Assessment of the Effectiveness of ICTs for Development in Ethiopia

(A case of the SchoolNet Project)

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Certificate of originality

This is to certify that the project entitled **Assessment of the effectiveness of ICTs for Development in Ethiopia (A case of the Schoolnet project)** is an original work of the student and is being submitted in partial fulfillment for the award of the Master's Degree in Business Administration of Indira Gandhi National Open University. This report has not been submitted earlier either to this university or to any other university/institution for the fulfillment of the requirement of a course of study.

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Acronyms

BHN	Basic Human Needs
CSA	Central Statistics Agency
EASSY	Eastern Africa Submarine cable System
EFA	Education for All
EICTDA	Ethiopian Information and Communication Technology Development Agency
ESDP	Education Sector Development Program
GDP	Gross Domestic Product
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
ICT4E	Information and Communication Technology for Education
IT	Information Technology
IS	Information Systems
MDGs	Millennium Development Goals
NGOs	Non-Government Organizations
SSM	Soft Systems Methodology
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural organization

Abstract

Information and Communication Technologies (ICTs) have been expected as a powerful tool for development. However, there is a high rate of project failures of ICTs for Development (ICT4D) projects. This research attempts to discover the reason of ICT4D project failures and solutions to avoid and overcome the failures through analysing a distance education project called 'SchoolNet' in Ethiopia.

The analysis of the SchoolNet project with the 'design-reality gap' (Heeks 1999a; 2002a) shows the techno-centric and the top-down approach without considering the local reality is the cause of several challenges that the project faced. As a gateway to a solution to lessen the design-reality gaps, teachers' participation is chosen since the participative approach is supported by both scholars in Information Systems (IS) and development studies. After discussing serious constraints to realise user participation, two suggestions, which are to have a long term strategy with flexibility and to upgrade teachers from consumer to producer of their educational contexts, are proposed as solutions.

As a conclusion, three suggestions are insisted as solutions to lead future ICT4D projects to success.

(1) The socio-technical approach is essential to avoid misleading ICT4D projects as the technology-centred projects.

(2) User participation is crucial to minimise the design-reality gaps.

(3) Longer term strategy with flexibility and the shift of users' status from consumer to producer of information are important to encourage real user participation as well as to motivate users to participate in ICT4D projects more willingly and actively.

CHAPTER ONE

1. Introduction

This chapter provides information about the research background, statement of the problem, research questions, objectives of the study, and scope & limitation of the study.

1.1 Background

The dawn of the new millennium marked the struggle of third world countries in the realm of information technology. While developed countries are already reaping the benefits of these advancements, developing countries are still groping in the dark whether to invest or not. Major social and economic alterations in most countries were attributed to their daring feats with the most advance micro-electronics-based information and communication technologies (ICTs). Their uses expand beyond all segments of economies and societies. ICT opens the door for potential and further growth for developed countries. It is these gains that prompt other countries to launch extensive support to the construction of a global information infrastructure (Mansell and When, 1998). In this decade, information and communication technology (ICT) has been seen as a powerful tool for assisting poor countries to achieve further development (Sahay and Avgerou 2002).

e-Government is a 'tool to enhance the economic competitiveness of business and to empower citizens' (Kraychuk and Schack, 1996), and to improve both service delivery and government decision making. Some of the benefits to citizens and businesses from this initiative are identified as:

- Better delivery of services and information;
- The creation of new employment opportunities;

- Reform of the public sector;
- Access to information empowering citizens;
- Bridging the digital divide and improving efficiency,
- Effectiveness, transparency and accountability of government processes, and Increase the possibility of foreign investment and assistance.

Although the Ethiopian state recognizes the crucial role of improved information technology in achieving the country's national objectives, its efforts are still want in terms of fully developing this sector. In order to give a clear view of the online development of the Government presence following is a description of the e-Government stages of progress:

✦ *Emerging*: in this stage a few independent government official websites establish their presence. The websites contain limited, basic and static information. The Internet functions as a brochure for posting government information on-line. In this stage customer cannot interact with officials.

✦ *Enhanced*: a comprehensive regular updating for the content and information of the websites including publications, legislation, newsletters, links, search engine and e-mail capabilities.

✦ *Interactive*: great deal of communication through downloadable forms, official emails through which users can make appointments and requests.

✦*Transactional*: a financial transaction presence where users can pay for services online. In addition, more sophisticated functions including digital signatures, passwords and encryption are also provided.

✦ *Seamless*: fully integration across departments to present e-Services and functions. All services can be accessed instantly from one portal without differentiation between government agencies and departments (UNDPEPA, 2002).

These stages are representative of the government's level of development based primarily on the content and deliverable services available through official websites. They are methods for quantifying progress. As the stages in e-Government initiatives have become operational; governments have begun to focus attention on measuring the efficiency, performance and impact of their websites. Performance measurement is a very important tool for the e-Government efforts. It can monitor the process of the e-Government initiatives and ensure that government's time and fund are being well spent (Ho, 2002).

Ethiopia, one of the poorest countries, is the one that expects ICT as an enabler for development. The prime minister of Ethiopia, Meles Zenawi said, 'We did not believe serious investment in ICT had anything to do with facing the challenges of poverty that kills. Now I think we know better. We recognise that it is a vital and essential tool for fighting poverty – for beating poverty that kills and ensuring our survival' (Zenawi cited in Farrell and Issacs 2007: 3-4).

Actually, the Ethiopian government has an ambitious e-government strategy which covers various sectors such as education, health, agriculture, and public administration (Dzidonu 2006; Tadess 2006). As a core part of the nation-wide e-government strategy, the distance education project, called 'SchoolNet', was launched in 2003 with support from UNDP (Hare 2007). It aims to broadcast video lectures of main subjects, which can be seen on plasma television displays equipped in classrooms, to almost all secondary and preparatory schools (about 550 schools) from the capital city, Addis Ababa through a satellite network, and to provide the internet connection for the schools in order to supply useful information about teaching and learning and to lessen the gap of education level between rural and urban areas (UNDP 2005; UNESCO 2004). In fact, in the case of the SchoolNet project in Ethiopia, many kinds of problems, such as, poor

infrastructure, low skills for maintenance, low motivation of teachers and language problem used in the contents, were identified by the author.

1.2 Rational of the Study

The School Net project arises from the need to integrate ICTs into Ethiopia's educational system. It is designed to develop a wide-area network linking all schools in the country and making internet and online education accessible to them. The initiative constitutes a key component of e-government programme and aims at the application of ICTs for purposes of teaching and learning.

SchoolNet facilitates effective learning for the national student population and enhance the teaching capacity of educators by providing all with a wealth of online instructions, lectures, references and other content in interactive multimedia formats, from national, regional as well as international sources, all accessible from any location throughout Ethiopia and at any time. This study explores the effectiveness of School Net Project in the progress of ICT application. The paper investigates the progress, challenges and opportunities of School Net Project in Ethiopia since its establishment. In order to achieve the main purpose of the study, the researcher evaluates the short-term and long-term plans of the e-government program of Ethiopia.

The result of the study will provide information regarding the current situation of School Net in Ethiopia. The common ICT concerns, problems and issues of School Net will be given attention in hope of addressing their needs to be able to help themselves as productive sectors of the country as well as to contribute to the overall education gains of the nation. The findings of this particular research endeavor will likewise promote awareness among education stakeholders.

In order to have efficient and effective e-Government in Ethiopia, one of ICTs activities, such as School Net implementation shall be managed in accordance with acceptable theories and practices. Conducting research on School Net practices to evaluate its effectiveness and identifying the major reasons that adversely affect its success may help e-Government officials particularly Ethiopian ICT Development Agency and Ministry of Education:-

- To bring improvements in overall School Net activities,
- To generate knowledge in respect with underutilization of resources and a means to get rid-off,
- To provide different techniques in manipulation of School Net requirements with best level of competency,
- To create the prospective of successful implementation and getting away from the problem of mismanagement and underutilization of resources.

1.3 Statement of the Problem

It seems that ICT brings about the development dramatically. However, there are not only positive reputations of ICT4D projects but also negative ones. For example, in the case of a telecentre which can be considered as a typical ICT4D project, many telecentre projects lack sustainability in reality (Oestmann and Dymond 2001). Additionally, 85 % of e-government for development projects is reported to be failure or partial failure (Heeks 2003). Moreover, when it comes to educational sector, there has been no definitive evidence to justify the more effectiveness of ICT investment than alternatives such as provision of text books, teacher training and nutritional supplement which may also improve educational situation (Cawthera 2001).

Implementation of ICTs-in-Education Initiatives, The Study shows that the majority (70 percent) of public and private schools that participated in study do not have ICT expenditure allocation as part of their annual school budget. The

implication of these findings is that: the vast majority of Ethiopian schools have limited or no financial resources at their disposal to implement or fully participate in a national SchoolNet initiative. A key challenge therefore is: the lack of financial and other resources to support e-education initiatives within the schools. This study will focus on identifying the issues of the effectiveness of School Net project in Ethiopia.

1.4 Research Questions

The basic questions which will be conducted to search the facts from the study area:-

1. How the government of Ethiopia assists the implementation of School Net?
2. What are the short-term and long-term e-government programs That the government of Ethiopia implements?
3. What are the policies that the Ethiopian government upholds to protect and maintain the country's School Net program?
4. What are the determinants of the feasibility and success of instituting School Net in Ethiopia?
5. What are the impacts of School Net to the educational development?
6. Why did the SchoolNet project face several challenges?
7. How can the SchoolNet project overcome the challenges?
8. How can the lesson from the SchoolNet project be used for the future e-government projects in Ethiopia?

1.5 Objectives of the Study

1.5.1 General Objectives

Since the study is primarily concerned with assessing the effectiveness of e-Government with especial reference to School Net in Ethiopia, the focus will be on finding out the success of implementing School Net in the country in meeting the demands of the educational development. The primary objective of this research is to evaluate the extent that the School Net project is effectively implemented in Ethiopia to achieve the grand objectives of educational goals at most effective level of understanding.

1.5.2 Specific Objectives

The following specific objectives will be recognized by this study:-

1. To study how the government of Ethiopia assists the implementation of School Net;
2. To identify the short-term and long-term government's ICT programs;
3. To study the policies that the Ethiopian government upholds to protect and maintain the country's School Net program;
4. To identify the determinants of the feasibility and success of instituting School Net in Ethiopia;
5. To develop clear view of how School Net Project is implemented in Ethiopia;
6. To identify the reasons negatively hinder (challenges) the effectiveness of School Net Project in Ethiopia;
7. To study how the School Net Project overcome the challenges;

1.6 Scope and Limitation of the Study

This research will primarily focus on assessing the implementation of programs and policies of School Net Project in Ethiopia. The focus will be on finding out the success of the implementation of School Net and its contribution to the educational success of the country. The study is also interested in finding out the feasibility and success of such program particularly to the ways and measures that the government employs in order to empower the School Net. The research will likewise present the common shortcomings, issues and problems that the School Net has.

Some of the possible constraints that the researcher may encounter while conducting the research include maintaining scheduling appointments with selected participants, the interviewees or informants who will rather refuse to take participation in the study, issues on the conceptualization and construction of the interview guide questionnaires, gatekeepers of information and permits, accumulating enough in-depth data and issues on the quality of the data gathered, time constraints of the semester require less time than may be ideal for an ethnographic study.

School Net Project covers the whole regions of Ethiopia. It is so broad and its outcome also looks so complex if it is going to be managed the research properly. But due to time and financial constraints to deal with in depth, the findings of the research will have a limitation to search every reason of negatively hinder the effectiveness of each project and the outcomes reflected.

1.7 Expected Contribution from the Study

The research shall be conducted as per the recommended methodology and with reference to contemporary literature. The recommendation would help the concerned government offices and educational sector to make appropriate decision

with better level of information. Specifically, the expected contributions of the research include three main parts in the course of research as follows:-

- ✦ Finding on School Net Project inception, development and implementation,
- ✦ Analysis of School Net implementation in general and success/ failure factors in particular,
- ✦ Recommendation to:-
  - Decision makers in School Net – lessons for future similar effort,
  - Researchers possible further research areas.

CHAPTER TWO

2. Literature Review

This chapter presents the theoretical and conceptual framework relevant to the research topic. The chapter aims at discussing the basic concepts of assessment of the effectiveness of ICTs for development in Ethiopia.

Among many sectors in which ICT is used, education can be regarded as one of the most important sectors. It is easy to understand that education has been a focal point of development when we consider the fact that main development initiatives have been always related to education such as Education for All (EFA) (UNESCO 2007) and the Millennium Development Goals (MDGs) (UN 2004). Thus, it is true that education is definitely crucial for human capacity building which is fundamental for development. Many authors (World Bank14 1995; Psacharopoulos 1995; Colclough and Lewin 1993) pointed out the importance of education for development (Lewin and Caillods 2001). For instance, literacy enables people to have greater knowledge and skills which ensure higher-paid employment (UNESCO 2006). Education is essential for addressing development issue such as unemployment, poor health and gender inequality. Therefore, more efficient and effective educational projects are always needed for national development. Unsurprisingly, for this purpose, ICT has gained more and more attention, and the use of ICT including radio and television for education has a long history (Grace and Kenny 2003).

Ethiopia's Information and Communication Technology (ICT) policy is an integral part of the country's larger development goals and objectives. While the goal is to rapidly transform the country's subsistence agricultural-based economy and

society into a predominantly knowledge- and information-based economy and society, the focus of the policy will be on the country's ICT development process. To achieve this objective, the Government of Ethiopia has developed multiple policies, most notable of which are the National ICT Strategic Plan and the ICT4D Action Plan for the year 2006-2010.

The Ethiopian Information and Communication Technology Development Agency (MINISTRY OF COMMUNICATIONS & IT) has a mission to develop, deploy and use ICT to improve the livelihood of Ethiopians and optimize its contribution to the development of the country. The Agency has thus undertaken a number of e-Government assignments to avail government services online and improve the access to the general public. The Government Information System Development and Data Centre Administration team of the Agency is managing projects targeted towards development of integrated information systems to avail government services online.

However in the current context there was a need to integrate the ICT initiatives undertaken and provide a strategic direction for e-Government implementation in the country. It is in this context MINISTRY OF COMMUNICATIONS & IT has engaged PricewaterhouseCoopers Pvt. Ltd. for designing the National e-Government strategy and implementation plan for the Government of Ethiopia.

2.1 Background of ICT4D

Let us see both opportunities and challenges of ICT4D projects by referring some literatures as follows:-

2.1.1 Opportunities

Opportunities of ICT4D are justified from three layers, such as ICT4D, ICT4E and e-government projects.

2.1.1.1 ICT4D

First of all, it is reasonable to start to justify necessity of ICT4D projects. One may have a question that which one is more important for developing countries, ICT or basic human needs (BHN)? However, this argument is not realistic because people in developing countries need both of them like 'water and information' (Heeks 2008a: 2). For instance, Castells (2001) insists that 'Development without the Internet would be the equivalent of industrialisation without electricity in the industrial era' (ibid: 269). The magnitude of the Internet for economic development is so huge since it can provide 'information power', 'knowledge generation' and 'network capacity', and being disconnected to the Internet means isolation from the global economy (ibid: 269).

Moreover, ICT can be a tool to make development projects more effectively and efficiently to fulfil the basic human needs (BHN). Therefore, it is not meaningful to prioritise one over the other, and what is more important is to think 'how' ICT can be utilised for creating better development projects (Walsham and Sahay 2006;Walsham et al. 2007). Along with this trend, the importance of ICT4D has been manifested by many officials and scholars (Wims and Lawler 2007). For instance, the former secretary general of the UN, Kofi Annan (2001) mentioned, *'…they [new technologies] are, without doubt, enormously powerful tools for development. They create jobs. They are transforming education, health care, commerce, politics and more. They can help in the delivery of humanitarian assistance and even contribute to peace and security'* (ibid: para3).

As Annan (2001) stated, ICT has a great potential to enable developing countries to develop. For example, distance learning and telemedicine assist people living in remote areas to access to useful information about education and healthcare respectively, and e-government project provides better services and more

transparency for citizens to build good governance. Even, there is an opinion that the information poverty is considered as the hardest obstacles to sustainable development (Prahalad and Hart 2002). Therefore, the ICT-enabled access to information can empower the poor (Wims and Lawler 2007). In fact, the importance of ICT use for development has been increasing and actual ICT use has spread out to wider sectors such as education, health, income generation, agriculture, public administration, public services, and so on.

2.1.1.2 ICT for Education

Among many sectors in which ICT is used, education can be regarded as one of the most important sectors. It is easy to understand that education has been a focal point of development when we consider the fact that main development initiatives have been always related to education such as Education for All (EFA) (UNESCO 2007) and the Millennium Development Goals (MDGs) (UN 2004). Thus, it is true that education is definitely crucial for human capacity building which is fundamental for development. Many authors (World Bank 1995; Psacharopoulos 1995; Colclough and Lewin 1993) pointed out the importance of education for development (Lewin and Caillods 2001). For instance, literacy enables people to have greater knowledge and skills which ensure higher-paid employment (UNESCO 2006). Moreover, educated mothers are likely to have safer deliveries; hence health babies, and also they tend to educate their daughters (Schultz 1993). In other words, education is essential for addressing development issue such as unemployment, poor health and gender inequality. Therefore, more efficient and effective educational projects are always needed for national development. Unsurprisingly, for this purpose, ICT has gained more and more attention, and the use of ICT including radio and television for education has a long history (Grace

and Kenny 2003). Now let us see the benefits of ICT for education as explained below.

1) ICT can increase access to education:

ICT such as distance education system, e-learning and access to personal computers (e.g. OLPC) provides education to people in remote areas where teacher recruitment is often difficult. Moreover, the internet enables them to access any information in the world without actual transportation.

2) ICT can improve the quality of education:

The quality of education is improved by ICT through use of digital teaching and learning materials, broadcasting qualified lecturers and providing distance learning for teachers.

3) ICT can motivate students:

ICT motivates not only students to study but also their parents to send their children to schools, because computers are something new which seem attractive and nowadays people recognizes that ICT skill is necessary for the information age.

2.1.1.3 E-government

To realise the above mentioned benefits, many ICT4E projects have been implemented by international organisations, non-governmental organisations (NGOs) and developing countries' governments. Amongst these stakeholders, government may have the strongest influence since the educational sector is managed within a framework of national educational policies and most schools are governmental ones. Actually, in the case of Ethiopia, the Ethiopian government has implemented ICT4E project as a key component of the broad e-government strategy (Getahun 2006). Furthermore, when it is considered that 'government has been the single largest collectors, users, holder and producer of information'

(Heeks 1999a: 16) and that the national development policy is created by the government, it is obvious that the government is the most important stakeholder not only for ICT4E but also ICT4D initiatives in general.

2.1.2 Challenges

As mentioned above, since the advantage and rationale of ICT use for development is understandable, an optimistic expectation may be generated that ICT is used as a powerful tool for development in many projects under the adequate government initiative. However, the reality is different from such an optimistic expectation. According to Heeks (2003), 35% of e-government projects in developing and transitional countries are total failures and 50% are partial failures. Similarly, Gauld and Goldfinch (2006) mention the high failure rate of e-government projects, especially large projects. Likewise, in the case of Ethiopia, particularly, the report from Addis Ababa University states that Addis Ababa city administration spent huge amount of money for ICT investment but the outcome is not as much as expected (Bekele et al. 2005). Moreover, in the case of ICT4E projects, negative statements are found on the documents from InfoDev/World Bank. For example, 'the positive impact of ICT use in education has not been proven' (Trucano 2005: 6) and 'the use of ICTs in education in many developing countries, especially the "poorest of the poor" is associated with high cost and potential failure' (infoDev 2007: 2). Why do ICT4D projects fail in such a high rate? In the following sections, factors which can cause failures of ICT4D projects are presented from three angles.

2.1.2.1 Techno-centric approach

One of the major reasons for ICT4D projects failure is a techno-centric approach. The weakness of the technology-centred approach is explained in terms of Information Systems (IS) projects generally and ICT4D projects particularly.

Firstly, in the case of IS projects in general, many authors (Laudon and Laudon 2004; Avison and Fitzgerald 2003; Checkland and Scholes 1990) point that IS projects often do not achieve expected benefits because of a lack of consideration to broad factors beyond technology. For instance, typical failures are such that a new IS is developed and works properly, but nobody uses it and that an IS is developed to solve the targeted problem, but the problem do not exist in fact (Curtis and Cobham 2005).

According to Laudon and Laudon (2004), IS is determined by not only technology but also management and organisation. Similarly, Avison and Fitzgerald (2003) state that 'the world of information system is concerned with organizations and people as much as technology' (ibid: 38). Secondly, when it comes to the IS projects in developing countries especially, there are more importance on the factors, such as political, economic, organisational and cultural aspects than technology since there are more diversities, instabilities and contradictions in the society and organisation in the developing and transitional economy (Salazar 1999; Westrup el al. 2003; Sahay and Walsham 1996). Truly, there are many kinds of constraints for ICT4D projects, such as, poor infrastructure (Duncombe 2006; Ndou 2004), organisation or community acceptance (Whyte 1999 cited in Harris et al. 2003), relevance of information (Etta and Parvyn, 2003), financial sustainability (Oestmann and Dymond 2001), lack of training and skilled personnel (Ndou 2004), literacy (Roman and Colle 2002; Warschauer 2003), gender (Farrell and Isaacs 2007; Törenli 2006).

When these constraints are allocated on the 'Onion-ring model' (Heeks 2007b) which shows broad factors affecting IS, it is obvious that technology is just a part of a whole and most of the constraints are not technological factors. planners and technology advocates think of the technology first and then investigate the

educational applications of this technology only later' (ibid: 5). As discussed above, it is clear that taking the techno-centric approach without paying enough attention to broader factors is one of the main causes of ICT4D project failure.

2.1.2.2 Idolise Approach

Though the shortcoming of the technology-sided approach is understood, why does such an inadequate approach tend to be chosen? The reason is explained by the maturity of the project stakeholders. As is the case of most development projects, local policy makers tend to be the main stakeholders for ICT4D projects such as e-government and ICT4E. However, they often think that ICT is a silver bullet which can solve any problems (Piotti and Macome 2007; Heeks 1999a). For example, a research about a national healthcare IS project in Mozambique found that policy makers considered computers as a complex 'black box' which brings miracle solution for problems (Piotti and Macome 2007). Though the 'Integrate' approach, which places technology as a tool to create a solution, is considered as the best one, the policy makers are unlikely to be so mature that they can consider technology as a tool, and therefore, they tend to take 'Idolise' approach, which places technology at the centre of projects.

It is because that there are many drivers which encourage 'Idolise' approach such as positive image and frequent advertisement of IT solutions created by the Western world including IT firms, IT technocrats, media and donors which advocate the technology-driven 'eDevelopment' (Heeks 1999a; Wilson and Heeks 2000). Furthermore, a lack of IT training for local policy makers assists them to accept the attractive idea that technology is a solution (Piotti and Macome 2007). The easy acceptance of values from outside may disable them to identify local strength and capabilities (Krishna and Madon 2003).

2.1.2.3 Design – reality gap

The discussion above indicates that the 'Idolise' approach which leads to the techno-centric and rational project design is problematic to initiate ICT4D projects in the project planning phase. As a result of this wrong approach, a project design does not match a reality. Heeks (2002a) named this gap as the 'design-reality gap'. There are mainly three kinds of design-reality gaps, such as 'country context gaps', 'hard-soft gaps' and 'private-public gaps', which cause the failures of ICT4D projects as explained below.

1) **Country context gaps**: Solutions created in industrialised countries do not work well in developing counties because of many differences between Northern design and Southern realities in terms of their social, economic, political and technical contexts.

2) **Hard-soft gaps**: Solutions based on the Western rationality which can be called 'hard thinking' do not match the 'soft' reality of developing countries where informality, complexity and contingency are common in organisational structure and work process.

3) **Private-public gaps**: Solutions from developed countries tend to be created for the private sector since the private sector is more dominant to use ICT. However, such solutions are not suitable for less developed countries where the public sector is the leading user of ICT because the characteristics of the public sector (e.g. less competition, stronger individual objectives than organisational ones, more bureaucracy, and so on.) are relatively different from the private sector. As mentioned above, these gaps, which are driven by the wrong project approaches, are considered as the main cause of ICT4D project failure. How can these gaps be lessened? In the following section, a conceptual framework is presented which can be used to find an answer to this question.

2.2 Background of SchoolNet Project in Ethiopia

Firstly, the environment sounding the SchoolNet project is explained by referring the national situation of Ethiopia. Secondly, details of the project are described through comparing its opportunities and challenges. Finally, the analysis of the project is conducted with the aforementioned framework to seek the cause of the challenges.

2.2.1 Background of Ethiopia

To understand the soundings of the project, general information of Ethiopia, the educational sector background and the ambitious national e-government strategy are described.

2.2.2 General Information

The Federal Democratic Republic of Ethiopia is located in the eastern Africa. Ethiopia is one of the African Countries located in the Horn of Africa. Ethiopia is in east-central Africa, bordered on the west by the Sudan, the east by Somalia and Djibouti, the south by Kenya, and the northeast by Eritrea. It has several high mountains, the highest of which is Ras Dashan at 15,158 ft (4,620 m). The Blue Nile, or Abbai, rises in the northwest and flows in a great semicircle before entering the Sudan. Its chief reservoir, Lake Tana, lies in the northwest.

Ethiopia has about 1.06 million square kilometers land with approximately 82.1 million populations (2011), and it is said that about 83% of the population live in rural areas relaying on traditional agricultural economy (CSA 2011).

Figure 4.1: Map of Ethiopia

Ethiopia is one of the least developed countries. However, there is a tiny hope that this poor country would achieve one of the MDGs, which is 100% coverage of the primary education. The following section describes the situation of educational sector in Ethiopia.

2.2.3 Educational Sector

The primary education is covered by the First Cycle Primary school (Grade 1 – 4) and the Second Cycle Primary School (Grade 5 – 8). Secondary education is offered by the First Cycle Secondary School (Grade 9 – 10), and Second Cycle Secondary School (Grade 11 – 12). The Second Cycle Secondary School is often called 'Preparatory School' because only students who pass the national examination at the end of grade 10 can enter this school in order to prepare for the next national examination for entering universities. Ethiopian government regards education as an essential component of national development and highly prioritises it (UNESCO 2004). For example, in terms of the national budget allocation, education has been the second sector followed by 'national defence and public order and security' in the period from 1997/98 to 2000/01 (Checkole 2004).

The Ministry of Education has developed the Education Sector Development Programme (ESDP) for several periods of years from 1997/98 (Yizengaw 2006). Thank to the ESDP I (1997/98 – 2002/03),ESDP II (2002/03 – 2005/06) and ESDP III (2005/06 – 2010/11), the current situation of the National Exam primary education is improved much better than before (Walua 2006).According to Walua (2006) from the Ministry of Capacity Building in Ethiopia, the primary education gross enrolment ratio is estimated to be 112.6% in 2010. It means that one of the MDGs would be achieve even before 2015.

However, there are much more negative indicators about the educational sector:- there are still many problems such as high drop out rate and relatively much lower enrolment rate in secondary and higher education. Particularly, it is now needed to improve the enrolment rate in the secondary education because much more children can complete the primary one and the secondary education has significant importance for the national development (Tilak 2007). Therefore, more classrooms

and teachers are required to achieve higher enrolment rate in secondary schools. Especially, it is necessary to improve much more severe situations in remote areas. To accomplish it, ICT is seen as a great tool for improving access to and quality of education in the secondary level. The Ethiopian ICT policy states that 'ICT is particularly crucial to Ethiopia because the vast majority of its population lives in remote areas and continues to be disadvantaged educationally' (EICTDA2006: 26).

2.2.4 ICT Sector

Similar to the low socio-economic development situation, indicators about the ICT sector are also in low level, let us see the following indicators:-

Type of Service	July 2003	January 2012	Change in %
Fixed Line	850,776	825,593	-3%
Mobile GSM	10,592,439	14,461,236	40%
Mobile CDMA	109,377	123,604	17%
Total Mobile GSM	10,701,816	14,584,840	40%
(EVDO,WCDMA, ADSL)	18,262	28,365	72%
(1x, Dialup, ADSL<256K)	140,275	148,877	33%
Total no. of Customers	**11,601,752**	**15,671,464**	36%

Source: Ethio Telecom

Though the ICT use in Ethiopia is lower level than other countries, it seems that the situation has been improving recently. For example, the number of the Internet users has increased more than twenty times in the last decade. The improvement can be explained by the national policy which places importance on ICT. Ethiopia has a plan to invest approximately 10% of the Gross Domestic Product (GDP) for

the ICT sector (Cisco Systems 2007). For instance, there is an ongoing plan called 'Rural Connectivity Program (RCP)' to lay 10,000 kilometres of optical fibre cable network throughout the country, and about 8,000 kilometres has already set up (Walua 2010). It is estimated that this network would be in use and as a result, the Internet access speed would be improved from current average of 5KBps to 10,000,000KBps, 'a theoretical 2 million fold increase!' (ibid: para12).

The national optical fibre network goes to six different directions from Addis Ababa. In the future, some of the ends of the network would be connected to the planned external network named the Eastern Africa Submarine cable System (EASSy) which lays from South Africa to Sudan through Tanzania, Kenya, Somalia, and Djibouti in order to enable Ethiopia to shift from the expensive satellite data transfer to the low cost one (Kinde 2007). (Source: Kinde 2007) As shown by this project, Ethiopian government expects ICT as a powerful driver for development. Such expectation can be seen in the comment of the Prime Minister, Meles Zenawi to the Financial Times in 2006. He said that, '*Ethiopia is too poor not to invest ICT*' and '*ICT is the fastest way to end our isolation*' (Zenawi 2005 cited in Financial Times 2005: para1). The enthusiasm of the ICT-driven development is also illustrated by the Ethiopian e-government strategy, according to which the SchoolNet project has been implemented. The following section describes the Ethiopian e-government strategy.

2.2.5 E-government Strategy in Ethiopia

Ethiopian government has several projects in the e-government for development sphere such as, SchoolNet, WoredaNet, AgrNet, HealthNet and so on. As described so far, the Ethiopian government put a high priority on ICT as an enabler of the national development. Among these ICT-enabled development projects, the

SchoolNet is considered as a core component of e-government projects (Dzidonu 2006). Actually, the government has spent a great amount of money since the SchoolNet project is a cross point of two prioritised sectors such as education and ICT. According to Kinde (2007), the estimated cost to equip the plasma TVs for 545 schools is about $1.25 million with a plasma TV costing $2000 to $2500.

CHAPTER THREE

3. Research Design and Methodology

In this section research design, participants of the study, sampling technique and sample size, Data-Gathering Methods & Sources and Data Analysis are briefly stated.

3.1 Research Design

This research was based on both qualitative and quantitative data and information that were gathered from beneficiary teachers and students, and also from government officials of schoolnet coordination office at corporate level, as well as from all the relevant bodies in the program. The selected research design will enable the attainment of the above mentioned objectives. For this research, various data sources will be used to determine how School Net affects the educational development of Ethiopia.

The study will be completed under the qualitative and quantitative research design and approach using the following data collection instruments. The use of interview guide questionnaires will be of great importance on the quality of the elicited data that will be used to come up with valid and reliable results and findings.

The methods included collecting primary and secondary data in selected high schools. The data has included both qualitative and quantitative to be normative and positive perspectives. Two high schools have been taken for the survey considering cluster sampling. Simple random sampling method was used to select the individual in the high schools due to their homogenous character with respect to most characteristics considered in this study.

435 questionnaires have been administered, 10% of the total members in each high school were used in the study. Interview is also conducted with 16 management members from schoolnet project coordination office, as supplementary to the data, which have been obtained through the questionnaire.

Questionnaire Administration:- administration of Questionnaires was the chief instrument for the collection of data in the research. Accordingly, questionnaires were prepared which were responded by each of the informants (teachers and students which are beneficiaries of schoolnet program in high school). The questionnaire focused on closed ended questions. More of closed ended questions are used so as to avoid complications that are inherent in open ended questions during coding, summarizing and processing the obtained information. About 105 teachers and 330 students a total of 435 respondents were participated in providing responses for the questionnaire. The questionnaire was administrated by trained enumerators and supervised by the researcher.

Semi Structured Interview:- This was extensive and qualitative interview conducted mainly with the respective officers of schoolnet coordination offices on the more complicated and administrative issues of the program implementation. It is believed that the management members know the major activities being performed by schoolnet project coordination office. Hence, in depth interview were conducted with some of them, on various activities regarding the quality and efficiency of schoolnet project. The interview were complemented with unstructured and open – ended questions so as to allow respondents to express their feelings or ideas on some issues freely and hence obtained more detailed information.

Direct Observations:- The researcher was made some personal observations to coordination offices and high schools considered in the study in order to perceive the characteristics of teachers and students, their teaching situations, public work efforts and attempts were made to compare some of the responses of the respondents with the fact on the ground.

3.2 Participants of the Study

The three main participants in the study are:-

1. Management team of the schoolnet project coordination office
2. High school teachers, and
3. High school students

The informants of the study who will be participating during the data collection period will be composed of individuals who belong to the implementation of the School Net Project in Ethiopia. The sample derived from the management team of the coordination office, teachers and students of different high schools will be used as the respondents of the study. They will be answering the interview and participating in the focus group discussion which will be used for the study. For selecting representative sample of the population cluster sampling techniques were used because this approach is more convenient than simple random Sampling, as the numbers of high schools that must be visited are considerably reduced and it also does not require a complete list of all sampling units in the population. To determine sample size, a combination of rule of thumb and mathematical methods were used to make it as representative as possible. The rule of thumb dictates to draw a sample size nearly equal to 10% of the total population. Teachers and students to be included in the study were selected by using multi stage cluster sampling. As the country is very wide and the population is dispersed, cluster sampling method was used to limit the geographic area and identify or choose

number of representative of high schools implementing the schoolnet project. Two high schools were selected from sampled high schools clusters for surveying. Using school net beneficiary figures 105 teachers and 330 students a total of 435 respondents were considered for the survey.

Documentary analysis will also be conducted to obtain the secondary data mainly. To collect general information about ICT4D, ICT4E and e-government, relevant literatures will be reviewed. In the case of the SchoolNet project particularly, some reports written by Ethiopian government, especially, Ethiopian Information and Communication Technology Development Agency (EICTDA), international organisations such as UNDP and UNESCO, and several researchers will be used.

3.3 Sample Size and Sampling Techniques

Sample Size

A number of considerations such as the size of the population as well as time and cost determine the sample size of the study. Although the larger the sample size, the greater the precision, taking large sample size is costly and time consuming. Hence, there needs to determine the sample size that can be managed.

In Addis Ababa, Capital city of Ethiopia, there are 38 high schools covered in School Net Program. Since all high schools have got similar programs I will try to adopt cluster sampling. A total of 451 respondents comprising 16 management members from schoolnet project coordination office, 105 high school teachers and 330 high school students were the subjects of the study.

Sampling Techniques

The sampling techniques adopted for the study are purposive and simple random. The purposive sampling technique helps the researcher in selecting respondents

who have direct relationship with the issue under study and who can provide their insight and share their experiences. Based on this, management members from the schoolnet project coordination office, high school teachers and high school students were selected. Questionnaires were the main instruments to collect information from high school teachers and students. In addition, structured interview were held to get factual information from management members from the schoolnet project coordination office.

3.4 Data-Gathering Methods and Sources

The right quality of data leads the result of the research so reliable and acceptable to the user of the research findings. From data-gathering techniques that will be employed, two sources of data will be used: the primary and the secondary resources. The primary sources of information will be derived from the interviews and focus group discussion conducted by the researcher. The secondary sources of data will be based on published articles from computer, business and IT journals, books written about School Net and related studies on the Internet web-sites.

Data were collected using a combination of different methods. Data collection was started with the preliminary survey. During preliminary survey, general and empirical figures of the existing statues of schoolnet beneficiaries were gathered to obtain general information that was used as an input in subsequent preliminary planning and sample selection tasks. Pilot survey interview and measurement was conducted to test the validity and reliability of instruments in order to ensure whether they really measuring what they set to measure. Finally, the actual data collection measurements, questionnaires and interview guide lines were administered.

Different methods were triangulated for gathering both quantitative and qualitative data from primary and secondary sources. Beneficiary survey was used to collect

the quantitative data; where as interview of key informants from schoolnet project coordination office were employed to generate supplementary qualitative data. These methods enable to gather a fresh data in relation to the achievements, contribution and forecast of schoolnet project. In addition to these, the study employed the method of reviewing relevant and genuine literatures as well as other pertinent documents in relation to schoolnet project. Primary data have been collected through questionnaire, filled by teachers and students from high schools and interview with management members from schoolnet project coordination office. Secondary data were collected from published and unpublished sources.

Review of related literature was made in advance to get information from what has been done in relation to the problem; documentary statistical analysis in the coordination office on student enrollment was made. Basic questions were formulated, data gathering instruments and questionnaires were prepared. The validity and reliability of the achievements test items were established through pilot testing using respondents of similar character outside the sample of the study. Instruments were administered with necessary explanation on their objectives. Finally, quantitative data analysis was made using appropriate statistical tools, where as data from interview were presented qualitatively.

3.5 Data Validation and Analysis

The data gathered from these instruments will then be subjected to analysis. The collected data will be sorted out through applicable tables. The analysis will be characterized by descriptive analysis and comparative approaches. Qualitative data that will be gathered from interviews will be present in text formats.

The data gathered have been analyzed in terms of the study objective already designed. In order to summarize the data tables and graphs were used. After the

data had been obtained through questionnaire, it has been aggregated and seen in relation with the information obtained from the interview; and interpretations of the results had been made accordingly. The results are described by using the descriptive statistics such as percentages and ratios. The non-quantifiable data have been discussed through qualitative description.

The primary data obtained from various sources in the high schools were central in critically reviewing the implementation of schoolnet project in Ethiopia. Measurements and information generated from those teachers and students in the high schools were targeted and have been benefiting from the project were used as methods heavily relied on considering users as a unit of analysis.

The study employed appropriate method for the analysis of both qualitative and quantitative data collected from primary and secondary sources. To keep its validity and reliability, the study was guided by the principles of multiple sources and sub- sequent cross- checking of information as well as applying various data collection instruments. Secondary data were in the form of data bases, statistics and reports. A desk of existing information is essential for all assessments. The data collected from secondary sources, quantitative and qualitative were also analyzed and summarized on subject basis.

CHAPTER FOUR

4. Research Findings and Discussion

This chapter analyses and discusses the major findings based on the field survey. It attempts to give responses to the research questions by testing the indicators of schoolnet project activities. It shows the relation ship between the concepts of schoolnet project in Ethiopia and actual practices in the real world. It presents the analysis of the findings in terms of tables and percentages. The analysis and discussion will help to reach on major conclusions and give possible recommendations.

4.1 SchoolNet Project in Ethiopia

In this section, the details of the SchoolNet project are explained. Then its opportunities and challenges are presented based on data collected from the author's experience, the interviews and document review of relevant reports.

4.1.1 Outline of SchoolNet Project

The Ministry of Education of Ethiopia launched the SchoolNet project in 2003 with support from UNDP (Hare 2007). It follows the ESDP II as well as the ICT in Education Implementation Strategy and the subsequent Action Plan which are parts of the national e-education initiative outlined by the ICT for Development 2010 plan (ibid). This project is to broadcast video lectures from a broadcasting station in Addis Ababa to almost every secondary and preparatory school via the satellite network. Currently, VSAT antennas (Photo 1) and plasma TVs (Photo 2) are equipped in about 550 schools all over the country (Kinde 2007) and the unified video lectures of main subjects (Mathematics, English, Physics, Chemistry, Biology, Civics and ethical education, Business and Economics) are broadcasted.

Among 40 minutes of a period of class, 30 minutes are allocated to watch the video lectures on plasma screen and only10 minutes are used by teachers to summarise and/or to answer questions from students. Additionally, to provide the Internet connection for schools is also an aim of the project in order for teachers and students to acquire important and useful information for teaching and learning. Currently, there is the Internet access in some schools. However, this research focuses on the distance education part of the project. Thus, its opportunities and challenges are limited to the distance education with plasma TVs.

4.1.2 Opportunities

According to the translation from Amharic (Ethiopian language) to English by Wolyie (2006), the pamphlet from the Ministry of Education mentions six benefits of the plasma TV education (ibid);

(1) By using images, teachers can teach effectively and provide a clear presentation to enable students to understand complicated and vague concepts.

(2) It enables teachers and students to access the up to date information easily and effectively.

(3) It provides a simple and accurate educational concept for teachers.

(4) It delivers the same quality of education to students simultaneously regardless of geographic differences

(5) Model and effective teachers (i.e. model lectures) can be seen on the screen.

(6) It will be a cost-effective method if it becomes widespread in the country.

Considering many constraints in the educational sector in Ethiopia, such as a shortage of teachers, low skills of teachers, insufficient educational facilities such as laboratories and libraries and a lack of teaching and learning materials, it is easy to understand the benefits of this televised lecture program. There are many advantages of ICT use for education. Therefore, it is expected that this distance

education project can contribute to improving access to and quality of education. In fact, according to data collected, teachers and students appreciate the video lectures with clear images such as charts, pictures, maps and experiments that they cannot see in the real classrooms.

Additionally, some teachers point out that its merits are more significant in rural areas than cities because there are more serious problems in educational sector in rural areas. For example, among 60 young Ethiopian teachers assigned to teach in Somali region, which is one of the least developed regions in Ethiopia, only 12 of them actually accepted the offer and only 3 of them continued to teach there after 1 year (according to the interview with the management members of schoolnet project coordination office). In such a remote district where teacher recruitment is very difficult, the role of the video lectures broadcasted from Addis Ababa is likely to be more appreciated by students.

4.1.3 Challenges

As mentioned above, there are definitely advantages of this distance education with plasma TVs. However, several disadvantages also exist. According to data collected, main challenges are listed below.

1) Electricity problem

There is sometimes electricity down which disturbs the plasma TVs. Even in the capital city, there is planned electricity interruption caused by the shortage of rainfall on occasion.

2) English problem

Though the plasma TV education starts from grade 9, the primary education is conducted in local languages until grade 8. Therefore, many students have

difficulties to follow the lectures led by native speakers on TV screen. Even, some of teachers have also the same problems about English.

3) Communication problems

The teachers on the plasma TV screen continue to talk without caring whether students understand or not since they are video lectures. And students cannot ask questions even when they want to do.

4) Time allocation problem

Only 10 minutes are allocated for teachers to teach face to face. Many teachers complain about this time management. 10 minutes are too short to sum up the lecture and answer questions from students.

5) Maintenance problem

There was no engineer who can solve the technical problems of this plasma TV system while there were sometimes problems such as volume fluctuation and unclear screen. Though there is an engineer for this purpose currently, he has just taken 2 weeks training for maintenance.

6) Too much volume of contents

The video lectures cover so many topics within one period. Therefore, if teachers have to teach by themselves when there is a problem such as no electricity, for example, they cannot teach all topics since they take time to communicate with students. It causes disconnection of one lecture to next one because of skipped topics.

7) Shortage of teachers' guide

There are CDs which contain the teachers' guides and students' guides of all video lectures including all scripts that teachers on the screen speak. However, their volume is too huge to print them out for all teachers and students. Therefore, there

is only one printed copy of the teachers' guide for each department and they have to share it. In the case of the students guide, the school cannot provide it to student because of a shortage of budget for printing while the students' guide is sold in book shops.

8) Inadequate schedule

Since the lectures are broadcasted from Addis Ababa, the schedule does not fit some events occurred in each school or region. Students lose some lectures when there are regional conferences or meetings at school.

9) Discourage teachers' motivation

The plasma TV-dominated classroom activity discourages the motivation of teachers since it deprive them of autonomy to control their class. As listed above, there are many problems pointed by the teachers and students. Since there is no comprehensive evaluation report about the SchoolNet project in the national level (according to the JICA expert), it is very difficult to judge which aspects, the advantages or the disadvantages are more dominant. However, it is true that there is much space to be improved to maximise the advantages of the plasma TV education system. In the next section, both advantages and disadvantages are critically analysed from the point of the socio-technical perspective and with the ITPOSMO checklist.

4.2 Analysis of the SchoolNet Project

In this section, firstly, the merits of this distance education are examined from the socio-technical perspective to understand whether there is really an expected benefit or not. Secondly, the reason why there are so many challenges of the project is explained by the design-reality gap.

4.2.1 The Gap between Rural and Urban Areas

As mentioned above, there are several expected benefits of the SchoolNet project. The merits of the plasma TV education system can be summarised as the provision of the unified and qualified education to every student all over country equally. Considering the fact that the national examination, which determines which university students can enter, is the same in any region in Ethiopia, it is fair to offer the same lectures to every student. However, a management member interviewed mentions that, '*Students living rural areas have more difficulty to follow the video lecture since they cannot acquire English skill needed to follow the video lecture until grade 9. It is because there is no good teacher who can teach in English and less opportunity to listen to English in ordinary life like BBC* news *and foreign movies on TV' (A student in grade 12).* When broad factors such as social, economical, and cultural aspects are considered, it is obvious that there are many obstacles for students in remote areas to obtain benefits of the video lectures produced by a company in South Africa.

Firstly, teachers in rural areas are less qualified, and thus, their English level is much lower than teachers in urban areas. Furthermore, there is less cafes, hotels and video houses where people can watch English news and films. It means that students are not well-prepared for the video lecture led by English only.

Secondly, poorer infrastructure in rural areas causes more frequent power failures which interrupt the video lectures.

Thirdly, it is easy to imagine that it takes more time to obtain spare parts and engineers for maintenance in remote areas, and it costs more because of transportation cost. Additionally, even if there are a few cafes and hotels with satellite TV, female students are more reluctant to go there to watch TV in rural areas because of cultural customs. Therefore, English ability in rural students is

much less than urban students. It means that the educational gap between rural and urban areas is not lessened by the distance education. Even, it is possible to say that the gap may become wider by the plasma TV education system because urban students with enough English ability can take full advantage of the improved lectures, while rural students cannot see it because of power failure or cannot understand the lectures because of poor English ability. Similarly, there is also the gap within students in the same areas.

The students from rich family can have more opportunities to learn English, for example, watching BBC news in their homes, and they can buy the students' guide from a book shop for preparing and reviewing the video lectures. But, the students from poor family cannot. Here again, the gap between 'have' and 'have-not' reflects the results of school education because of this project. As many authors (Madon 1994; Castells 2001; Heeks 2002b) mentioned, the social, economical and cultural environments determine the extent to which people can benefit from ICT. Benefits of ICT highly depend on context (Sein and Harindranath 2004). It is also true of the SchoolNet project in Ethiopia.

Considering this paradox that the distance education system aiming to lessen the gap between rural and urban areas brings about wider gap between them, it is obvious that the problem can not be solved by the distance education itself unless the shortage and quality of teachers in rural areas is improved. In other words, an educational approach is more important than ICT in order to solve the problem in the educational sector. Therefore, this project should have been considered as an educational project, not ICT project.

4.2.2 Design-Reality Gap

One of the main benefits expected, which is to lessen the educational gap caused by geographical differences by providing the unified lectures, is hard to realise as discussed above. How about the other outcome which is to improve the quality of education? Thanks to the lectures broadcasted, students can learn with various kinds of pictures, diagrams, photos, and maps. However, there are still many challenges which hinder the merits. Here, the reason why so many challenges exist is clarified by the design-reality gap according to the ITPOSMO dimensions.

Factor Design Reality-Information

The contents and language of video lectures are relevant to the Ethiopian students. It based on the rationality that the secondary education should be done in English according to the national educational policy. The lectures are only in English spoken by native speakers. But, the English is too difficult for students to follow because many teachers teach in local languages in reality. Contents in a period are so much that teachers cannot teach all topics by themselves.

Technology

One-way data transfer from Addis Ababa is enough for the classroom activity.

Poor electric infrastructure. One-way data transfer causes passive behaviour of the student. Students cannot ask questions timely.

Process

Video lecture-centred teaching is selected because it can reduce the workload of teachers. Video lectures are broadcasted from Addis Ababa only. Video lecture-centred teaching actually reduces the teachers' workload. But, it also undermines their dignity and motivation. The lecture schedule differs from each region and school.

Objective/Value

To provide the uniform lecture is the best way to improve the access to and the quality of education. It depends on situation (e.g. students' and teachers' English ability and infrastructure) whether the lecture broadcasted is understood or not.

Skills/Staff

The training provides necessary skills for teachers. Engineers are assigned for maintenance. Teachers can see the teachers' guide on computer. The teachers who took the training were so limited. They are not willing to teach their knowledge that they learnt. Engineers are not well trained. Many teachers are not skilled or motivated to see the teachers' guide on computer.

Management/Structure

Local IT teachers follow the order from their director. IT teachers are reluctant to do extra work without additional payment.

Other (Time/Money)

Schools have enough facility and budgets to prepare handouts for the video lectures. Some schools do not have a printer. Even if they have it, they do not have enough budgets to buy ink and papers.

There were several gaps between the project assumption and the reality. The aforementioned three kinds of gaps, *Country Context Gaps*, *Hard-Soft Gaps*, and *Private-Public Gaps*, are also seen in the SchoolNet project. *Country Context Gaps* As explained above, there are differences between rural and urban schools similar to the Country Context Gaps. Because of the differences of context such as electricity stability and a level of English ability, the rural-urban gap hinders the expected outcome in Objectives (providing the unified education to all students). Even, the assumption without consideration of the difference between urban and

rural areas may cause to widen the gap in education level between urban and rural areas.

Hard-Soft Gaps

Hard-Soft Gaps are found in the gaps of Information and Process. According to the national educational policy, only English should be used in classrooms. But the reality is different. Many teachers use local languages. Moreover, rationally, a semester in every school starts and ends on time. However, starting and ending of a semester actually depends on each school. If there are many students who come back to school on time, a semester can start as planned. But, if not, the starting time will be delayed according to the situation. For example, when the author asked the other teachers when the new semester starts, everyone said 'nobody knows'. Therefore, the uniform schedule for broadcasting planned by the Ministry of Education often does not fit many schools in reality. Every teacher and student interviewed tells that they missed several lectures because of the fixed schedule decided in Addis Ababa.

Private-Public Gaps

Finally, the Private-Public Gaps are discovered in the gaps of Skills/Staff and Management/Structure. Differing from the private sector, teachers are not motivated to prepare their lecture very well because it does not reflect their salary. Because of low motivation, some of them are not willing to bother to check the teachers' guide on computer in advance. Likewise, some of IT teachers are also unlikely to volunteer for teaching how to find and open files of the teachers' guide on the CD-Roms because it takes time but their school does not provide any additional payment for their extra work. Why are there so wide gaps in the SchoolNet project? These gaps can be considered to be generated by the top-down approach without careful consideration of local reality. In fact,there was not enough effort for teachers' involvement before the actual project Implementation.

All teachers interviewed say that they did not have an opportunity to present their opinion about the SchoolNet project before the actual project implementation. Though only a few teachers from each school participated in training in advance, the purpose of the training was to learn a basic operation of the plasma TV and basic computer skills. It was not to collect their opinions. The shortcoming of the top-down approach without local user participation is pointed out by several authors. Kenny (2006) states that about e-government project, ‘a top-down policy of revolutionary IT innovation is far more likely to suffer from such failures’ and ‘Evolutionary processes involving carefully piloted projects and stakeholder involvement have to be preferred’(ibid: 119). Likewise, Unwin (2005) mentions that many ICT4E projects in Africa have failed because of the top-down and supply-led approach without sufficient attention to the teachers’ involvement and training.

The SchoolNet project was explained in consideration of the Ethiopian national strategy which regards ICT as a powerful weapon to alleviate poverty. Analysing the project from a point of the socio-technical perspective proved that the expected benefit, which is to provide equal education for every student, is very difficult to achieve because of the significant difference between rural and urban environment represented by the disparity of opportunity to learn English, the quality of teachers and stability of infrastructures. It implies that the SchoolNet project can be considered as a technology-driven project without paying an adequate attention to the broad issues such as social and economical differences. Furthermore, the analysis with ITPOSMO checklist found that many challenges of the project are caused by the design-reality gaps which consist of three types of gaps such as Country Context Gaps, Hard-Soft Gaps, and Private-Public Gaps. When one more step to think about a reason of these gaps is taken, it is revealed that the top-down

approach can be considered as the root problem of the gaps. As a conclusion of this chapter, the first research question 'Why did the SchoolNet project face several challenges?' is answered. The answer is that the technology-driven approach without caring the broad factors as well as the top-down approach without local user involvement caused the design-reality gaps, and the gaps generated many challenges.

4.3 Results of Questionnaires

4.3.1 Characteristics and Satisfaction of Teacher Respondents

The main respondents of the schoolnet survey were Teachers and Students of high schools which are under my study area. These respondents were selected based on simple random sampling method as discussed above.

Over all 435 sample respondents were participated in the schoolnet survey. Among the total respondents who were supposed to be the main beneficiaries of schoolnet project 105 were high school teachers where as 330 were high school students. Now, let us see the characteristics and satisfaction of teacher respondents as follows.

Table: 4.3.1.1 Sex of Teacher Respondents

Respondents	**Total No. of Respondents**	**Sex of Respondents**	
		Male	**Female**
High School Teachers	105	93	12
Percentage (%)	100%	88.6%	11.4%

Source: Survey data (2012)

As can be seen from the above table 4.3.1.1 majority (88.6%) of teacher respondents were male and only 11.4% were female. As far as education and job opportunity are concerned principle of equal chance for all have been

implemented. But there is dominance of male in various socio – economic issues of community life. The prevalence of such gender disparity could obviously deter the effective utilization of the development potential of education unless the necessary affirmative action is taken.

Table: 4.3.1.2 Age of Teacher Respondents

Respondents	Total No. of Respondents	Age of Respondents			
		Below 20	21-30	31-40	41-50
High School Teachers	105	-	87	10	8
Percentage (%)	100	-	82.9%	9.5%	7.6%

Source: Survey data (2012)

As far as the age of teacher respondents is concerned majority(82.9%) of teachers respondents are 21 to 30 years old. This is an important potential that, majority of which are young teachers. Teachers who are greater than 40 years old account only for 7.6 %. From the above table 4.3.1.2, it can be observed that there were extreme age differences in teachers from 23 years to 48 years.

Table: 4.3.1.3 Teaching Experience of Teachers

Years of Experience	No of Respondents	Percentage
Less than 1 year	6	5.7%
1 – 3 years	35	33.3%
3 – 5 years	52	49.6%
More than 5 years	12	11.4%
Total	105	100%

Source: Survey data (2012)

High school teacher respondents were asked about their teaching experience, i.e. how long they stay in education activity as a teacher. Their responses were summarized in the above table 4.3.1.3. As far as teaching experience is concerned

from the data given in table 4.3.1.3 above, it is evident that majority of high school teachers have less years of experience i.e. less than 5 years. Less years of experience shows that there is relatively higher teacher turn over. This does not benefit the institution; since it does not allow the high schools to keep teachers loyal to the institution and reduce cost of hiring new teachers, where as 49.6% of teacher respondents serves the institution for 3 to 5 years. Other teacher respondents (11.4 %) serve the institution for more than 5 years. Regarding teachers' work experience (service year), majority of teachers have less than 5 years of experience that they may not have enough information on education issues.

Table: 4.3.1.4 Opinion of Teacher Respondents on the contents of Video lecture

Do you think the contents of the video lecture are attractive?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	30	28.6%
No	75	71.4%
Total	105	100%

Source: Primary data of the author

Teacher respondents were asked their opinion regarding the contents of the video lecture given by the schoolnet project. As it can be observed from the above table 4.3.1.4, the majority (71.4 %) said the contents of video lecture are not attractive, where as only 28.6 % said that the contents of video lecture are attractive.

Table: 4.3.1.5 Comment of Teacher Respondents on problem about Data transfer speed

Is there any problem about data transfer speed?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	69	65.7%
No	36	34.3%
Total	105	100%

Source: Survey data (2012)

The other question teacher respondents were asked was about the problem in data transferring speed. As it is shown in table 4.3.1.5 above 65.7 % of the teacher respondents replied that there is problem in data transferring speed and 34.3 % said that there is no problem in data transferring speed. As we know, problem in data transferring speed will bring about inconvenience in teaching and learning process, which affects in turn the interest of teachers in using the technology.

Table: 4.3.1.6 Teacher Respondents' comment on the schoolnet project (plasma) budgets.

Do you think your school has enough budgets to cover cost related to plasma?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	12	11.4%
No	93	88.6%
Total	105	100%

Source: Survey data (2012)

Furthermore, teacher respondents were asked to give their comment on whether their school has enough budgets to cover cost related to plasma or not. Accordingly, as indicated in table 4.3.1.6 above the majority (88.6 %) said that

their school has no enough budgets to cover cost related to plasma. As we know, limited financial resource can be mentioned as an important element which hinders to run the schoolnet project (plasma) flexibly.

Table: 4.3.1.7 Opinion of Teacher Respondents on advantage of plasma

Do you think educational level of students is improved because of the plasma?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	32	30.5%
No	73	69.5%
Total	105	100%

Source: Primary data of the author

Teacher respondents were requested to give their opinion on whether educational level of students is improved because of the plasma or not. As can be seen from the above table 4.3.1.7 majority (69.5%) of teacher respondents said that education level of students is not improved because of the plasma, whereas 30.5 % said that education level of students is improved because of the plasma. Therefore, the advantage of plasma in improving the educational level is insignificant. In other words, respondents were inquired to express their opinion about the attention given to the schoolnet project (plasma) in terms of budget allocation. Thus in terms of budget allocation 69.5 % replied that the allocated budget is not enough while 30.5 % replied that the budget allocation is enough. Here, as can be seen from the above table 4.3.1.7, schoolnet project (plasma) is not given due attention at all levels of the coordination offices as compared to other activities. This is because of the fact that insufficient budget allocation will lead to inefficient implementation of the project.

Table: 4.3.1.8 Satisfaction of Teacher Respondents with respect to the technology used for plasma

Are you satisfied with the technology used for the plasma?		
Response	**Frequency**	
	No	**Percentage (%)**
Very satisfied	10	9.5%
Satisfied	14	13.3%
Somewhat satisfied	65	62.0%
Unsatisfied	16	15.2%
Very unsatisfied	-	-
Total	105	100%

Source: Survey data (2012)

Teacher respondents were asked their opinion regarding the technology used for plasma. As can be seen in table 4.3.1.8 the majority (62.0%) of teacher respondents confirmed that they are somewhat satisfied with the technology used to the plasma. Only 9.5 % of the respondents expressed their idea that they are very satisfied with the technology used for the plasma. In this regard, the management members were asked to provide their opinion about the technology used for plasma. They also explained the problem in using the plasma technology and suggested the need for convenient and sustainable technology to be used for the plasma. Here, the question of reliable and efficient technology for the plasma should be answered.

Table: 4.3.1.9 Teacher Respondents' level of satisfaction with respect to multimedia resources

Are you satisfied with the multimedia resources used in day to day instruction?		
Response	**Frequency**	
	No	**Percentage (%)**
Very satisfied	4	3.8%
Satisfied	8	7.6%
Somewhat satisfied	75	71.4%
Unsatisfied	5	4.8%
Very unsatisfied	13	12.4%
Total	105	100%

Source: Primary data of the author

Teacher respondents were asked about their satisfaction with the multimedia resources used in day to day instruction. The above table 4.3.1.9 demonstrates that greater portion (71.4%) of the respondents were somewhat satisfied, whereas about 12.4 % of the respondents were very unsatisfied. As we know, sufficient availability of multimedia resources is the main key factor for proper and uninterrupted transmission. Here, the need for meaningful multimedia resources so as to attain successful plasma transmission is unquestionable.

Table: 4.3.1.10 Opinion of Teacher Respondents on plasma improves quality of education

Do you agree the plasma improves quality of education?		
Response	**Frequency**	
	No	**Percentage (%)**
Strongly agree	10	9.5**%**
Agree	14	13.3**%**
Neutral	18	17.1**%**
Disagree	63	60.1**%**
Strongly disagree	-	-
Total	105	100**%**

Source: Survey data (2012)

The other question teacher respondents were asked was to indicate the level of agreement on the idea that plasma improves the quality of education. The responses are organized and presented in the above table 4.3.1.10. As a result majority (60.1 %) of the respondents was disagreed (did not accept) that plasma improves quality of education. In actual fact, application of technology in the process of education will play a significant role if it is implemented in the proper manner. But under the existing circumstances, due to various constraints, plasma technology could not be used as facilitator of modern education.

4.3.2 Characteristics and Satisfaction of Student Respondents

Table: 4.3.2.1 Sex of Student Respondents

Respondents	Total No. of Respondents	Sex of Respondents	
		Male	Female
High School Students	330	183	147
Percentage (%)	100%	55.5%	44.5%

Source: Survey data (2012)

As can be seen from the above table 4.3.2.1 about 55.5% of student respondents were male and 44.5% were female. As far as education and job opportunity are concerned principle of equal chance for all have been implemented. But there is dominance of male in various socio – economic issues of community life. The prevalence of such gender disparity could obviously deter the effective utilization of the development potential of education unless the necessary affirmative action is taken.

Table: 4.3.2.2 Age of Student Respondents

Respondents	Total No. of Respondents	Age of Respondents			
		Below 10	11-15	16-20	21-25
High School Students	330	-	154	176	-
Percentage (%)	100%	-	46.6%	53.4%	-

Source: Survey data (2012)

With regard to ages of student respondents, most of them are 16-20 years old. It is observed from the above table 4.3.2.2 that the minimum age was 13 years old and the age range is 13 to 19.

Table: 4.3.2.3 Student Respondents' comment on the contents of video lecture

Do you think that the contents of video lecture are attractive?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	98	29.7**%**
No	232	70.3**%**
Total	330	100**%**

Source: Primary data of the author

Student respondents were asked to give comment on the contents of the video lecture given by the schoolnet project. From the table 4.3.2.3 it can be noted that majority (70.3 %) of the respondents said the contents of video lecture are not attractive, and 29.7 % of the respondents supported the attractiveness of contents of the video lecture.

Table: 4.3.2.4 Evaluation of Student Respondents on the advantage of plasma

Do you think that teaching and learning process in the class using plasma is advantageous?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	112	33.9**%**
No	218	66.1**%**
Total	330	100**%**

Source: Survey data (2012)

Student respondents were requested to evaluate whether teaching and learning process in the class using plasma is advantageous or not. The above table 4.3.2.4 demonstrates that greater portion (66.1 %) of the respondents were not accept the advantage of using plasma for teaching and learning process in the class, where as

33.9 % the respondents support the advantage of using plasma for teaching and learning process in the class.

Table: 4.3.2.5 Opinion of Student Respondents on plasma as instrument for becoming better learners

Do you think students become better learners because of the plasma?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	92	27.9**%**
No	238	72.1**%**
Total	330	100**%**

Source: Survey data (2012)

Furthermore, student respondents were asked their opinion regarding whether students became better learners because of plasma or not. Accordingly, as indicated in table 4.3.2.5 majority (72.1 %) of the respondents did not accept that students became better learners because of the plasma. On the other hand, 27.9 % of the respondents accepted that students became better learners because of the plasma.

Table: 4.3.2.6 Comment of Student Respondents on plasma in relation with improvement of educational level

Do you think educational level of students is improved because of the plasma?		
Response	**Frequency**	
	No	**Percentage (%)**
Yes	133	40.3**%**
No	197	59.7**%**
Total	330	100**%**

Source: Primary data of the author

The other question student respondents were asked was about plasma in relation with improvement of educational level. As indicated in the above table 4.3.2.6, majority (59.7 %) of the respondents said that education level of students is not improved because of the plasma, where as 40.3% said that education level of students is improved because of the plasma. Therefore, from the above given evaluation of respondents we can generalize that the advantage of plasma in improving the educational level of students is not as expected.

Table: 4.3.2.7 Student Respondents' evaluation on quality of education

How do you feel about the quality of education provided to you by schoolnet (plasma)?		
Response	**Frequency**	
	No	**Percentage (%)**
Very satisfied	21	6.4**%**
Satisfied	70	21.2**%**
Somewhat satisfied	106	32.1**%**
Unsatisfied	70	21.2**%**
Very unsatisfied	63	19.1**%**
Total	330	100**%**

Source: Survey data (2012)

Student respondents were asked to express their feeling about the quality of education provided to them by schoolnet (plasma). As can be seen from the above table 4.3.2.7 about 32.1 % the respondents were somewhat satisfied, and 19.1 % of the respondents were very unsatisfied. If we take the total picture of responses, the balance will lead to unsatisfaction.

Table: 4.3.2.8 Student Respondents' degree of satisfaction with schoolnet (plasma)

In general, indicate your degree of satisfaction with the schoolnet project (plasma):-		
Response	**Frequency**	
	No	**Percentage (%)**
Very satisfied	49	14.8**%**
Satisfied	63	19.2**%**
Somewhat satisfied	112	33.9**%**
Unsatisfied	71	21.5**%**
Very unsatisfied	35	10.6**%**
Total	330	100**%**

Source: Primary data of the author

Student respondents were asked to rate the overall satisfaction regarding schoolnet project (plasma). It can be noted in table 4.3.2.8 above, the majority (33.9 %) they were somewhat satisfied and 10.6 % of the respondents were unsatisfied. The response rate in favor of learning dissatisfaction is quit discouraging in the field of education.

Table: 4.3.2.9 Opinion of Student Respondents on adequate of resources for education

I have access to adequate resources to support my education		
Response	**Frequency**	
	No	**Percentage (%)**
Strongly agree	52	15.7**%**
Agree	35	10.6**%**
Neutral	74	22.4**%**
Disagree	106	32.1**%**
Strongly disagree	63	19.2**%**
Total	330	100%

Source: Survey data (2012)

Student respondents were asked to give their view on the accessibility of adequate resources to support their education. As observed above in table 4.3.2.9 that majority (32.1%) of the respondents expressed their disagreement on the given issue. With regard to the availability of teaching and learning materials, such as text books, facilitators' guide and teaching aids, most respondents expressed their dissatisfaction.

Table: 4.3.2.10 Comment of Student Respondents on contents of the lesson

The lesson is well organized and easy to follow		
Response	**Frequency**	
	No	**Percentage (%)**
Strongly agree	42	12.8**%**
Agree	84	25.4**%**
Neutral	113	34.3**%**
Disagree	35	10.6**%**
Strongly disagree	56	16.9**%**
Total	330	100**%**

Source: Primary data of the author

The other question student respondents were asked was to indicate the level of agreement on the contents of the lesson. The responses are organized and presented in the above table 4.3.2.10. As a result, majority (34.3 %) of the respondents were neutral to comment on that the lesson is well organized and easy to follow.

CHAPTER FIVE

5. Conclusions and Recommendations

This chapter presents the research outcomes and findings based on the research questions and hypothesis, theoretical and conceptual framework and the analysis and discussion of the data from the field survey. It interprets the findings and presents the major conclusions and recommendations accordingly.

5.1 Summary of Major Findings

The main respondents of the schoolnet survey were Teachers and Students of high schools which are under my study area. These respondents were selected based on simple random sampling method.

Over all 435 sample respondents were participated in the schoolnet survey. Among the total respondents who were supposed to be the main beneficiaries of schoolnet project 105 were high school teachers where as 330 were high school students.

Majority (88.6%) of teacher respondents were male and only 11.4% were female. As far as education and job opportunity are concerned principle of equal chance for all have been implemented. But there is dominance of male in various socio – economic issues of community life. The prevalence of such gender disparity could obviously deter the effective utilization of the development potential of education unless the necessary affirmative action is taken.

As far as the age of teacher respondents is concerned majority(82.9%) of teachers respondents are 21 to 30 years old. This is an important potential that, majority of which are young teachers. Teachers who are greater than 40 years old account only for 7.6 %. There were extreme age differences in teachers from 23 years to 48 years. Majority of high school teachers have less years of experience i.e. less than

5 years. Less years of experience shows that there is relatively higher teacher turn over. This does not benefit the institution; since it does not allow the high schools to keep teachers loyal to the institution and reduce cost of hiring new teachers. Regarding teachers' work experience (service year), majority of teachers have less than 5 years of experience that they may not have enough information on education issues. Majority of teacher respondents said the contents of video lecture are not attractive, there is problem in data transferring speed which will bring about inconvenience in teaching and learning process, which affects in turn the interest of teachers in using the technology. Their school has no enough budgets to cover cost related to plasma. As we know, limited financial resource can be mentioned as an important element which hinders to run the schoolnet project (plasma) flexibly. schoolnet project (plasma) is not given due attention at all levels of the coordination offices as compared to other activities. This is because of the fact that insufficient budget allocation will lead to inefficient implementation of the project. They also explained the problem in using the plasma technology and suggested the need for convenient and sustainable technology to be used for the plasma. Here, the question of reliable and efficient technology for the plasma should be answered. Majority of teacher respondents were somewhat satisfied about availability of multimedia resources. But sufficient availability of multimedia resources is the main key factor for proper and uninterrupted transmission. Here, the need for meaningful multimedia resources so as to attain successful plasma transmission is unquestionable. Majority of the respondents was disagreed (did not accept) that plasma improves quality of education. In actual fact, application of technology in the process of education will play a significant role if it is implemented in the proper manner. But under the existing circumstances, due to various constraints, plasma technology could not be used as facilitator of modern education. With regard to the availability of teaching and learning materials, such

as text books, facilitators' guide and teaching aids, most respondents expressed their dissatisfaction. From the above given evaluation of respondents we can generalize that the advantage of plasma in improving the educational level of students is not as expected and the lesson is not well organized and not easy to follow. Majority of student respondents also gave similar responses as mentioned above and we will have the same comments.

5.2 Conclusions

This research attempts to find how ICT can be used to support development in less developed countries through analysing the SchoolNet project in Ethiopia. After reviewing the current argument about ICT4D projects including opportunities and challenges, the socio-technical perspective, user participation and design-reality gap with ITPOSMO checklist were introduced as the framework which is used to lead the answers to two main research questions, '*Why did the SchoolNet project face several challenges?*' and '*How can the SchoolNet project overcome the challenges?*'. The techno-centric approach without enough attention to wider factors is a cause of many gaps between the project design and the local reality, which bring challenges the SchoolNet project encountered. Moreover, the top-down approach lacking the teachers' involvement is considered as the root problem.

User participation was set as a gateway to find the second research question '*How can the SchoolNet project overcome the challenges?*' because of two reasons. Firstly, it is clear that misunderstanding of the local reality bought about the design-reality gaps and the local teacher were not involved in the project. Secondly, the local teachers show adequate understanding about the merits and demerits of the project and suggest reasonable solutions to improve the current difficulties of the project. The argument in the Chapter 4 leads two solutions to

realise the real teachers' participation. One is to make the project more flexible to be able to accept demand from them after a certain period of time. To give time for users to acquire knowledge and experience is important so that they can prepare themselves for participation more equally against decision makers. The other solution is to upgrade teachers from consumers to producers of information. It is assumed that what motivates them to participate in the project more actively is to provide autonomy and to train them to acquire IT skills to create contents for their lessons. These solutions are likely to contribute to actualising real user participation as 'participation as right'.

5.2.1 For the Future e-Government Projects

Ethiopia regards ICT as a strong driver for the national development. There are several e-government projects being planned and ongoing. How can the lessons from the SchoolNet project be used for the future e-government? From the SchoolNet project, three lessons are derived.

♦**Sector problem-oriented solution, not technology-driven solution**

Through analysing the SchoolNet project from the socio-technical view, it is revealed that the distance education project itself cannot solve the educational gap between rural and urban schools completely because whether students can benefit from the video lecture broadcasted or not highly depends on the contexts, such as opportunities to learn English in daily life, stability of electricity and quality of teachers. ICT can assist to create a solution for educational problems but cannot be a solution itself. The main problem in the educational sector in Ethiopia is still a problem of education. Unless the quality of and the number of teachers are increased, it is difficult to improve the educational situation. From this lesson, it is obvious that any ICT4D project should not be treated as an ICT project, but each sector's one. Without a deep analysis of sectoral problems, it is impossible to

produce good solutions even if ICT has a great potential since ICT is not a panacea. As several authors (Farrell and Isaacs 2007; Heeks 1999a, Trucano 2005) insist, ICT should be used as supplement to support a solution which is created by sectoral problem-oriented approach, not technology-driven one. Therefore, the future e-government projects should be considered as each sector's project at first. It is important to doubt if there is really a possibility for ICT to make projects more efficient and effective. Using ICT is not necessarily a better solution.

♦**More focus on local reality with user involvement, not top-down approach**

After effectiveness and efficiency of ICT use are justified, ICT can be allowed to participate in projects in each sector. Here, it is necessary to consider how the design-reality gaps can be lessened. As the SchoolNet project shows, if the top-down approach is taken, gaps between project design and reality are likely to be wider since there is a lack of consideration about the local reality. Especially, in Ethiopia, there is a great deal of diversity. The stability of infrastructure dramatically differs from urban and rural areas. The geographical situation is completely different from each district. Their culture is also diverse according to ethnic groups, for example, there are more than 70 languages. Moreover, there is a sense of rivalry between tribes. Thus, it is impossible to assume their local reality without local user participation whatever a project is. Therefore, local user participation is crucial to minimise the gaps since it is local users that know the real situation. Though who are local users differs according to projects such as teachers, farmers, medical doctors, and so on, they should be involved in the projects.

♦ **Flexible and long term strategy & shift from consumer to producer**

Though user participation is important, it is necessary to care how to realise it. As Heesk (2002a) points out, usse of participatory methodologies created in developed

countries does not necessarily fit ICT4D project. As an alternative method, this research suggests to have flexible and long term strategy and to treat users as producers of information so that local users can participate in their projects more easily and actively. What these suggestions support is to reduce barriers for the real participation and to motivate users. Otherwise, the real participation is very difficult to be realised.

5.2.2 The future of ICT4D

Contribution of ICT to development has been expected by donors and developing countries. However, the results of ICT4D projects tend to be less than the expectation in reality. In order for ICT to be a powerful tool for development, many scholars (Walsham and Sahay 2006; Walsham et al. 2007; Heeks 2002a) point out that how ICT should be used is important. A common perspective suggested by many authors (Puri et al 2004; Sein and Harindranath 2004) is that the use of ICT depends on context. It is true that every project situation differs and it is not reasonable to apply one-fit-all approach to various kinds of projects in different areas. However, on the other hand, it means that there is a lack of concrete as well as universal strategy to lead ICT4D projects.

This research tries to find such a concrete and universal method. Two kinds of suggestions generated through the analysis of the SchoolNet project, which are to have a flexible and long term strategy and the shift from consumer to producer of information, are expected to be such a method. Moreover they may have a possibility to revive some of failure projects represented by a rural community telecentre because local users now know problems and have more knowledge about ICT. It is now a good timing to listen to and accept their voice and to promote them to producers of information. In this point, the ICT4D projects have more chances to be improved rather than traditional infrastructure projects such as

dam contractions and irrigation projects because it is not difficult to change the contents thank to digital technology nowadays. To change website and to revise video lectures is much easier than to redirect water canals. Moreover, the technology is being improved day to day and new technology may provide better solutions to meet the real user demands, which can be raised by more matured local users. Therefore, it is not necessary to be pessimistic about ICT4D even though there are not many successful projects. What is necessary is not criticise disappointed ICT4D projects, but to analyse and to try to find adequate approaches which can bring about the expected results from ICT use for development.

5.3 Recommendations

The previous chapter revealed the reason of the challenges. In this chapter, the way to improve the project is sought from a point of user participation. Papenek (1983) mentions that a basic problem of IS design is caused by an inadequate or a lack of relationship between design and people. In other words, a lack of local user involvement is one of the main causes of the challenges since the design-reality gap is generated by poor understanding of the local reality. Thus, user participation can be one of the possible solutions to lessen the design-reality gaps since it contributes to exposing the local reality which Heeks (2002a) suggests as one of the solutions. The following sections discuss possible solutions for the SchoolNet project from the point of user participation.

5.3.1 Suggestions from Users

First of all, several suggestions proposed by teachers are introduced. Through the interviews, every teacher shows their precise understanding about both advantages and disadvantages of the plasma TV education. Their attitude to this project is very moderate. They are not too optimistic or too pessimistic. For example, every teacher points that though using images in classroom improves the quality of

education, the plasma TV-dominated teaching style should be changed. They suggest that CDs or DVDs of the video lectures should be distributed to each school so that each teacher can select only necessary parts to be used in their classroom. Their preferable time allocation for the video lecture is about 20 minutes out of 40 minutes class. Additionally, though many teachers mention about the English problem, they do not recommend changing language from English to their local language. It is because they know that English is definitely important for the future of their students and the real solution is not to use the local language but to improve the quality of English education in the primary education in order for students to equip English skills enough to follow the video lectures until grade 8. These suggestions from the teachers are really reasonable and absolutely right. It means that the users know the reality. Thus, their participation is considered as a way to avoid the challenges and solve the problems. Considering both facts that the teachers' suggestion is really sharp shooting and that the participation is theoretically supported by many scholars from development studies as well as IS development, the teachers involvement can be justified as a possible solution for solving problems of the SchoolNet project.

5.3.2 How Can User Participation Be Realised?

As discussed above, user participation can be a means for improving the SchoolNet project. However, it is not easy to realise it in reality. The difficulty of user participation exists in real world. How can the difficulty be avoided? In this section, two kinds of solutions are proposed to enable real user participation. One is to make a project more flexible to focus on future modification of the project after implementation. The other one is to assist users to upgrade themselves to producers from consumers of information.

5.3.2.1 Flexibility to Accommodate the Late User Participation

As Puri et al. (2004) point an importance of capacity building for users, one of the possible solutions to encourage real user participation is to educate users at the beginning of project planning. Education may encourage users to participate in project planning. However, it does not work always. For example, it is easy to find telecentre projects in which users are taught how to create their websites, but such websites are unlikely to be updated at all. After all, it is very difficult to teach something innovative to users who do not have any basic knowledge and experience. Even if they can understand the basic operation of computer and software, such education tends to be a supply-driven training without caring whether they really understand a purpose of the project and an aim of the training. Though the user education is important, what is more important for complete armatures is to take time for them to acquire knowledge and experience practically. In fact, in the case of the SchoolNet project, despite the fact that many teachers were not trained about operation of the plasma TV and they did not have an opportunity to be informed about the project before the actual project implementation, now every teacher knows about the aim, merits, demerits and operation of the plasma TV education system much more than what they could have learned in such a training. The most surprising point found by the fieldwork in Ethiopia is the significant difference of teachers' opinion compared to the time when the plasma TV education was introduced three years ago.

They did not express good understanding of advantages and disadvantages of the project at that time. But, now they know both positive and negative aspects of the project very well. Furthermore, they suggest the reasonable solutions. It is three years experience teaching with plasma TV that enabled them to understand the problems and possible solutions clearly. This fact indicates that a certain period of

time is very necessary for users to use the new system and to know new technology in order to grasp a purpose of the new system and a roll of technology practically. Therefore, it is possible to say that the project should have a flexible and long term strategy to encourage and accept user participation even after a certain period of time. It contributes to Improving the project with real demands raised by users after they prepare themselves for the real participation. Otherwise, it is very difficult to realise real user participation since they do not have knowledge about IT required for the participation.

5.3.2.2 From Consumer to Producer

Though it is a good solution to make a project more flexible to be modified along with user demands even after a few years, there is still a problem. It is a motivation of users. In the case of the SchoolNet project, even if DVDs are distributed to every school according to teachers' suggestion, all teachers do not check the DVDs to select necessary parts of them in advance if they are not motivated to prepare their classes. Some teachers, who are not motivated to teach, are likely to use DVDs for all 40 minutes of their lesson without teaching anything by themselves. In fact, many teachers in Ethiopia are not satisfied with their salary and are eager to find out higher-paid jobs. Unsurprisingly, their motivation is too low to spend extra time to prepare for better lessons. Therefore, unless there is something which motivates them, to provide DVDs may not improve the current situation even though it is the suggestion from the local users.

What can motivate them? Without their motivation, the participatory design may bring about 'participation as obligation' (Hickey and Mohan 2004). The answer to this question lies on 'What motivates people?'According to Loher et al (1985), people can feel satisfied when they have autonomy and control something by themselves. Similarly, Staw (1989) and Galbraith (1977) insist that one of the ways

to motivate workers is to provide autonomy. On the other hand, Petrova (2003) states that 'Motivated people show enthusiasm for acquiring information that is useful for the production process' (ibid: 3). When these points are considered, to treat users as a producer of contents can be a solution. If teachers are upgraded to be producers from mere consumers of information, they can have autonomy to decide what should be contained in their lessons and also they can learn how to create digital contents by themselves. It may be true that IT skills are new information and knowledge for teachers to improve the production process as well as to build their confidence. Therefore, it is assumed that if they have autonomy to use plasma TV as their teaching tool, teachers are willing to learn IT skills to prepare and improve their lessons. For instance, if teachers are allowed to select necessary parts of the video lecture such as experiments and figures from DVDs and they can rearrange them with additional texts and comments on slides using presentation software like Microsoft Power Point, they are likely to be satisfied. If they can create their own slides as teaching aids, they may be more excited to teach their students because their lessons will become a stage to show their ability for presentation as well as their IT skills through showing off the digital contents tailored by them and because teachers can feel confident by dominating ICT. Just to provide DVDs means that teachers are still consumers of information, but to give them autonomy and to train them to know how to create contents can upgrade their position to producers of information from consumers.

In fact, through the interviews, every teacher shows their interest and positive attitude to create the contents by themselves. Moreover, they insist that the plasma TV-dominated teaching style should be modified to be teacher-dominated one. In fact, this shift from consumer to producer in ICT4D projects is detected by Heeks (2008a; 2008b). He states that one of the paradigm shifts from old ICT4D projects

to the latest ICT4D projects is to treat local users as producers, not consumers. However, to treat users as a producer can be especially effective for ICT4D projects because IT skill is believed as something important and necessary by people in developing countries, and thus, they are proud of acquiring IT skills. Furthermore, to provide opportunities to show their products can contribute not only to motivating them but also to making them confident. In other words, it is an empowerment of local users. Since empowering people is highly related to development (Alsop et al. 2006), the shift from consumers to producers is also very important from the point of human development. Hickey and Mohan (2004) insist that participation should not be 'participation as obligation', but 'participation as a right'. These solutions may be able to shake users free from 'participation as obligation' and move to 'participation as a right' by giving them preparation period for real participation and providing autonomy and skills which may empower them.

5.3.2.3 Minimising Design-Reality Gap with ITPOSMO checklist

The importance of the socio-technical approach with user participation is clarified. However, one more problem is the gap between project design and reality. Unless the gap is minimised, it is very difficult to realise project success. The ITPOSMO checklist (Heeks 1999a; 2006) is a useful tool to evaluate and measure the gaps from the point of the socio-technical perspective since it covers both technical and the other dimensions such as Information, Technology, Process, Objectives/Value, Skills/Staffs, Management/Structure, Other resources.

According to Heeks (2002a), local improvisation is crucial to close the gap and he suggests four kinds of strategies to support the local.

a) Expose organisational realities

It is fundamental that local reality should be understood properly. For this purpose, three methods are suggested, such as, smoothening communication among stakeholders, articulating differences between their ideal model and the reality, and proving tools for stakeholders to show their realities.

b) Improve local capacities

For the local improvisation, those who have both competencies of a sector and IS are necessary. Therefore, it is required to develop personnel who have such a hybrid competency.

c) Educate the carriers

The stakeholders, who carry IS projects from North to South (i.e. international donors, consultants, IT vendors, western-trained civil servants), should be educated so that they can understand the weakness of current ICT4D approaches through rigid evaluation and then take the 'Integrated' approach. Additionally, it leads a necessary shift from support for ICT consumption to local capacities development for ICT production.

d) Analyse the 'how' as well as 'what'

It is necessary to analyse not only IS contents (what) but also the IS development process (how). Methods for IS development are really important. For example, just to apply Western-made IS development techniques is unlikely to fit developing country contexts even if it is a participative approach. It is possible to think that these four strategies are related to the aforementioned Socio-technical approach with user participation.

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Annex 1- Questionnaire for high school Teachers

Dear sir/ Madam

This questionnaire is designed to conduct a research on Assessment of the Effectiveness of ICTs for Development in Ethiopia- A case of the SchoolNet Project.

The study is purely for academic research purpose required for partial fulfillment of MBA of Indira Gandhi National Open University (IGNOU). The main objective of the research is to investigate and describe the implementation of schoolnet project in Ethiopia.

Your frank and genuine responses to the questions are highly indispensable. Therefore, indicating that you may not need to mention your name, and promising that all the information that is collected from you would be kept confidential and used only for the purpose of the study, the researcher hereby kindly request your cooperation for the same. I kindly request you to fill up this questionnaire and return to me at your earliest.

Thank you in advance for taking your time to complete the questionnaire.

Fikru Kassa

January 15, 2012

Questionnaire One

Questionnaire to be filled by Teachers from the schoolnet

Sex

Male □

Female □

Age ……

1. How long are you associated with the schoolnet?

   a) Less than 1 year

   b) 1 – 3 years

   c) 3 – 5 years

   d) More than 5 years

2. Did you teach before 'Plasma' was introduced?

   Yes / No

3. Do you think the contents of the video lecture are attractive?

   Yes / No

4. Is there any problem about data transfer speed?

   Yes / No

5. Is there any staff that can solve troubles and maintain the 'Plasma' in your school?

   Yes / No

6. Do you think your school has enough budgets to cover cost related to the 'Plasma?'

   Yes / No

7. Do you think students became better learners because of the ''Plasma'?

   Yes / No

8. Do you think teachers became better teachers because of the ‘Plasma’?

   Yes / No

9. Do you think educational level of students is improved because of the ‘Plasma’?

   Yes / No

10. Are you satisfied with the technology used for the ‘Plasma’?

    (5= Very satisfied 4= Satisfied 3= Somewhat satisfied 2= Unsatisfied
    1= Very unsatisfied)

    5 4 3 2 1

11. How do you see the teaching and learning process in the classes where ‘Plasma’ is used?

    5 4 3 2 1

12. How do you feel about the condition of the classes as well as laboratories?

    5 4 3 2 1

13. Are you satisfied with the multimedia resources used in day to day instruction?

    5 4 3 2 1

14. What do you think about the laboratory equipments including the computers?

    5 4 3 2 1

15. Are you satisfied with the work as a teacher now?

    5 4 3 2 1

16. Are the books in the library adequate for reference and as per curriculum?

    Yes / No

17. Are you satisfied with the standard of facilities like labs; canteen etc?

    Yes / No

18. Do you want to continue working in the area you are in now?

    Yes / No

19. Do you feel that you maintain a good balance between work and private life?

Yes / No

20. Do you agree the ‘Plasma’ improves quality of education?

(5= Strongly agree 4=Agree 3= Neutral 2= Disagree 1= Strongly disagree)

5 4 3 2 1

21. The blackboards, dusters, chalks and other necessary things are in abundance and are readily available.

5 4 3 2 1

22. The computer systems in the computer labs are updated with latest software and hardware.

5 4 3 2 1

23. The books as per the curriculum are all available in the school library.

5 4 3 2 1

24. The teacher to student ratio is such that it allows equal attention to all students.

5 4 3 2 1

25. In case of misconduct, all students are treated equally.

5 4 3 2 1

Annex 2- Questionnaire for high school Students

Dear sir/ Madam

This questionnaire is designed to conduct a research on Assessment of the Effectiveness of ICTs for Development in Ethiopia- A case of the SchoolNet Project.

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Your frank and genuine responses to the questions are highly indispensable. Therefore, indicating that you may not need to mention your name, and promising that all the information that is collected from you would be kept confidential and used only for the purpose of the study, the researcher hereby kindly request your cooperation for the same. I kindly request you to fill up this questionnaire and return to me at your earliest.

Thank you in advance for taking your time to complete the questionnaire.

Fikru Kassa

January 15, 2012

Questionnaire Two

Questionnaire to be filled by Students from the schoolnet

Sex

Male □

Female □

Age ……

1. Do you think that the contents of the video lecture are attractive?

   Yes / No

2. Do you think that teaching and learning process in the classes using ‘Plasma’ is advantageous?

   Yes / No

3. Do you think students became better learners because of the ‘’Plasma’?

   Yes / No

4. Do you think educational level of students is improved because of the ‘Plasma’?

   Yes / No

5. How do you feel about the quality of education provided to you by the schoolnet?

   (5= Very satisfied 4= Satisfied 3= Somewhat satisfied 2= Unsatisfied 1= Very unsatisfied)

   5 4 3 2 1

6. How do you feel about the condition of the classes as well as laboratories?

   5 4 3 2 1

7. Are you satisfied with your lesson?

   5 4 3 2 1

8. Are you satisfied with the laboratory equipments including the computers?

   5 4 3 2 1

9. Are the books in the library adequate for reference and as per curriculum?

   Yes / No

10. Do you enjoy going to school?

    Yes / No

11. Are you comfortable with asking questions in class?

    Yes / No

12. In general, how would you think about the following elements of teaching on your education?

    (5= Very satisfied 4= Satisfied 3= Somewhat satisfied 2= Unsatisfied
    1= Very unsatisfied)

Curriculum and contents	5	4	3	2	1
Reading materials	5	4	3	2	1
Enthusiasm of lecturers	5	4	3	2	1
Feedback from the instructor	5	4	3	2	1
Stimulates my interest	5	4	3	2	1
Stimulates critical thinking	5	4	3	2	1
Continuity between teaching sessions	5	4	3	2	1
Relevance	5	4	3	2	1

13. Do you think the schoolnet offers enough help with difficult subjects?

    Yes / No

14. How do you feel in the skills you are learning?

(5= Very satisfied 4= Satisfied 3= Somewhat satisfied 2= Unsatisfied
1= Very unsatisfied)

5 4 3 2 1

15. In general, indicate your degree of satisfaction with the schoolnet program:

5 4 3 2 1

16. I am satisfied with the quality and quantity of schoolnet education I have received.

(5= Strongly agree 4=Agree 3= Neutral 2= Disagree 1= Strongly disagree)

5 4 3 2 1

17. I have access to adequate resources to support my education.

5 4 3 2 1

18. The lesson is well organized and easy to follow.

5 4 3 2 1

19. There is no discrimination among the students based on sex, caste or religion.

5 4 3 2 1

20. Your school teachers give fair reports & treat every student equally.

5 4 3 2 1

Annex 3- Interview guide questions for Management members of Schoolnet project coordination office

Dear sir/ Madam

This questionnaire is designed to conduct a research on Assessment of the Effectiveness of ICTs for Development in Ethiopia- A case of the SchoolNet Project.

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Thank you in advance for taking your time to complete the questionnaire.

Fikru Kassa

January 15, 2012

Interview guide questions for management members of the schoolnet project coordination office

Q1. How is the national Schoolnet organized and what is its objective?

Q2. How many schools are actively involved or use services in the Schoolnet project?

Q3. What do you think about the advantages and disadvantages of 'Plasma'?

Q4. What difficulties (if any) are you experiencing in the national Schoolnet?

Q5. What types of Internet connectivity are available to schools?

Q6. What are the major obstacles to greater Internet connectivity in schools?

Q7. Are there plans to develop the Schoolnet any further?

Q8. What is your opinion about the importance of quality assessment in the Schoolnet?

Q9. Have you already defined quality criteria for the Schoolnet's ongoing monitoring and evaluation?

Q10. What kind of support is required to strengthen the Schoolnet?

Q11. Is the governing body explicitly supportive of the project, and has allocated sufficient funding for the effective implementation and ongoing development of the project?

Q12. Does senior management regularly inform the governing body about the ongoing implementation and development of the programme?

Q13. Why did the SchoolNet project face several challenges?

Q14. How can the SchoolNet project overcome the challenges?

Q15. How can the lesson from the SchoolNet project be used for the future E-government projects in Ethiopia?'

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1. INTRODUCTION PAGE

1. Introduction

1.1 Background of the Study

The dawn of the new millennium marked the struggle of third world countries in the realm of information technology. While developed countries are already reaping the benefits of these advancements, developing countries are still groping in the dark whether to invest or not. Major social and economic alterations in most countries were attributed to their daring feats with the most advance micro-electronics-based information and communication technologies (ICTs). Their uses expand beyond all segments of economies and societies. ICT opens the door for potential and further growth for developed countries. It is these gains that prompt other countries to launch extensive support to the construction of a global information infrastructure (Mansell and When, 1998).
In this decade, information and communication technology (ICT) has been seen as a powerful tool for assisting poor countries to achieve further development (Sahay and Avgerou 2002).

e-Government is a 'tool to enhance the economic competitiveness of business and to empower citizens' (Kraychuk and Schack, 1996), and to improve both service delivery and government decision making. Some of the benefits to citizens and businesses from this initiative are identified as:

- Better delivery of services and information;
- The creation of new employment opportunities;
- Reform of the public sector;
- Access to information empowering citizens;
- Bridging the digital divide and improving efficiency,

- Effectiveness, transparency and accountability of government

processes, and

-Increase the possibility of foreign investment and assistance.

Although the Ethiopian state recognizes the crucial role of improved information technology in achieving the country's national objectives, its efforts are still want in terms of fully developing this sector. In order to give a clear view of the online development of the Government presence following is a description of the e-Government stages of progress:

✦ *Emerging*: in this stage a few independent government official websites establish their presence. The websites contain limited, basic and static information. The Internet functions as a brochure for posting government information on-line. In this stage customer cannot interact with officials.

✦ *Enhanced*: a comprehensive regular updating for the content and information of the websites including publications, legislation, newsletters, links, search engine and e-mail capabilities.

✦ *Interactive*: great deal of communication through downloadable forms, official emails through which users can make appointments and requests.

✦*Transactional*: a financial transaction presence where users can pay for services online. In addition, more sophisticated functions including digital signatures, passwords and encryption are also provided.

✦ *Seamless*: fully integration across departments to present e-Services and functions. All services can be accessed instantly from one portal without differentiation between government agencies and departments (UNDPEPA, 2002).

These stages are representative of the government's level of development based primarily on the content and deliverable services available through official

websites. They are methods for quantifying progress. As the stages in e-Government initiatives have become operational; governments have begun to focus attention on measuring the efficiency, performance and impact of their websites. Performance measurement is a very important tool for the e-Government efforts. It can monitor the process of the e-Government initiatives and ensure that government's time and fund are being well spent (Ho, 2002).

Ethiopia, one of the poorest countries, is the one that expects ICT as an enabler for development. The prime minister of Ethiopia, Meles Zenawi said, 'We did not believe serious investment in ICT had anything to do with facing the challenges of poverty that kills. Now I think we know better. We recognise that it is a vital and essential tool for fighting poverty – for beating poverty that kills and ensuring our survival' (Zenawi cited in Farrell and Issacs 2007: 3-4).

Actually, the Ethiopian government has an ambitious e-government strategy which covers various sectors such as education, health, agriculture, and public administration (Dzidonu 2006; Tadess 2006). As a core part of the nation-wide e-government strategy, the distance education project, called 'SchoolNet', was launched in 2003 with support from UNDP (Hare 2007). It aims to broadcast video lectures of main subjects, which can be seen on plasma television displays equipped in classrooms, to almost all secondary and preparatory schools (about 550 schools) from the capital city, Addis Ababa through a satellite network, and to provide the internet connection for the schools in order to supply useful information about teaching and learning and to lessen the gap of education level between rural and urban areas (UNDP 2005; UNESCO 2004).

In fact, in the case of the SchoolNet project in Ethiopia, many kinds of problems, such as, poor infrastructure, low skills for maintenance, low motivation of teachers and language problem used in the contents, were identified by the author who worked as a Japan Overseas Cooperation Volunteer (JOCV) Information Technology (IT) teacher in a secondary and preparatory school in Ethiopia from 2003 to 2005 and also worked for various educational projects as a consultant for the Japan's Grant for Grassroots Human Security Projects in the Embassy of Japan in Ethiopia from 2005 to 2007.

1.2 Rational of the Study

The School Net project arises from the need to integrate ICTs into Ethiopia's educational system. It is designed to develop a wide-area network linking all schools in the country and making internet and online education accessible to them. The initiative constitutes a key component of e-government programme and aims at the application of ICTs for purposes of teaching and learning.

School Net Facilitates effective learning for the national student population and enhance the teaching capacity of educators by providing all with a wealth of online instructions, lectures, references and other content in interactive multimedia formats, from national, regional as well as international sources, all accessible from any location throughout Ethiopia and at any time.

This study explores the effectiveness of School Net Project in the progress of ICT application. The paper investigates the progress, challenges and opportunities of School Net Project in Ethiopia since its establishment. In order to achieve the main purpose of the study, the researcher evaluates the short-term and long-term plans of the e-government program of Ethiopia.

The result of the study will provide information regarding the current situation of School Net in Ethiopia. The common ICT concerns, problems and issues of School Net will be given attention in hope of addressing their needs to be able to help themselves as productive sectors of the country as well as to contribute to the overall education gains of the nation. The findings of this particular research endeavor will likewise promote awareness among education stakeholders.

In order to have efficient and effective e-Government in Ethiopia, one of ICTs activities, such as School Net implementation shall be managed in accordance with acceptable theories and practices. Conducting research on School Net practices to evaluate its effectiveness and identifying the major reasons that adversely affect its success may help e-Government officials particularly Ethiopian ICT Development Agency and Ministry of Education:-

- To bring improvements in overall School Net activities,
- To generate knowledge in respect with underutilization of resources and a means to get rid-off,
- To provide different techniques in manipulation of School Net requirements with best level of competency,
- To create the prospective of successful implementation and getting away from the problem of mismanagement and underutilization of resources.

1.3 Statement of the Problem

It seems that ICT brings about the development dramatically. However, there are not only positive reputations of ICT4D projects but also negative ones. For example, in the case of a telecentre which can be considered as a typical ICT4D project, many telecentre projects lack sustainability in reality (Oestmann and

Dymond 2001). Additionally, 85 % of e-government for development projects is reported to be failure or partial failure (Heeks 2003). Moreover, when it comes to educational sector, there has been no definitive evidence to justify the more effectiveness of ICT investment than alternatives such as provision of text books, teacher training and nutritional supplement which may also improve educational situation (Cawthera 2001).

Implementation of ICTs-in-Education Initiatives, The Study shows that the majority (70 percent) of public and private schools that participated in study do not have ICT expenditure allocation as part of their annual school budget. The implication of these findings is that: the vast majority of Ethiopian schools have limited or no financial resources at their disposal to implement or fully participate in a national SchoolNet initiative. A key challenge therefore is: the lack of financial and other resources to support e-education initiatives within the schools. This study will focus on identifying the issues of the effectiveness of School Net project in Ethiopia.

1.4 Research Questions

The basic questions which will be conducted to search the facts from the study area:-

1. How the government of Ethiopia assists the implementation of School Net?
2. What are the short-term and long-term e-government programs That the government of Ethiopia implements?
3. What are the policies that the Ethiopian government upholds to protect and maintain the country's School Net program?
4. What are the determinants of the feasibility and success of instituting

School Net in Ethiopia?

5. What are the impacts of School Net to the educational development of Ethiopia?
6. Why did the SchoolNet project face several challenges?
7. How can the SchoolNet project overcome the challenges?

1.5 Objectives of the Study

1.5.1 General Objectives

Since the study is primarily concerned with assessing the effectiveness of e-Government with especial reference to School Net in Ethiopia, the focus will be on finding out the success of implementing School Net in the country in meeting the demands of the educational development. The primary objective of this research is to evaluate the extent that the School Net project is effectively implemented in Ethiopia to achieve the grand objectives of educational goals at most effective level of understanding.

1.5.2 Specific Objectives

The following specific objectives will be recognized by this study:-

1. To study how the government of Ethiopia assists the implementation of School Net;
2. To identify the short-term and long-term government's ICT programs;
3. To study the policies that the Ethiopian government upholds to protect and maintain the country's School Net program;
4. To identify the determinants of the feasibility and success of instituting School Net in Ethiopia;
5. To develop clear view of how School Net Project is implemented in Ethiopia;
6. To identify the reasons negatively hinder (challenges) the effectiveness

of School Net Project in Ethiopia;

7. To study how the School Net Project overcome the challenges;

1.6 Literature Review

Among many sectors in which ICT is used, education can be regarded as one of the most important sectors. It is easy to understand that education has been a focal point of development when we consider the fact that main development initiatives have been always related to education such as Education for All (EFA) (UNESCO 2007) and the Millennium Development Goals (MDGs) (UN 2004). Thus, it is true that education is definitely crucial for human capacity building which is fundamental for development. Many authors (World Bank14 1995; Psacharopoulos 1995; Colclough and Lewin 1993) pointed out the importance of education for development (Lewin and Caillods 2001). For instance, literacy enables people to have greater knowledge and skills which ensure higher-paid employment (UNESCO 2006).

Education is essential for addressing development issue such as unemployment, poor health and gender inequality. Therefore, more efficient and effective educational projects are always needed for national development. Unsurprisingly, for this purpose, ICT has gained more and more attention, and the use of ICT including radio and television for education has a long history (Grace and Kenny 2003).

Ethiopia's Information and Communication Technology (ICT) policy is an integral part of the country's larger development goals and objectives. While the goal is to rapidly transform the country's subsistence agricultural-based economy and society into a predominantly knowledge- and information-based economy and society, the focus of the policy will be on the country's ICT

development process. To achieve this objective, the Government of Ethiopia has developed multiple policies, most notable of which are the National ICT Strategic Plan and the ICT4D Action Plan for the year 2006-2010.

The Ethiopian Information and Communication Technology Development Agency (MINISTRY OF COMMUNICATIONS & IT) has a mission to develop, deploy and use ICT to improve the livelihood of Ethiopians and optimize its contribution to the development of the country. The Agency has thus undertaken a number of e-Government assignments to avail government services online and improve the access to the general public. The Government Information System Development and Data Centre Administration team of the Agency is managing projects targeted towards development of integrated information systems to avail government services online.

However in the current context there was a need to integrate the ICT initiatives undertaken and provide a strategic direction for e-Government implementation in the country. It is in this context MINISTRY OF COMMUNICATIONS & IT has engaged PricewaterhouseCoopers Pvt. Ltd. for designing the National e-Government strategy and implementation plan for the Government of Ethiopia.

1.7 Methodology

1.7.1 Research Design

This research will make use of the descriptive research design, where impact of School Net to the education of Ethiopia will be taken into account. The selected research design will enable the attainment of the above mentioned objectives. For this research, various data sources will be used to determine how School Net affects the educational development of Ethiopia.

The study will be completed under the qualitative and quantitative research design and approach using the key informant interview and focus group discussion methods. The use of interview guide questionnaires will be of great

importance on the quality of the elicited data that will be used to come up with valid and reliable results and findings.

1.7.1.1 Participants of the Study

The three main participants in the study are:-

1. Management team of the coordination office
2. High school teachers, and
3. High school students

The informants of the study who will be participating during the data collection period will be composed of individuals who belong to the implementation of the School Net Project in Ethiopia. The sample derived from the management team of the coordination office, teachers and students of different high schools will be used as the respondents of the study. They will be answering the interview and participating in the focus group discussion which will be used for the study.

Documentary analysis will also be conducted to obtain the secondary data mainly. To collect general information about ICT4D, ICT4E and e-government, relevant literatures will be reviewed. In the case of the SchoolNet project particularly, some reports written by Ethiopian government, especially, Ethiopian Information and Communication Technology Development Agency (EICTDA), international organisations such as UNDP and UNESCO, and several researchers will be used. Additionally, the activity reports written by some JOCVs who have worked as a teacher in urban and rural parts of Ethiopia will also be reviewed since they used the video lectures on plasma TVs and/or they worked as an IT teacher.

1.7.1.2 Sampling Techniques and sample Size

In Addis Ababa, Capital city of Ethiopia, there are 38 high schools covered in School Net Program. Since all high schools have got similar programs I will try to adopt cluster sampling. Two high schools having 130 teachers and 400 students of 9^{th} grade and 300 students of 10^{th} grade will be selected for the study.

As far as sample size is concerned, I will take 6 management team out of 10, 50 teachers out of 130, and 70 students out of 700 for sampling. Therefore, the research will be run up by deploying the cluster sampling techniques from the high school population.

1.7.2 Data-Gathering Methods and Sources

The right quality of data leads the result of the research so reliable and acceptable to the user of the research findings. From data-gathering techniques that will be employed, two sources of data will be used: the primary and the secondary resources. The primary sources of information will be derived from the interviews and focus group discussion conducted by the researcher. The secondary sources of data will be based on published articles from computer, business and IT journals, books written about School Net and related studies on the Internet web-sites.

1.7.3 Data Analysis

The data gathered from these instruments will then be subjected to analysis. The collected data will be sorted out through applicable tables. The analysis will be characterized by descriptive analysis and comparative approaches. Qualitative data that will be gathered from interviews will be present in text formats.

1.8 Scope and Limitation of the Study

This research will primarily focus on assessing the implementation of programs and policies of School Net Project in Ethiopia. The focus will be on finding out the success of the implementation of School Net and its contribution to the educational success of the country. The study is also interested in finding out the feasibility and success of such program particularly to the ways and measures that the government employs in order to empower the School Net. The research will likewise present the common shortcomings, issues and problems that the School Net has.

Some of the possible constraints that the researcher may encounter while conducting the research include maintaining scheduling appointments with selected participants, the interviewees or informants who will rather refuse to take participation in the study, issues on the conceptualization and construction of the interview guide questionnaires, gatekeepers of information and permits, accumulating enough in-depth data and issues on the quality of the data gathered, time constraints of the semester require less time than may be ideal for an ethnographic study.

School Net Project covers the whole regions of Ethiopia. It is so broad and its outcome also looks so complex if it is going to be managed the research properly. But due to time and financial constraints to deal with in depth, the findings of the research will have a limitation to search every reason of negatively hinder the effectiveness of each project and the outcomes reflected.

1.9 Expected Contribution from the Study

The research shall be conducted as per the recommended methodology and with reference to contemporary literature. The recommendation would help the concerned government offices and educational sector to make appropriate decision with better level of information.

Specifically, the expected contributions of the research include three main parts in the course of research as follows:-

- ✦ Finding on School Net Project inception, development and implementation,
- ✦ Analysis of School Net implementation in general and success/ failure factors in particular,
- ✦ Recommendation to:-
  - Decision makers in School Net – lessons for future similar effort,
  - Researchers possible further research areas.

1.10 Organization of the Study

The research will be organized as follows:

➡Chapter one will be encompassed: The Introduction part, i.e. the background, the rational of the study, the statement of the problem, the objectives, the methodology and scope & limitation of the study**;**

➡Chapter two contains the literature review**;**

➡Chapter three deals with methodology, sampling technique and analytical tool**;**

➡Chapter four covers findings and discussions**;**

➡Chapter five indicates the conclusion and the recommendations of the study.

1.11 Activity Schedule and Estimated Cost

The Study activities Schedule and estimated cost can be summarized as follows:-

Item	Activity	Schedule (2011)						Estimated Cost
		July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	Proposal Writing, Advisor Selection and approval by the study center	…..	…					1000
2	Approval of Research Proposal by IGNOU (India)		…	…..				--
3	Questionnaire Design, Approval with advisor, - Duplication of Questionnaire - Distribution of Questionnaire - Collection from respondents		…	….	..			2000 5000 2000
4	Data editing, updating and compilation (Data Analysis)				….			4000
5	Report Writing					…		3000
6	Final Report Submission					...		
Total amount								**17000**

The main costs are: - photocopying articles, printing my report and binding my report. The total estimated expenses will not exceed Birr 17000, which is equivalent to USD 1000.

(1USD = 17 Ethiopian Birr)

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