knowledge and skills have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in in Jimma town, Ethiopia.

4.9. Summary of Descriptive Statistics

The analysis is based on the assumption Zaidatol (2009) comparison bases of mean score for five point Likert scale instruments is used to compare the mean value. According to Zaidation (2009), the mean score below 3.39 is considered as low; the mean score from 3.40 up to 3.79 is considered as moderate and mean score above 3.8 is considered as high. The factors with means exceeding to 3.8 present a high agreement of the respondents. This study also accepts the assumption of Zaidation (2009).

Table 4.24 the ranking of the influencing factors of ICT implementation in schools

Factors	N	Mean	Std. Deviation
School ICT Infrastructure	90	4.7823	.70115
ICT School Vision	90	3.5111	1.07311
Financial Resource Role	90	3.2778	1.26338
ICT Knowledge and Skills	90	2.3222	0.93423

Source: Own Survey result (2020) SPSS Output

Based on the ranking, the highest influencing factors of ICT project implementation in the study area were School ICT Infrastructure at means score of 4.82, ICT School Vision at mean score of 3.51, next financial resource role at mean score of 3.37, and ICT Knowledge and Skills at mean score of 2.02.

4.10. Discussion of findings

Infrastructure was found to be a major determinant of ICT projects implementation in schools.

Low numbers of computers: The respondents also observed that Low numbers of computers in schools has contributed to poor implementation of ICT in Jimma town. Some schools do not have computers and books in ICT while others have less than the adequate number of computers to teach effectively. The study observed that the number of computers in the schools was evidently low where 8.9% have less than five computers, 10.0% have five to ten computers, 14.4% ten to fifteen computers, 38.9% have fifteen to

twenty computers while 26.7% of the total number of the schools sampled have 20 computers and above. This makes them inadequate and inaccessible for use by the teachers and the students. This was agreement with the Hare (2007), found that Access to ICTs by teachers is also limited, especially to computers and the Internet, which makes it difficult to assume that educators can integrate ICT into their teaching.

Lack of ICT infrastructure like computer laboratory: Most of schools do not have ICT infrastructure like computer laboratory making it very difficult to implement ICT in Jimma town seconder schools. The first thing to do to have a good ICT implementation is to build go infrastructure to facilitate successful ICT implementation. Therefore, every authority, region and institutions had to come up with strategic plans of how they were going to solve the problem of infrastructure to help the government implement ICT successfully. Most of the schools in Jimma town where the study was carried out were found not to be having formal computer laboratories forcing some schools to change one of their classes in a computer laboratory, some had their computers only left to rust in offices of the principal, others were in the store. Only 15.6% of the respondents said that their computers were placed in formal laboratories. Most of the computers in the schools are found in the converted classrooms and was represented by 47.8%, 33.3% have their computers in the offices while 2.2% have their computers in other places. This implied that the planned ICT projects for secondary schools have not been fully implemented in Jimma town.

Limited internet connectivity: There is low internet connection in the public secondary schools. Recurrent interruption of internet connection was the main challenges in secondary school. As study indicated, 92.2% of the schools did not have internet connection. This implies that most of the students and teachers never access the e-learning materials. In the literature review Hare (2007) states that access to ICTs by teachers is limited, especially to computers and the Internet, which makes it difficult to assume that educators can integrate ICT into their teaching.

Poor funding for implementation of ICT: The researcher further found out that 27.8% of the respondents strongly disagreed with the view that there is adequate financial resources for ICT projects in their schools and 22.2% disagreed. Most schools were found to be capable economically to implement ICT projects where; 24.4% of respondents strongly disagreed and 24.4% disagreed. Additionally the statement on schools spending a reasonable amount of money on ICT implementation was supported by 21.1% who strongly agreed, 30.0% disagreed. Some of the participants in the study proposed that the funding of ICT implementation was fundamental in the implementation of ICT. Therefore, the government of Ethiopia must aim at increasing the funding to implement ICT. Some respondents said the government of Ethiopia knows very well that funding is very poor to this effect but why they cannot do the right thing by doing first things first is what is not known. Furthermore, respondents suggested those in planning for the implementation should be inspected to see if they are competent if not they be replaced by competent ones.

The principals interviewed confirmed that the cost of hardware and the software is high hence a major hindrance in the integration of ICT in teaching and learning. Budget constraints in the schools cannot allow the principals to make investment in training their teachers on the use of computer programs in the class. At the same time, the heads of the schools fear that after training the teachers they can also transfer to other schools making the training given to these teachers inappropriate use of the already scarce financial resources in the schools.

Absence of technical support: This leaves teachers unable to handle computer breakdowns in the absence of technicians in the schools. The teachers accepted that there were regular computer failures, which interrupt classroom progress. Teachers also lack familiarity with best practice on accepting of how to use ICTs, because of lack of ICT policy in their schools. Access to technical support by the teachers on hardware and software was a big challenge. The study showed that 85.6% agreed that there was lack of technical support. The teachers also accepted that there was regular computer breakdown, which interrupt classroom progress and that they fear to use computers in class because

of inadequate technical support. The study found the teachers also felt that there were high costs of staff training on simple basic skills of computer maintenance; where 3.3% strongly agreed and 81.1% agreed. The teacher training programs have not adequate incorporate ICT training in the teacher training programs. This is because most of the teachers agreed to that they have limited pre-service training before they are deployed in the schools and also, lack of time for in-service staff training. Similarly, all most all respondent study the 83.3% teachers agreed lack of time for in-servicing staff on ICT skills. The respondents of the study (85.6%) stated that they Lack of technician to help teachers with the computer hardware or the software. This leaves teachers unable to handle computer breakdown in the absence of technicians in the schools.
The teachers also accepted that there was regular computer breakdown, which interrupt classroom progress and that they fear to use computers in class because of inadequate technical support.

This was in agreement with the views by the World Bank Institute report (2009), that the backbone of ICT projects in education ties itself to infrastructural facilities that range from hard infrastructure like: computer laboratories, computers, and electricity and computer hardware, to software infrastructure like local internet connection and computer software. Therefore, the slowed rate of ICT projects implementation in the region was highly tied to the fact that most schools were missing proper ICT infrastructure like electricity, computer laboratories, and the computer itself.

According to Mingaine (2013), a typical claim that investing in IC is cost-effective, as well as the continuous decline in ICT prices, the entire cost of possession of ICT including software, hardware, upgrading, maintenance, development and acquiring right skills remains high. Investing in ICT for schools might be perceived as an additional cost, and supporting significant ICT implementation is a problem experienced by many schools in developing countries, mainly those that rely on donor support. The research found out that 27.8% of the respondents strongly disagreed with the view that there is adequate financial resources for ICT projects in their schools, 22.2% disagreed, 17.8% were uncertain,18.9% agreed and there were 13.3% responded who strongly agreed with

the statement. Cost of computer accessories is high as the principals disclosed. Budget constraints in the schools cannot allow the principals to make investment in training their teachers on the use of computer programs in the class .To save on these costs they are forced to develop policies restricting the use of computer related materials, which further disadvantages the teachers and the students. In most developing countries, it is very hard when it comes to implementing technology into education systems because it involves substantial funding by the government. The teaching aids for ICT demands a lot of funds and setting up the infrastructure, maintenance and support of ICT facilities are some of the problems that the schools are having (NomsaMndzebele, 2013).

Inadequate Schools' vision: ICT projects implementation could be possible in the world when proper school vision and management come in an on behalf of. The selected factors of the schools' visions on ICT were strong indicators of effective implementation of ICT project in public secondary schools. Factors like schools having elaborate plan for ICT implementation, the need for regular training of teachers in ICT and commitment to acquiring ICT tools should be addressed to increase implementation of ICT projects in public secondary schools (Francis, Ngugi, and Kinzi 2017). The study sought to find out the school vision that influence the implementation of ICT projects in Jimma town count and found out that most schools do not support the implementation of ICT projects fully. This was with 65% of the respondents while 5% were not sure and 30% agreed that school administration support ICT. However most respondent indicated that schools had no timeframe for implementing ICT project where 2.2% strongly agreed, 3.3% agreed, 10.0% were uncertain while 10.0 % disagreed and 74.4 % strongly disagreed. This was further indicated by continued drop in the respondents on whether the schools had existing ICT policy, which is in line with national ICT policy were 17.8% strongly agreed, 23.3% agreed, 15.6% were uncertain while 16.7 % disagreed and 26.7 % strongly disagreed. However most respondent indicated that schools had no timeframe for implementing ICT policy where 2.2% strongly agreed, 3.3% agreed, 10.0% were uncertain while 10.0 % disagreed and 74.4 % strongly disagreed. This was further indicated by continued drop in the respondents on whether the schools had existing ICT

policy, which is in line with national ICT policy were 17.8% strongly agreed, 23.3% agreed, 15.6% were uncertain while 16.7 % disagreed and 26.7 % strongly disagreed. According to Grono (2010), technological thinking and problems could be reduced through demonstrating clear visions, stranded with pedagogical understanding, and reflected in well-constructed, short-term and long-term, strategic plans. In Jimma town, all the interviewed principals lacked a strategic plan and vision for ICT projects in their schools.2 out of the 3 were found to be having misplaced ideas when they argued that ICT could lead to unnecessary expenditure, could spoil the students and the teachers at large. Therefore, the research attributed the slow rate of ICT projects implementation to the fact that administration does not fully give fully support through hiring of ICT teachers, allocating funds and lacking both ICT vision and strategic plans in their schools. The study also observed that selected factors related to schools' visions were comparatively the major hindrance to implementation of ICT project in secondary schools in the study area. In this regard, the negative factors related to schools' vision need to be addressed to make the implementation of ICT project a reality. This can be achieved through schools reviewing their strategic plans to include ICT policies with clear goals and objectives. The schools should plan for the installation of ICT infrastructure as well as envisioning the need for regular training of teachers in ICT as a staff development program. The school management should be committed to acquisition of ICT tools within a given duration.

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, discussions, conclusions and recommendation of the research. The chapter also contains suggestions of related studies that may be carried out in the future.

5.2 Summary of Findings

The research aimed at finding out the factors that influence the implementation of ICT projects in public secondary schools in Jimma town. From an analysis and review of the research data and additional data gathered through the respondents and informants, a number of issues became apparent.

The first objective of the study was to establish how infrastructural facilities influence the implementation of Information Communication Technology projects in public secondary schools in Jimma town. Data analysis, interpretation of interview responses and questionnaire responses from the respondents of the study revealed that infrastructure plays a major role in implementing ICT projects in schools. In the study for example, a greater percentage of above 60% of the schools were lacking formal and well-equipped computer laboratories. Others had turned their classrooms into make shift computer laboratories. Only 3.85% of the schools had more than 20 computers. With the increasing number of students in schools, a number less than 20 computers is much low than the standard agreed ICT4ED 2010 agreement. Only 20% of the population indicated that in their schools there was fully power supply from electricity and back-up generator while 10% of the schools still have no source of power. Frequent power black outs rated high as part of the challenges that were facing most schools in ICT projects implementation.

Inadequate infrastructure includes inadequate number of computers in the schools, inadequate power supply, limited internet connectivity and inappropriate hardware and software. These was related with literature view of Hare (2007) states that access to ICTs by teachers is limited, especially to computers and the Internet, which makes it difficult to assume that educators can integrate ICT into their teaching. From the interview discussion principals confirmed that loss of accessories, lack of physical infrastructure like ICT furniture‘s; printers are some of the challenges related with ICT infrastructure in secondary schools. Therefore, infrastructural development has to be taken into account when implementing ICT projects in schools because they are carefully tied.

The second objective was to determine how financial resources influence the implementation of Information Communication Technology projects in public secondary schools in Jimma town. The study found out that most schools did not have enough financial resources set aside to boost and implement ICT projects. This was shown when 41.7% of the respondents strongly disagreed with the view that there are adequate financial resources for ICT projects in their schools while 45.8% of the respondents disagreed with the statement that their schools spend a reasonable amount of money on ICT implementation. This was also with the principals during the interview when three of the three strongly argued that implementing ICT projects in their schools was a challenge since most of them had constrained budges. This has left many ICT projects in the public schools Jimma town at a hanging level since most of them have no finances that could see their effective implementation.

The third objective was to assess the influences of schools’ visions on implementation of ICT projects in public secondary schools in Jimma town. In the study for example, a greater percentage of above 24.4% of the schools were lacking schools were found to be having the 5-year strategic plan. However most respondent indicated that schools had no timeframe for implementing ICT policy where 2.2% strongly agreed, 3.3% agreed, 10.0% were uncertain while 10.0 % disagreed and 74.4 % strongly disagreed. This was further indicated by continued drop in the respondents on whether the schools had existing ICT policy, which is in

line with national ICT policy were 17.8% strongly agreed, 23.3% agreed, 15.6% were uncertain while 16.7 % disagreed and 26.7 % strongly disagreed. Most schools lack ICT policies that would enable proper integration of ICTs in teaching and learning. These was related with literature view of Alenezi (2015) that stated the integration of an ICT policy for secondary school education to enhance the quality and effectiveness of the learning process is still somewhat limited .High cost of ICT maintenance pushes the principals to cut down on the use of ICTs in teaching and learning. The findings were further supported by the interviewee's report, which indicated that one of negative effect of ICT implementation in the area of this study was that the strategic plan at the sub-county level did not provide plan for the implementation of ICT policy in public secondary schools.

On the final objective that sought to determine the level of teachers' ICT knowledge and skills influence the ICT project implementation in public secondary schools in Jimma town. Access to technical support by the teachers on hardware and software was a big challenge. 1.1% strongly agreed, 85.6% agreed that there was lack of technical support, 6.7% were uncertain, 2.2% disagreed, and 4.4% strongly disagreed. Proper use of ICT is not possible without knowledge, skills and experience to use the available infrastructure in the schools. ICT knowledge and experience depend of teachers' pre-service and in-service training and the research revealed that teachers have varied academic and ICT professional training. The literature review revealed that for proper use of ICTs in schools teachers should have adequate computer skills (Tin 2002). The researcher wanted to establish the teachers' level of ICT knowledge and skills that would enable them to use computers at personal or professional level. From the interview, discussion principals confirmed that, all of the respondents indicate there is no right skilled ICT expert in secondary schools. All interviewee argued that technical problems related with ICT infrastructure affecting the implementation of ICT projects drives from both physical infrastructure and network infrastructure. The literature review of Mogas (2014, p.256) commended that the adoption of ICT international standards and its inclusion in the Ethiopian education system. Continuous training and retraining of teachers, others

supporting staff and academia on computers and ICT skill acquisition should be provided.

5.3 Conclusion

Findings of this study hope fully will provide an objective point of view, which will benefit government and other stakeholders in the education sector to collaborate and be aggressive on the implementation of ICTs project in secondary school. The ICTs have great advantage in improving all sphere of life including education this century. The research expected to establish the factors influencing the implementation of ICT projects in public secondary schools in Jimma town. The researcher therefore concludes that the interplay of factors have negatively influenced and slowed the implementation of ICTs project in teaching and learning in secondary schools.

This includes unavailability and inappropriate, ICT infrastructure in the secondary schools; lack of computer lab in most schools, the insufficient power supply in most of the secondary schools in the town had contributed to the slow integration of ICTs in the schools. Inadequate numbers of computers in the schools, Poor internet connections in few schools and most of schools not having internet connectivity even a school e-mail address and its website.

Lack of sufficient finances has been a challenge in most schools in Jimma town. High cost of computer maintenance, high prices of computers and limited financial support for ICT projects from both the national government and regional government made it hard for the ICT projects to be fully implemented in schools.

Factors related to the schools' visions on ICT with the highest negative effect to implementation of ICT project were schools with no clear vision of ICT implementation and school having no ICT policy, which is in line with National ICT policy. Factors with lowest negative effect were schools having 5- years' strategic plan though most these strategic plans had no clear vision of ICT implementation.

Limited ICT knowledge and skills for both the teachers and principals characterized by inadequate time for in-service courses for teachers; limited technical support during teaching and learning process and restrictive administrative practices mainly limited budgetary allocations and lack of proper ICT policies in the secondary schools.

5.4 Recommendations

Based on the research findings and conclusions drawn, the following recommendations have been forwarded to Education policy makers and other concerned stakeholders to give attention and consideration for successful implementation of ICT project.

- The government should invest heavily to provide adequate number of computers in schools and enhance internet connection in the schools to ensure easy access to teaching learning materials in the web. All educational stakeholders contribute infrastructural facilities like those that construction of computer laboratories should be provided to facilitate the implementation ICT projects in the town.

- The Ministry of Education should finance vote head for the acquisition of ICT infrastructure like internet connection and purchase of teaching and learning programs. Government should make available avenues in which the schools can acquire computers at a reduced cost. This can be done through tax waiver on computers meant for learning in the secondary schools. In addition, schools management should allocate funds for repair and maintenance of the available ICT tools in schools.

- The school administration should familiarize themselves with the national ICTs policies and especially in education in order for them to develop school ICT policy that would enable them integrate use of ICTs in teaching and learning in class. Schools should review their strategic plans to include ICT policies with clear goals and objectives. The schools should plan for the installation of ICT infrastructure as well as envisioning the need for regular training of teachers in ICT as a staff development program. The school management should be committed to acquisition of ICT tools within a given duration.

- There must be well skilled and trained in ICT project services. Secondly, furnishing school with relevant infrastructure like building, retrofitting physical facilities, purchases of hardware and software and the like must be considered. Thirdly, professional development of teachers through in-service courses should be well planned. Lastly, school leaders should have interest, committed and supporter the implementation. To achieve this, the government should collaborate with private sector and other stakeholders in the process of implementing ICT project in schools. Further, the Ministry of Education has been conducting in-service courses to equip teachers and school leaders with necessary ICT skills.

5.5 Suggestions for further studies

However, it is believed that this study has helped to fill some gaps. That is, it would be particularly important that for the following future studies.

1) Factors influencing implementation of ICTs in Public secondary schools in Jimma zone to compare the results.

2) A study could be carried out to find out the factors that influence the implementation of ICTs in the private secondary schools.

3) A comparative study can be carried out on the impact of using ICTs in secondary school performance.

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APPENDIX

Appendix I Questionnaires for teachers

Jimma University

College of Business and Economics

General Directions: The purpose of this study is to collect data on the ***factors influencing implementation of ICT in Public Secondary Schools in Jimma town, Ethiopia***. This questionnaire is a part of Master of Arts in Project Management and finance at the University of Jimma, and is completely unnamed. Please indicate the correct option as honestly and as correctly as possible by putting a TICK "√" on one of the options. For the questions that require your opinion, please complete the blanks. The response for each item in the questionnaire could be of great help to the intended purpose. Therefore, the researcher kindly requests your honesty reply. Responses to the questionnaire will be kept in confidence and the information required for this study will only be used for masters" thesis of project management research''. Your willingness to answer all of the questions will be appreciated. If you have any queries or would like further information about this project, please telephone to me on **+251992505750.**

Thank you for your interest in participating in this survey!

Note: A). Do not write your name.

B). Please respond by putting mark "√"or by writing your responses on the space provided.

Part I: Background Information

1) Age: 20-30 ☐ 31-40 ☐ 41-50 ☐ above 51 ☐

2) Sex: Male ☐ Female ☐

3) Qualification: Certificate ☐ Diploma ☐ Bachelors‟ degree ☐ master's degree ☐ PHD ☐

4) Work experience in years: _____

5) School name_____ Type of school_____ Department name _

Part II: Item on Infrastructural Facilities

6) Does your school have computers? Yes ☐ No ☐

7) If yes in 6 above, approximately name how many? 0-5 ☐ 5-10 ☐ 10-15 ☐ 15-20 ☐ above20 ☐

8) What do computers for use? Exams ☐ teaching ☐ Office work ☐ Others ☐ please specify_____

9) Do you believe that computers are great tools to improve the quality of learning? Yes ☐ No☐

10) If your answer is 'Yes 'how? Explain_____

11) What is the main source of internet in your school? Local network (Wi-Fi)☐ Internet server ☐ not-connected ☐

12) Where are computers located in your school? Computer laboratory ☐ Offices ☐ Converted classes ☐ Staff room ☐ other places ☐

13) Why do you think the answer you have given in 12 above is the most appropriate _____?

14) What is the main source of electricity/power in your school? Electricity ☐ Electricity & Generators ☐ Generators ☐ Solar ☐ No power supply ☐

15) Indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows.(SA-Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree).

No.	Factors	SA	A	U	D	SD
15.1	There is adequate Number of Computers in Schools for ICT implementation					
15.2	The schools have Internet Connection for Computers					
15.3	The school has well-equipped computer laboratories Zq1	`				

Part Iii: Item on Effects of Financial Resource on ICT Implementation

16) **I**ndicate the extent to which you agree that the following reasons influence the adoption of ICT in your school. SA-Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD-Strongly disagree

No.	Factors	SA	A	U	D	SD
16.1	There is adequate financial resources allocated for ICT implementation					
16.2	The school spends a reasonable amount of money on ICT implementation					
16.3	The school is capable economically to implement ICT					

Part IV: items Effects of the Schools' Vision on Implementation of ICT project Factors

17) Indicate the extent to which you agree that the following reasons influence the adoption of ICT in your school. SA-Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- Strongly disagree

No.	Factors	SA	A	U	D	SD
17.1	The school has a 5-year strategic plan					

17.2	The 5-year strategic plan has clear vision of ICT implementation in the school					
17.2	The school has an existing school ICT policy which is in line with National ICT policy					
17.3	The school has an e-mail address and is on a website					
17.4	Majority of the offices are equipped with ICT equipment					
17.5	The school has in place clear goals and objectives for implementation of ICT					
17.6	The school envisions the need for regular training of teachers in ICT as a staff development programme					
17.7	The school management is committed to the acquisition of ICT tool within a given duration					
17.8	The school has plans for the installation of ICT infrastructure					

Part IV: ICTs knowledge and skills influence its implementation in public schools.

18) Can computer improve the efficiency and effectiveness in teaching and learning in schools? Yes ☐ No ☐

19) If the above question answer 'yes', why do you think this has not been achieved?_____

20) Indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows.(SA-Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree).

No.	Factors	SA	A	U	D	SD
20.1	Lack of finance to train on use of ICT programs					

20.2	Insufficient amount of pre-service training on ICT					
20.3	Lack of time for in-servicing staff on ICT					
20.4	Lack of technician to help teachers with the computer hardware or the software					
20.5	High cost of computer maintenance and upgrading					
20.6	Fear of computer and technology breakdown during teaching process					
20.7	Frequent breakdown of computer and other digital equipment					

21) Please rank the use of computer in your school on the scale below: All teachers use computer ☐ Some teachers use computer ☐ No teacher uses computer

22) How is the appropriateness of ICT equipment in your school? Occasional breakages ☐ Not aware Satisfactory ☐ Very good ☐

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Appendix II: Interview Guide for school principals

Answer the following questions to the best of your knowledge. You should note that the questions are meant for a research to establish the determinants of ICT implementation in secondary schools.

1) Does the infrastructural facility have any effect in the implementation of ICT in Secondary schools? Explain.
2) What is the role of finance in implementation of ICT in secondary schools?
3) What is the vision of your school with regard to ICT implementation in your school?
4) In what ways do the level of teachers' ICT knowledge and skills influence the ICT project implementation in your school?
5) Do you provide teachers for training about implementation of ICT project? How are they selected? Do you have plans for training and selecting your teachers?
6) Are you satisfied with ICT project in secondary schools? If yes how? If no why?
7) Do you think your teachers are satisfied with implementation of the ICT project? And how would teacher satisfaction be measured? Do you ask for teacher feedback? How?
8) To what extent do you think ICT project in secondary schools is well designed and does it provide tangible results?
9) In your opinion, what factors facilitate the implementation of ICT project in secondary schools?
10) In your opinion, what factors that hinder the implementation of ICT project in secondary schools? What do you suggest to overcome these obstacles?