Lund University
Department of sociology

"We will be there soon. Sawa*? Sawa?"

A study on increased ICT use among secondary school students in Mutomo

Author: Helena Brandt and Kajsa Ryberg
Bachelor thesis: SOCK01, 15 hp
A minor field study financed by SIDA
Spring semester 2013
Supervisor: Birgitta Ericson

*Sawa = okay in kiswahili

Abstract:

Africa stands on the doorstep of a global information revolution that presents a range of opportunities. ICT has enormous potential to contribute to the development of Africa, both on an individual and societal level. The purpose of this study is to examine what effect increased ICT use has on secondary school students in Mutomo, Kenya. Furthermore the study presents a mapping of the secondary school students ICT use and identifies opportunities and challenges with an increased use of ICT. The focus of the study is to relate ICT use in a rural area to social sustainability. In order to study this, a field study, with an ethnographic approach, among secondary school students in Mutomo, Kenya was conducted. Through a qualitative research approach interviews and participant observations were conducted. The empirical material collected during the field study indicates the main opportunity with increased ICT use to be the possibility of finding and spreading information, which enhances creation of shared institutions. The main challenge of ICT is identified as overcoming the digital divide between students. The analysis further shows that an increased use of ICT is beneficial in most aspects of social sustainability. The equity indicator and equality factor of social sustainability are not positively affected from increased ICT use among secondary school students in Mutomo.

Keywords: ICT, Social Sustainability, Internet, Mobile phones, Education

Index

1. Introduction

When we, one of our first days in Mutomo, take a walk in the lively and dusty village we meet a boy. He is sitting under a tree hiding from the burning sun. When he spots us he instantly approaches us and suggests that he accompanies us into town. He is fourteen years old and during the walk he shares with us his story:

> "I've been walking for two hours, I had to rest under the tree, it is so hot. But now we can walk together to town. I am going to town to charge my phone. We don't have electricity at home" (Boy, 14 years old).

In the spring of 2013 we applied for a SIDA financed scholarship that would make it possible for us to conduct a minor field study in a developing country. To our relief and satisfaction we were granted the scholarship and four weeks later we, for the first time, sat foot on the African continent. We were to spend eight weeks in the small rural town of Mutomo, Kenya.

Africa, like all other regions of the developing world, stands on the doorstep of a global information revolution that presents a great range of opportunities. Information and Communications Technology (ICT) have enormous potential to contribute to the development of Africa, both on an individual and societal level. ICT plays an important role in promoting democracy, human resource development, socio-economic development, international cooperation, trade and commerce. Africa, as a region, has staggering economic and social challenges that ICT can help meet (Wilson III & Wong, 2003).

Mutomo town with its 2000 inhabitants is located in the heart of Kenya's third poorest district, Mutomo district. Mutomo is a dry district where the lack of fresh water and poor health are the biggest problems. ICT is today a potent force for economic development in the world's poorest countries (Aker & Mbiti, 2010) and for Mutomo, that long has been neglected in Kenyan politics (Mutomoprojetet: infrastruktur, 2013), ICT can give Mutomo the opportunity to reduce poverty and develop their district. Mutomo is inaccessible located because of Kenya's insufficient infrastructure. However, due to an Internet tower, provided by the government in 2008, Mutomo has the opportunity to benefit from ICT and achieve increased accessibility (Rotary, 2013).

The study is a field study, with an ethnographic approach, concerning ICT use among secondary school students in Mutomo, a local, rural area in Kenya. The method used for this qualitative study is semi-structured interviews and participant observations. The focus of the study is to relate ICT use in a rural area to social sustainability and poverty reduction.

ICT is a relatively new topic in societal discussions. ICT generates, on a daily basis, a debate in many different areas of society with different premises and purposes. The encounter with the fourteen year old boy in Mutomo made us realise with what force these new technologies have gained new grounds in this rural area.

We consider this study to be of high sociological relevance, development of technologies has always affected human's way of life. The Information revolution that now reaches almost every place on our planet has changed our ways of communication, interactions and spread of information. ICT technologies have changed the conditions for people living in rural and developing areas that have created a whole new field of study within sociology. Recently the link between ICT and sustainable development are being discussed among different scholars but since the subject is new the research is limited. The scholars in the field of urban sociology Amir Ghahramanpouri, Hasanuddin Lamit and Sepiedeh Sedaghatnia (2013) state that among the three pillars of sustainability, economic, ecologic and social, the social aspect are the least studied. Sustainability is a well-known concept of sociology and with the technologies changing the society now more than ever, within communication and information flows; social sustainability becomes a more important part of sociology.

1.1 Disposition

After purpose, research questions and limitations with the study follow a presentation of the context of Mutomo. In the chapter previous research we conclude our preparatory readings regarding ICT in Sub-Saharan Africa and the challenges with implementing ICT in education. Our theoretical framework compromises theories regarding social sustainability and ICT for poverty reduction. After the methodological discussion follow the result from the study. The analysis is continuously presented together with the result. The study is completed with a conclusion and discussion of the most important findings from the study.

1.2 Purpose

During the field study we examine the use of Information and Communication Technology (ICT) among secondary school students, 13-20 years old, in Mutomo, Kenya. The aim is to present a mapping of the secondary school students' ICT use. A further aim of the study is to identify opportunities and challenges with an increased use of ICT among secondary school students in Mutomo. Furthermore the aim is to relate how increased use of ICT can affect social sustainability in a developing area in sub-Saharan Africa.

1.3 Research questions

- How, why and when is ICT used among secondary school students and what factors shape these patterns of use?
- What challenges and opportunities exist with increased use of ICT among secondary schools students in Mutomo?
- How do these challenges and opportunities affect social sustainability among secondary school students in Mutomo?

1.4 Limitations with the study

The study is based on one field study in the area of Mutomo, Kenya. It would of course be interesting to map out the ICT use in all of Kenya but due to limited resources and time we have restricted the study to one single case, the case of Mutomo. Mutomo is interesting from the ICT point of view because they in 2008 got access to Internet via an Internet tower, which is an assumption for the study. Another necessity for this study is that there are schools in the surroundings that we can visit.

A lot of technologies can be included in the concept of ICT. We have chosen to focus on mobile phones, computers and Internet since that is what is available in Mutomo.

ICT is analysable from many different perspectives but we have chosen to put our research in relation to the theoretical framework of social sustainability with immerse in poverty reduction. Further delimitation for this study is the choice to conduct the study among secondary school students. A larger range of respondents would have given us a too fragmented selection of material.

We wanted to make a thorough investigation of one group of people instead of a fragmented survey based on the whole population of Mutomo. The reason we chose secondary school students is that we believe this group to be most subjected to and in most contact with ICT. This is fundamental for our study. Another reason for choosing students is the will to identify challenges and opportunities with an increased use of ICT. This increase comes naturally to the students since ICT has recently been introduced into the school environment.

A comparison with different groups of population in Mutomo would have been interesting but this is a too small-scale project to manage that kind of study. This would of course be interesting to do as a future project.

2. The context

To be able to assimilate the content of the study it is necessary to understand the context in which the study is conducted. This chapter will describe the situation of Mutomo.

2.1 Mutomo

Mutomo town with its 2000 inhabitants is the administrative centre in the Mutomo district with 180 000 inhabitants. The area is the third poorest in Kenya and the poverty is widespread. The majority are estimated to live below the poverty line of 1.25 USD per day (Mutomoprojektet: befolkning, 2013).

Mutomo is very dry and one of the biggest challenges is the lack of fresh water. The rain falls unevenly over the year and some years it does not rain at all. When it does rain floods and erosion come as a consequence (Mutomoprojektet: klimat, 2013).

Mutomo also struggles with serious infection diseases. The combination of poverty and lack of water and food lead to severe health problems. Mutomo has a mission hospital that contributes to rising health but for most people in Mutomo it is too expensive to go to the hospital (Mutomoprojektet, hälso- och sjukvård, 2013).

The people in Mutomo that has a regular income work in the service sector, as teachers, in the governmental administration or have their own businesses but the majority of Mutomo's popu-

lation make their living by farming and trading goats, poultry, cows, maize, fruit and vegetables on the local market (Mutomoprojektet: befolkning, 2013).

In Mutomo the extensive lack of infrastructure has inhibited the development of the district. Mutomo district do not have tarmac roads and the roads they have are rough, bumpy and very dusty. During the rain periods the roads can be impassable. The inhabitants have to spend a lot of time on transportation and a lot of money on reparation of their vehicles (Motomoprojektet: infrastruktur, 2013).

Since 2010 Mutomo has electricity via the national net that still today expands and reaches further out in rural areas. Most households cannot connect to the net because of the cost. The electricity is very unstable and the power is easily affected by external factors like rain and wind (Mutomoprojektet: infrastruktur, 2013).

Mutomo district has many schools, some of them are public and some are private or sponsored by different organisations. The eight-year primary school in Kenya became free and mandatory in 2003. The government finance teachers, buildings and books but most schools are dependent on funds from parents because of high number of pupils. Despite the fact that primary school is mandatory many children do not attend school because of poverty, long distances to school and the need of their work on the farms. Secondary school in Kenya is a four-year education and in Mutomo they have both public and private. Secondary school is not free like primary and every student pays a fee at around 2500 Swedish crowns per year. This fee makes it impossible for many parents to send all of their children to school. Only 20 percent attend secondary school in Mutomo district (Mutomoprojektet: utbildning, 2013).

Mutomo, despite their lack of infrastructure, have good contact with the rest of the world because of the Internet tower that is located close to town (Rotary, 2013). Mutomo have some Internet cafés and computer schools and the use of ICT is increasing every day. Most of the residents are using a mobile phone and there are several places in town where it is possible to buy credit and charge mobile phones.

3. Previous research

Our preparatory readings have been on previous research regarding ICT in sub-Saharan Africa. Previous research on this subject is limited (Gillwald & Stork, 2007) but below follow a descrip-

tion of those previous findings that are of importance for this study. The previous research regarding ICT in sub-Saharan Africa is based on findings from two articles. The first one is written by four information technology scholars Francis K. Andoh-Baidoo, Felix Bollou, Olga Morawczynski & Oyelanki Ngwenyama (2006) presented in the journal Information Systems in Developing Countries. The second article is by Jenny C. Aker and Icac M. Mbiti, two scholars in the development economics sector.

Further we present previous research regarding challenges with implementing ICT in education in East-Africa. This research is interesting because it connects the focus of the study with our limitations. This section is built on an article by Mercy Gatchoka, Mittwa Kaemba and Diana Kessy (2006), all researchers in the field of information technologies. .

Statistics regarding ICT use and numbers of connections in our field of study do not exist. Statistics show that between 2010 and 2012 ICT connections in Kenya increased with seven millions connections up to 32 millions. These statistics give us a high number of connections in the country however these numbers are not applicable on Mutomo because of its isolation and Kenya's diversity (MDI: Kenya, 2013).

3.1 ICT and development in Sub-Saharan Africa

African nations have consistently ranked close to the bottom of the Human Development Index. The Human Development Report 2003 warned that the world was facing a development crisis with many African nations suffering severe social-economical reversals. The problems with HIV/AIDS and falling life expectancy rates is blamed for the decline, but some researchers have also blamed the decline on the lack of ICT penetration. The digital divide between the people having access to ICT and those who do not is growing. Africa is getting left further and further behind, as others with access move ahead more rapidly. Many scholars argue that ICT can make significant contributions to social development in Africa. Among other things an increased use of ICT is expected to help rural areas be part of the global digital economy (Andoh-Baidoo et al., 2006).

In the article *Mobile Phones and Economic Development in Africa* (2010) Aker and Mbiti examine the growth of mobile phone technology and its potential impacts on life quality in low-income countries with focus on sub-Saharan Africa. Sub-Saharan Africa has some of the lowest levels of infrastructure in the world. In 2010 only 29 percent of the roads were tarmac, a quarter of

the population had access to electricity and there were fewer than three landlines per 100 people. Despite this the access to and the use of mobile phones has increased dramatically over the past years. There are ten times as many mobile phones as landlines in sub-Saharan Africa and 60 percent of the population has mobile phone coverage, compared to 10 percent in 1999. Mobile phones have brought new possibilities to Africa such as connect individuals, information, markets and services across urban-rural and rich-poor divides. The new technology is fast and easy accessible for people that live in rural areas. People can call each other instead of spending time and money on transportation and they can easily find information. These effects of ICT can have significant impact of the life in rural Africa (Aker & Mbiti, 2010).

New technologies like Internet and mobile phones are gaining new ground every day. One reason why ICT is so warmly embraced by many Africans is the failure of old telecommunication systems to create a reliable, open, and widespread system for transmitting information. Another reason for ICT's rising popularity is the rise of economic globalisation and accelerating international competition. To be a part of the world market ICT are more and more necessary. New technologies are powerful since they bring access to information and knowledge. Aker & Mbiti conclude their article by saying that access to ICT in no longer a luxury for the few; it is the necessity for the many. Despite the speed of these changes and its expansion it is hard to reach an all-embracing conclusion about the impact of the increasing ICT in sub-Saharan Africa (Aker & Mbiti, 2010).

Despite the ideas about how ICT can contribute to development, the majority of African countries appear ill prepared to embrace the potential of ICT. In the article *Is there a Relationship between ICT, Health, Education and Development?* (2006) the authors write not only about the positive effect of ICT but also present a range of challenges with an increased use of ICT. Andoh-Baidoo et al. emphasise in the article that investment in ICT may not bring the same returns in the developing world as it has in the developed world. The authors continue with the statement that a lot of investments in ICT development without investments in building health and education infrastructure could be a recipe for failure and could frustrate millions of people in the developing world. The authors are critical to ICT investments before it is known what increased ICT will do to the people it is supposed to help. They consider health and education to be prioritised and when a good level is reached it is reasonable to start thinking about ICT. Their argument for reining ICT

development is that poorer health and education result in lower economic productivity that needs to be well organised before engaging in ICT (Andoh-Baidoo et al., 2006).

3.2 ICT and education

Since the study is based on secondary schools students' use of ICT previous research regarding the link between ICT and education is interesting to create an understanding about the context in which our interviews are conducted. This study is investigating challenges and opportunities with ICT and therefore the following article about previously detected challenges with ICT in education is presented bellow.

In the article *The Reasons for Under Use of ICT in Education: in the Context of Kenya, Tanzania and Zambia* Gachoka et al. (2006) write that there are a number of opportunities with the use of ICT in education. It offers support and help in doing tasks and assignments such as presentations, papers, research and online and distant learning. Getting new information and the facilitation in communication between students and teachers are also benefits of ICT in education.

However, in the article the authors list some different reasons for the under use of ICT in education in Kenya, Tanzania and Zambia. Because of the East-African countries' economic, social and political characteristics the efficient use of ICT in the education systems is limited. With challenges, like poverty, low levels of living, inequalities, illiteracy and low productivity it is hard to benefit from the advantages of using ICT in education.

One of the most important actuating factors when it comes to use of ICT is cost. You need hardware and software, appropriate telecommunication networks and maintenance. These costs are usually not within school budgets. In the article the authors point out that if the venture on ICT is to be successful the technologies need to be cheaper. These countries usually have more pressing problems then investing in ICT, such as health and food problems. One further challenge is the insufficient infrastructure like poor transportation, electricity and telecommunication facilities that also requires a lot of funds.

Gachoka et al. (2006) list government policies as the next factor. Government has a high role to play in development of ICT in any country. Through an effective ICT policy schools can be encouraged and assisted in the integration of ICT in educational purposes. As the article discloses these kinds of policies do not often exist. In Kenya the lack of government support has greatly hampered the growth of the ICT sector and the use of it in education systems.

The next factor that is presented in the article does not concern money or resources. Instead this obstacle is referred to as cultural attitudes and ignorance. The authors mean that ignorance is one of the core reasons why the level of ICT integration is so low. Some schools even have enough infrastructures to use ICT but they are not aware of its benefits or how to use it in education. The article also says that most East-African countries possesses cultural attitudes that do not benefit ICT since they think that technology is just for developed countries and has nothing to do with them.

The last factor that is mentioned concerns the students' limited computer knowledge. The under use of ICT in education can be attributed to the fact that learning institutions are reluctant to introduce ICT since the students lack knowledge in how to use it. This can be due to lack of resources or because the students prioritise other things, like how to earn a living, than improving their computer skills.

To conclude our previous research there are many positive aspects of increased ICT use in developing countries, such as economic growth, increased accessibility and easier access to information. However there are also negative aspects such as the funds and resources needed for ICT, which hamper the implementation of ICT in for example education. Research regarding ICT is to great extent focused on the development of societies. The effects these developments and changes have are often measured in economical terms. The focus of the following theory section is therefore on the social aspects of development.

4. Theories

We have chosen the theoretical framework of social sustainability and poverty reduction. Social sustainability is a concept that includes a wide range of aspects. First a general discussion about social sustainability is held. The material is collected from three articles, one by the social sciences and sustainable development researchers Bill Hopwood, Mary Mellor and Geoff O'Brien. Amir Ghahramanpouri, Hasanuddin Lamit and Sepeideh Sedaghatnia, all researchers in the field of urban sociology, are authors to the second article. Stephen McKenzie with a PhD in cultural studies with the main research field in sustainability is author to the third article. Then a more specific framework of social sustainability is presented. For this an article by Mark Davidson, researcher in the field of sustainability, is used. This framework provides the basis for the analy-

sis. Since Mutomo is the third poorest district in Kenya and poverty is a problem that pervades everything in the area a section about poverty reduction as a part of social sustainability is also presented. For this we have used the book *Information and Communication Technologies for Development and Poverty Reduction* (2006). It is written by Joachim von Braun, economist, and Maximo Torero, division director at International Food Policy Research Institute, his major research work lies in analyzing poverty, inequality and how technical breakthroughs can improve the welfare.

The research field in this study is interdisciplinary and is a relative new field of study and therefore our theory sections involve material from scholars from different disciplines. To understand our field of study and our gathered material we chose to use the theoretical framework of social sustainability and poverty reduction.

4.1 Social sustainability

The most common definition of sustainable development is given in the Brundtland commission: *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (UNWCED, 1987:8).

The concept of sustainable development is the result of a growing awareness of the global links between increased environmental problems, socio-economic issues concerning poverty, inequality and a quest for a healthy future for humanity. The usual model for sustainable development is of three separate but connected parts of environment, society and economy. Some scholars mean that the environmental pillar sets the boundaries, the economic pillar provides the means and the social pillar is the goal (Hopwood et al., 2005). This next chapter will focus on the social sustainability part of sustainable development.

Many scholars have tried to define social sustainability, and therefore exists a couple of different views on the concept. The view popular among studies of rural, urban or community sustainability is the functional approach. Usually the definitions either portray the conditions or define the principals and measurement framework for social sustainability (Ghahramanpouri et al., 2013).

In the first alternative, social sustainability is described as either a currently existing positive condition or as a goal that is to be achieved. Stephen McKenzie (2004) lists some features as

indicators of this condition. The first one he calls equity of access to key services including health, education, transport, housing and recreation. Further he mentions equity between generations, a system of cultural relations in which the positive aspects of disparate cultures are valued and protected, a sense of community responsibility and widespread political participation.

The second group of definitions utilise measurement frameworks. These definitions present main principles and involve series of indicators of social sustainability. Such indicators can be positive (rate of literacy) or negative (rate of homicide). Usually positive indicators, for example sense of community ownership, are used among scholars (McKenzie, 2004).

In the article *Urban Social Sustainability Trends in Research Literature* it is emphasised that a definition or model of social sustainability needs to involve attributes regarding both future focus and process attributes (Ghahramanpouri et al., 2013). Stephen McKenzie offers such a definition "a life-enhancing condition within communities, and a process within communities that can achieve that conditions" (McKenzie, 2004:12).

When reading about social sustainability it becomes clear that the concept is differently related to depending on discipline and scholar. However, some aspects seem to be fairly common in reviewing social sustainability. These include social equity, satisfaction of human need, well-being, quality of life, social interaction, cohesion and inclusion, sense of community and sense of place (Ghahramanpouri et al, 2013).

In the article *Social sustainability: a potential for politics* Mark Davidson (2009) explore how to construct social sustainability. He argues that it is important to identify what kind of society that should be sustained. He means that social sustainability as a theoretical concept means very little by itself. Social sustainability as a goal is the preservation of the status quo, which means the preservation of one specific society. Since both society and sustainability are changing it is impossible to attain this specific society. It is therefore necessary not to strive for sustainability as a goal; rather the goal should be increased indicators on social sustainability.

Davidson (2009) presents in his article components of the definition of social sustainability developed by the City of Vancouver. The components are (1) basic needs such as housing and income, (2) individual or human capacity or opportunity for learning and self-development and (3) social or community capacity for the development of community organisations and network that foster interaction. In addition to these visions to strive fore the City of Vancouver present four principles to guide social sustainability actions:

- Equity - every individual should have access to sufficient resources to participate in their community and have opportunities for personal development. There should be a fair distribution among communities to facilitate participation and collaboration.
- Social inclusion and interaction - every individual should have the right and opportunity to participate and enjoy all aspects of community life and interact with other community members.
- Security - every individual and community should have economic security and have confidence that they live in safe, supportive and healthy environments.
- Adaptability - every individual and community should have resiliency and ability to respond appropriately and creatively to change.

All these principles should be permeated by equality. Equality factors that are interesting for this study are gender, age and socio-economic status.

To be able to study your field from a social sustainability point of view a defined framework for social sustainability is needed. We will analyse our empirical data by using the City of Vancouver's visions and actions towards a social sustainable community. This framework is chosen because it is a concrete but wide definition of social sustainability. Since the study concern many different aspects of social sustainability a more narrow definition of social sustainability could not be used. Of the different definitions of social sustainability that we considered, we feel that the City of Vancouver's indicators are most applicable on our study because the four indicators are all aspects that Mutomo struggle with.

From a critical point of view this definition can be seen as too general. The indicators comprise many aspects of society but do not examine any of them in depth. Despite this we consider this definition the most suitable since the aim is to investigate ICT´s effect on social sustainability in a holistic way.

Social sustainability is a concept that includes a wide range of aspects and many of them are contained in poverty reduction such as education, health, equity and participation. Since a big challenge for Mutomo is to reduce poverty we have chosen to add extra focus on these aspects and next follow a section regarding ICT for poverty reduction.

4.1.1 ICT for poverty reduction

According to Torero and von Braun (2006) poverty is nothing but layers and layers of old ideas and economic and social relationship that keep the poor tightly wrapped. Poor people need the power to cut themselves free from these old patterns. That ICT can play the most effective role in helping the poor break these patterns is the basic thought of Torero and von Braun's book: *ICT for Development and Poverty Reduction* (2006).

Torero and von Braun (2006) write that countries must put the full power of ICT to use to accomplish the fond dream of all ages: ending poverty and hunger, ensuring equality, equal opportunity of all human beings, human rights for all, good governance, peace among nations and so on.

ICT still remains concentrated in the developed world but it is starting to reach developing countries with high hopes of positive poverty reduction outcomes. Torero and von Braun (2006) mention in their book some of the positive aspects by using ICT in poverty reduction: accelerate growth, create jobs, reduce migration pressure from rural to urban areas, increase agricultural and industrial productivity, strengthen competitiveness in developing countries and encourage greater public participation and democracy. They also point out that ICT promotes greater inclusion of individuals within network and collective shaping of institutions.

Torero and von Braun (2006) assert that information is becoming the critical resource and basis that countries need to be able to establish their position in the world order. The key role of ICT for poverty reduction lies in its ability to handle and communicate information. Easier access and the rapid spread of information help developing countries to reduce poverty and accelerate development. This leaves developing countries with no choice but to invest in ICT in order to participate in the emerging global economy and avoid the immense costs of exclusion. Developing countries have pressing investment priorities, such as food, safe water, education and public health. Torero and von Braun state that developing countries need to prioritise ICT at the same level as the other investment priorities to achieve poverty reduction. The spread of ICT is a global trend that developing countries cannot afford to ignore.

Many scholars argue that ICT will be limited to a small group of the population because of cost. Torero and von Braun (2006) do not consider this to be an issue and argue that there is no reason to believe that access to ICT will be limited to small segments of the population in a developing country. They mean that this will be regulated by demand and supply. The demand of ICT

by poor people is already strong because they know that information is the key to economic and social development (Torero & von Braun, 2006).

One big obstacle that makes many of the scholars critical to this theory is that before the poor people can benefit from the new technologies they have to invest in telecommunication infrastructure.

As shown by the theoretical frameworks above social sustainability and poverty reduction are closely linked. Many of the indicators of social sustainability go hand in hand with the goals for poverty reduction. It felt impossible to further analyse the impacts of ICT in a rural area without investigating the relation between ICT and poverty reduction.

5. Methodology

5.1 Choice of method

This research is a field study, with an ethnographic approach, among secondary school students and their use of ICT. We conducted this field study with the aim to capture the ICT use and how students in Mutomo perceive it. Ethnographic studies are used when the aim is to understand peoples' behaviour by participating in their everyday life. This approach makes it possible to investigate and analyse the impact of values and customs and compare what people say with what they actually do. Using an ethnographic approach, and its analytic strategies, can provide tools to reveal patterns governing perceptions and practices (Fangen, 2011). These tools will be useful when it comes to mapping out the use of ICT.

An ethnographic approach is suitable when the researcher lives and interacts in a local society and it is a research style that emphasises that the understanding of someone else's reality is best reached by existing in it. When using an ethnographic approach the researcher strives to understand other peoples' culture, actions and beliefs by putting themselves into their context (Fangen, 2011).

We have chosen an ethnographic approach since the aim of this study is to achieve a deeper understanding of how, why and when ICT is used. Therefore we needed to understand how they perceive the increased use of ICT. Since this study is conducted in a culture, different from ours, it is important to be aware of their customs and cultural values.

5.2 Approach

This study is based on semi-structured interviews and participant observations. As a complement to this, informal talks and field diaries have been used to gain a holistic picture of the situation among secondary school students in Mutomo.

5.2.1 Interviews

The study consists of semi-structured interviews with 30 students, aged 13-20, at five different secondary schools in Mutomo. We chose this qualitative approach because we wanted not only to identify the use of ICT but also find out how, why and when it is used.

Interviews are used when the researcher wish to gain the understanding people have when they are to put words on their own experiences. An interview can mirror the subjective experiences and perceptions an individual has. Interviews as a method are suitable for data collection based on opinions, feelings, perceptions and experiences. To describe these, more detailed answers than can be gathered from questionnaires, are needed.

When conducting semi-structured interviews the researcher has a list of subjects that are to be discussed with the interviewee. Semi-structured interviews however mean that these subjects are not set in stone. The researcher need to be flexible and prepared to let the interviewee develop their ideas, which can change the course of the interview. Depending on the interviewee's answers the researcher needs to be willing to change the subjects and their sequence (Crang & Cook, 2007).

Since this study is based on interviews with people from different backgrounds and different personal experiences semi-structured interviews gave us the best material to answer our research questions. How the interviewees percept their use of ICT and the opportunities and challenges they identify need to be thoroughly discussed with a possibility to digress from the original plan and follow up interesting side-tracks.

5.2.2 Participant observations

It is common to complement interviews with observations to get a better understanding of the context of the studied subject. Participant observation is a method for collecting data through studies of peoples' everyday life and how they act depending on the situation. Participant observations

give an opportunity to ask the people being observed why they acted like they did and how they interpreted the situation.

One advantage of doing a participant observation is the possibility to acquire knowledge through first-hand experiences. These direct experiences can improve the understanding and interpretation. An observation can give information that the interviewees do not believe relevant for the study (Fangen, 2011). By a participant observation approach it is possible to create a holistic picture of the ICT use among secondary school students. It is possible to get a more correct picture of the students' actual ICT knowledge by observing them as a complement to interviews.

5.2.3 Discussion of method

If only doing interviews the information mirrors the subjective experience from one individual. By combining interviews with observations there is an opportunity to move outside the interviewees selective perspectives by combining the interview data with material from observations (Fangen, 2011).

One advantage by combining these methods is that observations make it possible to understand the interviews by putting them into a context. Some data would not have made sense without knowledge about the context. Even some misunderstandings during the interviews because of language barriers could be clarified with information from the observations.

When doing observation it is often recommended for the observer to remain unnoticed (Fangen, 2011). This was impossible for us though students instantly noticed our involvement. Therefore participant observation felt natural for us. Another reason for choosing participant observation is the opportunity to interact and ask questions during the observations.

One negative aspect of our observations is that our presence was not only noticed but also arose a lot of curiosity and made the students act slightly different. We are aware of this but still consider the material adequate thanks to the combination with interviews.

One challenge when doing a participant observation is to keep in mind to be neutral in your observation. This means to avoid looking for the things expected to be found (Fangen, 2011). It is important to be open-minded and prepared to change presumptions.

The observations were a good experience for us since we really got an understanding on how big differences there are between schools and students in Mutomo district. Because of this our interview guide looks different from student to student.

5.3 Limitations within the field

We have chosen to interview and observe secondary school students because it gives us a delimited group of interviewees. We believe that the use of ICT among adolescents is more prevalent than in other groups in Mutomo. We are aware that secondary school education requires a fee, only 20 percent of the adolescents in Mutomo attend secondary school, which means that some groups of adolescents will be omitted from this study. The standard of the secondary schools in Mutomo district are widely different but we have chosen not to do any limitations regarding the schools' features since we wanted a comprehensive range of interviewees. Among these 20 percent that attend secondary school we believe we have a diverse selection of data.

Since it is crucial for our research to be able to study people that actually use ICT we consider the fact that there is a school fee to operate in our favour. We believe there is a greater chance that the interviewees have been in contact with ICT since the use of ICT is usually constrained by cost factors. We put a lot of effort into interview students from all forms, ages and evenly numbers of boys and girls.

We limited our observations to computer classes, both theoretical and practical, since we realised there is no computer use outside the computer classes. The students are not allowed to bring their mobile phones to school so it seemed meaningless to observe other classes than computer classes.

5.4 Conducting the study

In this chapter we examine how the material, that this study is based on, was gathered. Before arriving in Mutomo we had contact with a person in the field, a so-called gatekeeper, a local active entrepreneur with big contact nets that in the beginning could help us establish contacts with interviewees. We visited five different schools, made 30 interviews and observed six different computer classes, both practical and theoretical. Five of our 30 interviews were unusable so the

study is based on 25 interviews with secondary school students, six observations and some complementing informal talks with teachers and principals at the schools.

After spending our first two weeks getting to know Mutomo and forming an opinion about the schools in the area we chose five schools that were representative for the area. Our gatekeeper helped establish contact with the schools and we could introduce ourselves to the principals and explain our project. All principals were very helpful and interested in our project so we decided on dates that we could come back and do the interviews and observations. In total we visited each school three to four times.

When we revisited the schools to do our interviews and observations we began with an informal talk with the principal of the school. This was done to gain background information about the school and their ICT plans before doing interviews and observations. At all the schools we asked the teachers to select 5-7 students that we could interview. We asked the teachers to help us select students who were outgoing and fairly good at English. Some of the interviews did not go so well and those interviews we have not included in the study.

We met with the students alone, usually in an empty classroom. We were both present during the interview but one of us was quiet and taking notes while the other conducted the interview. We got the permission to record each interview and they lasted for approximately 30 minutes. The focus in the interviews was the students' use of ICT, negative and positive effects of ICT, how the use of ICT had affected their lives and their future thoughts about ICT. Depending on the student's situation and knowledge we had to adapt the interview. Of course an interview with someone having his or her own laptop got very different from an interview with someone who had never seen a laptop.

As researcher from a different culture we need to realise that our influence affect the interviewees' behaviour. Depending on how the interviewee feels in relation to us the information they give us can differ. This can be due to language barriers but since we where two older, white women it could also be that the interviewee did not know how to express their selves in our presence. In some of the interviews we got the feeling that the interviewees were lying and exaggerated about their actual ICT knowledge. We believe this was because they wanted to impress us and not to feel inferior. In these cases we have been critical to some of the information and have compared interview material with what we have actually seen during our observations.

We observed both theoretical and practical computer classes. Before the computer classes started we introduced ourselves and then we sat in the background and observed how the classes went on. We focused on what kind of information the teacher mediated, how the classes were organised, how much the students already knew and how the students received the information and acted during the class. During some of the observations the teacher wanted us to take part of the class for a while, and then the students asked questions and we could help them with the computers. We realised that this interference affect the computer class but felt that it gave us a clearer picture of the students' level of knowledge.

Similar to the interviews, we realise that our presence in the observations affected the material we gathered. When we were in the classroom the students' attention to the teacher often decreased as they paid us attention. However this was inevitable and we have taken it under consideration while analyzing our material.

Below follows a description about the school we visited and the students we interviewed to give an idea about the group from whom we collected our data.

5.5 Discussion of schools and interviewees

This section is a description of the five different schools we visited. Each school get their own presentation since their qualities are so distinct that a categorising would be misleading.

School A is a girl school close to town centre with around 400 students. This is a boarding school and some students travel far distances, for example from Mombasa or Nairobi, to go to this school but the majority are locals. Some students come from very rural homes and some are from more urban homes. Urban homes in this area are still very rural but these homes are located close to town centres and have easier access to key services concerning education, health and transportation. While the homes we have identified as rural are located further away from these services. The school has a computer lab but the facilities are not up to date. They have ten working computers but they are old. They recently got five new computers from a donation. In form I they have theoretical computer lessons and in form II they continue with practical classes. After form II it is optional to continue with computer classes.

School B has 300 students, also located close to town centre. It is a mixed boarding school and they have a new computer lab and the 25 computers were given to the school from the gov-

ernment just a few months before we came. Even this school has a mix of students from urban and rural homes. The plan is to have computer classes in form I and II and after the students get the opportunity to continue if they want to.

School C is a mixed school with around 200 students and it is located three kilometres from closest town centre. Students that come from far away are usually boarding but there are some students walking up to five kilometres to get to school. This school, like the others, have a mix of urban and rural living students. This school is lacking a computer lab and has neither theoretical nor practical computer classes. The school has one computer but only for the teachers' administration.

School D is a boy's boarding school with 450 students. This school is located close to a town centre and there is a mix of students from rural and urban homes. They have a big computer lab with 15 relatively new computers. Like the other schools they have theoretical classes in form I and practical in form II and in form III and IV it is optional.

School E is a small mixed school with less than 100 students. It is located very rural with over 10 kilometres to a town centre, but still it is not a boarding school. Most of the students come from rural homes and since this school do not even have electricity they do not have any computers.

In Kenya adolescents start secondary school at different ages so the students in one form do not have the same age but all students interviewed were between 13 and 20 years. To describe our interviewees we have distinguished a scale inside which all student can be placed according to their background. At one end we place the students from rural areas where the families earn their living by farming. These farms are very isolated and located far from the towns. These families usually have one phone and generally they do not have access to electricity at home. These students had never seen a computer before coming to school and they do not have any place near home where they can use a computer.

At the other end we have the more urban students that live in town with parents that do not earn their living by farming. They are usually businessmen or shop keepers. These students have experience of computers before they come to school and they have their own mobile phone. Some of these families have computers at home, if not these students know where to go if they want to use a computer outside of school.

In between we have the adolescents that do not have a computer at home but have access to it in town at for example a computer school. They usually have their own mobile phone that some of them can connect to Internet. Often one of their parents is working with farming and the other one is working in town. The living standard among these students varies, but they have in common moving towards a more urban living.

5.6 Analysis method

The relation between data collection, presentation of empirical material and analysis is important to create cohesion within a study. In the sociological field there are two different ways to organise your empirical material. The first way is to interpret words and define and analyse keywords. The second way has an ambition to create social understanding by combining parts of the empirical material into a greater context (Nylén, 2005).

To achieve the necessary cohesion in our study the best way to present the material from the data collection was not to focus on single words but to reach a social understanding by thematisation of the empirical material. An ethnographic researcher needs to find a balance between the points of views of the ones being studied and the researchers interpretations of the context in relation to the surroundings (Nylén, 2005).

To interpret ethnographic research is not simple. All people are individuals, not just belonging to a group or nation, which mean they do not act in identical manners and they express themselves differently in different contexts and situations. This means what is expressed in interviews and in observations are not always coherent which makes material harder to interpret and process. Even though science is meant to be objective researchers should be aware of their own luggage when analysing their material. A researcher's luggage affect the interpretation of the material and this luggage can comprise preconceived ideas, previous academic training and factors related to gender, ethnicity, age and social status (Sjöberg, 2011). These factors have of course affected our reviewing of the material but we have done our best to be attentive to our own luggage.

In our results we are presenting our empirical material in four different themes. These themes mirror the predominant and most important parts of our data collection to answer our re-

search questions. The empirical material is then placed in relation to previous research and our theoretical framework.

5.7 Ethics

This research is conducted in accordance with the ethical guidelines for research in social science. Even though our interviewees are young we consider our subject not to be of such nature that approval from parents is needed. Our interviewees will remain anonymous and we have taken measures to ensure that their identity cannot be detected, even though our data cannot be classified as sensitive.

6. Result and analysis

This chapter begins with a presentation of the material collected during observations. We consider the observations a necessary mean to be able to analyse and understand the interviews. The results from the study are presented in following themes: observations, the mapping of ICT use among secondary school students, motivation and negative aspects of ICT. The analysis is done continuously when presenting the empirical material.

In the conclusion the link between ICT, social sustainability and poverty reduction will be summarised and discussed.

6.1 Observations

Of the five schools we have visited three have computer labs. The schools that have computers do not have one computer for each student so usually they are 4-6 students at every computer. We did not do any observations in the schools without computer classes so the observations are based on three of the five schools. In all three schools we did observations both during their theoretical and practical computer classes.

During the theoretical classes, at all three schools, the focus is not on how to use a computer practical. Focus is on teaching students the history of computers, what kind of computers exists and what they can be used for. All students are very eager to learn and they seem very excited about the subject. Everybody is taking notes and raising their hands willing to answer the questions. One boy even mimes what the teacher says, so enthusiastic to absorb all the knowledge

the teacher is giving him. One of the teachers are very pedagogic and very convinced that ICT is the future and try to inspire his students:

"The ICT is moving very fast, we will be there soon. Sawa[1]? Sawa?"

Unlike the theoretical classes the practical lessons we observed differed in technical aspects as well as level of computer knowledge. We have therefore chosen to present the observations of the practical lessons school by school because of different levels and methods in learning.

The computer classroom in school A is not at all organised and the computers are standing in a mess, it does not look like someone is taking care of this classroom. Only ten out of twenty computers are working. All students are in form II and they have all been introduced to computers before. As soon as they get into the classroom they start the computers and open different programs. During the lesson they are supposed to learn the program Microsoft Access. The teacher does not have his own computer to demonstrate how they are supposed to proceed, instead he draws pictures on the blackboard and he is giving the students instructions to follow on a paper. The students are not beginners with the computers but we can see that they lack the fundamental computer thinking. They do not have basic understanding on how to operate a computer. An example of this is when a group of students try to shut down a word document for five minutes. During the class the teacher comes to us and let us know that the students find it very hard to follow instructions. He also tells us that none of the students have computers at home so they are unable to practice outside of the classroom; they have only these 40 minutes to learn. Even though the students do not know exactly what they are doing they are very committed to the assignment and keep discussing with each other how to proceed. They are five-six students at every computer and they are very helpful and let all students give it a try.

At school B they just recently got the computers so all students were beginners and have just learned the very basics. Today they will learn how to operate Microsoft Word. This teacher also uses the blackboard to give the students instructions. Very few of the students understand the instructions and are able to perform the task. Most of the students seem a bit afraid and do not dare to try if not sure on what to do. The students all wait until they can get personal help, so they spend a lot of the class waiting for the teacher. There are many students in this class and they are

---

[1] Okay in kiswahili

more than six students at every computer. The levels of engagement are fragmented. Some students do not care at all and some are fighting over the mouse so that they can try.

The last computer class, at school D, we visited was very organised, they had a clean and big classroom. These students are quiet and disciplined and today's lesson is about Microsoft Word. This teacher also lacks equipment to show his students how to do. The level of computer skills varies among the students; some seem very comfortable working with the computers while some just point the mouse and does not realise they have to click. Also these students are afraid to try by themselves, which makes the teacher frustrated.

Doing the observations gave us a good ground on how ICT is used in schools and the level of the students' knowledge. Only one school seem to prioritise the subject while the other neglect it by not taking care of their technical devices or lacking competent teachers. Over all the students are committed to the subject and seem to be trying their best but from our observations we can tell that the computer classes are very basic. This unutilised potential is mainly because lack of resources, both institutional and technical.

While doing the observations we realised what level of computer knowledge the students possess. It is shown that they are too uncertain to try buy themselves and that they lack the most basic skills. The whole computer concept is challenging for the teachers since they do not have any means that can facilitate the teaching. Even though it is hard to gain as much as it costs the schools are very focused on implementing ICT in some way. We consider the theoretical computer classes not so favourable but we admire the schools will and ambitions to give the students at least some kind of ICT education.

6.2 The mapping of ICT use among secondary school students

6.2.1 Communication

All interviewed students have to some extent a relation to ICT. All of the students have at least access to one mobile phone at home and they are all familiar on how a mobile phone is working and what it can be used for. Except for this no generalisations are applicable for all students. According to our empirical data the level of contact with mobile phones, computers and Internet can among the students be derived to if they are from a rural or more urban home and the profession of their parents. Twelve out of 25 interviewees have their own mobile phone that they use when

they are not in school and these students all live in more urban areas. The rest of our interviewees use mobile phones either by borrowing in school or from someone in their family.

Communication is for the students by far the most important aspect of mobile phones. Within the communication aspect we have identified three subcategories: the social aspect, the security aspect and the economic aspect.

All the students mention the social part of communication. With mobile phones they have the possibility to contact relatives and friends that live far away. They are all very pleased because now they can save both money and time on calling or sending text messages instead of travelling far distances.

> "Before, when there were no mobile phones, there were a lot of problems. Like a person in a rural area and a person in town could not communicate. But now when mobile phones have come, people can just talk to the person, and have already communicated with the person without going there" (girl, school C, 17 years old, form IV, urban home).

The students think communication is a very important part of their life and they mention how life has become easier. Mostly they call each other to know where they are or just to check on each other.

One of the indicators of social sustainability, social inclusion (Davidson, 2009), is obviously affected by the increased use of ICT. Our understanding is that access to a mobile phone is extremely important to experience inclusion and to have the opportunity to participate in all aspects of community life. This assumption is motivated by the fact that students stress the ability to contact family and friends living far away and that they want to change contacts after just a few minutes of interaction.

The increased use of ICT in Mutomo promotes the ability to create networks, both within Mutomo and with other communities in Kenya. These networks will strengthen the sense of community and sense of place and in the extension it will make Mutomo less isolated. When ICT creates a greater sense of community the migration pressure from rural to urban areas, which according to Torero and von Braun (2006) is one factor of poverty reduction, decreases. With ICT the rural population have access to the same services as in urban areas and do not feel the same urge to move to towns.

Even though all students mention that they use mobile phones for communication in some way it is obvious that their perception regarding the link between communication and mobile phones differ. On the question "how do you communicate with your family?" one boy answered:

> "I communicate with them politely. We talk politely sometimes, but sometimes you
> must be harsh" (boy, school B, 18 years old, form II, rural home).

We got similar answers from other students from rural homes. Except for these, all students immediately understood that we were asking about their means of communication and not their way of conversing.

The difference in how they perceive our questions regarding communication indicates different frame of references regarding ICT between students from rural and urban areas. It is clear that students from more urban areas have had more contact with ICT than students from rural areas. This distinction between students, as a result from increased use of ICT, has a negative impact on equality, a fundamental part of social sustainability (Davidson, 2009). The students with access to ICT have a bigger opportunity to social inclusion while students without access fall behind. ICT is beneficial for those with access, from a social sustainability point of view, but as long as there are some people without access the inequality gap will increase and affect social sustainability in a negative way.

The next subcategory within communication is what we have chosen to call the security aspect. Many students mention mobile phones as a security if they would get sick, forget something or get lost. One reoccurring example is the possibility to call parents announcing the need to be taken to a hospital. We asked one student if it would be a problem not to have access to a mobile phone. He gave us the answer:

> "For example, there are people living in a village, they just have one single phone.
> Tell me what will happen if I get sick around there at night, what will I do? If I had
> that phone I could call somebody, and they can help me" (boy, school C, 17 years old,
> form 2, urban home).

The following quote is another example on how a mobile phone can give security:

By help this boy means advices or economic support he tells us. The economic support is our third subcategory. All our interviewees know about the mobile service Mpesa, a service where money is sent through a phone, and the students mention how it has increased the efficiency of money management. They let us know that without a mobile phone you can be left out and forgotten because you cannot be part of the Mpesa. Now they think it is ridiculously old-fashion to send money the traditional way in a letter, besides it is not certain that the money ends up where they should. With the Mpesa system they are all lyric over how easy it is to control the money and how fast and effective the system is. With the Mpesa system being available to everybody, with a mobile phone, the sense of economical security seems to have increased.

One indicator of social sustainability states that every individual is entitled to feel confidence that they live in a safe, supportive and healthy environment (Davidson, 2009). As the seventeen year old boy explained for us, he would not feel safe getting sick in a place without the possibility to contact somebody for help. This shows that the access to ICT contributes to a sense of security. With ICT the students feel more secure in terms of health and the possibility of getting advice or money when facing a situation where assistance is needed.

6.2.2 Internet and information

The mobile phones are not used only for communication but also for entertainment and relaxation.

"When I am at home and I'm tired of learning, I can take my phone and relax" (boy, school C, 17 years old, form 2, urban home).

The majority of the students, independent on their access to mobile phones, mention entertainment as the second aspect of mobile phone use. By entertainment they mean downloading music, taking photos, chatting with friends and playing games. These are activities they gladly engage in during their leisure. Entertainments are mostly limited to the ones with access to Internet on their mobile phone but all students mention it as an area of use. The use of Internet is among students not lim-

ited to computer access. Half of our interviewees can access Internet from a phone in their surroundings.

After realising that many students can access Internet on mobile phones we ask for their areas of use and the answer is crystal clear: sending and finding information. The information they are looking for can be of any kind: job opportunities, economic development, looking at the news and finding information about other countries.

> "Computers collect all the information worldwide. I can just see it. I browse what is happening in South Africa and India" (boy, school C, 18 years, form III, urban home).

One of the students mention a specific case of finding information:

> "Let's say, I have a disease. Last time I just browsed and asked. And didn't have to go to the hospital" (boy, school B, 18 years old, form II, rural home).

Computers are among the students considered to save time more regarding the search for information and accumulation of knowledge than saving time in terms of communication.

> "In the case of the laptops, you can send the e-mails and you will save time" (girl, school B, 15 years old, form II, urban home).

As Torero and von Braun (2006) state the key role for ICT in poverty reduction lies in its ability to handle and communicate information. Mutomo has good Internet connections and since the students are aware of this they have a spread of opportunities to benefit from ICT and its ability to spread information. The students know how to find information but we see a challenge regarding knowing what to do with the information when they have it. Despite this there are big opportunities with the information flow. As mentioned by Torero and von Braun (2006) one opportunity of ICT lies in the ability to collective creation of shared institutions. The flow of information can result in shared institutions about for example family planning, which is considered a big problem in Mutomo.

One boy gave us another perspective on how ICT can provide a more sustainable family planning:

"Before when we did not have mobile phones people had nothing to do but making babies. Now when they come home they just go and look at their mobile phones instead" (boy, school E, 16 years old, form I, rural home).

Another aspect that is mentioned among students about information is the possibility to supervise and take part of public occurrences. One student mention the possibility to oversee money transactions and another one determine that the information flow leads to more critical thinking. But most important seems to be the opportunity to receive any kind of information that is not available without Internet.

"There is information that is not accessible from the people so with the use of the Internet you can get the information" (girl, school A, 16, form 4, urban).

According to the City of Vancouver's indicators of social sustainability participation is essential for all individuals (Davidson, 2009). With easier access to information it becomes easier to engage and participate in different aspects of society, for example in politics. The flow of information can result in a more critical thinking regarding politics, politicians and corruption. ICT brings, for the people in Mutomo, the possibility to not only form opinions based on input from their surroundings and the restricted information that by traditional means reaches the isolated Mutomo.

A further opportunity with greater access to information is the possibility to form alliances in different areas of interest. ICT makes it easier for the people of Mutomo to organise themselves around the information and create organisations to strive for different purposes. One challenge with this assumption is the ignorance on how to benefit from ICT that according to Gatchoka et al (2006) is one of the main reasons for under use of ICT in education. Our experience is that the students had many ideas and thoughts about how to develop the community but they did not know how to put it into practice. We are of the opinion that ICT is the tool needed for the realisation of ideas, which in the long run will lead to greater feeling of participation and commitment.

As Torero and von Braun mention (2006), poor people need power to cut them free from old patterns of poverty. We believe that participation in and the facilitation of making organisations will give the people of Mutomo some power needed to break out of poverty.

6.2.3 Computers

Even though Internet and computers are closely linked, questions about Internet often gave us answers concerning entertainment and research for information, for which they usually use their mobile phones. When we talked about computers, as a technical device, they usually think more about the use of it in relation to their education.

Only a few students, all urban, have access to computers at home. Everybody, except for the most rural living students know where to go if they need access to computers. Usually they go to one of the four computer schools in town or use the computers donated by a NGO and located in the hospital area. Since they rarely use computers outside of school answers to questions about computer use mostly concern what the students wish to do when they get access more frequently. The students from rural homes have had much less contact, than students from urban homes, with computers and it is clear to us that they are not aware of computers fully potential and therefore they are insecure about what they want to learn about computers. When asking an 18-year-old girl from a rural home if she wanted to use computers more, she said "yes". When we asked her what she then would use it for, she said "I don´t know".

The students from urban homes have more clear ideas on how computers can assist their schoolwork. Many of them mean that typing notes on a computer would facilitate their learning. Also finding information is a recurrent aspect but now related to school projects. They wish to use Internet because it is more up to date and they would not have to depend on textbooks. They also mention how it would ease the burden for teachers that today are the source of closely everything they learn in school.

When discussing benefits with ICT the urban students mention for example finding jobs, distant learning, managing money transactions while the more rural students let us know there are benefits but they are having trouble exemplifying these except for communication and information.

This is an example on how ICT can disadvantage social sustainability. The gap between students from rural and urban homes is something that permeates all our empirical data. The article by Gatchoka et al. (2006) stress problems with implementation of ICT in schools. Some of these problems can be identified in the section above. The article brings up that it is a common belief in East-Africa that students usually think that ICT is only for developed countries. Among students from very rural areas, with less contact with ICT, to some extent believe that ICT do not

concern them. This is shown by lack of knowledge regarding what ICT can be used for and these students are the only one not expressing a wish to develop their ICT skills.

What seems to be one of the most important aspects of ICT for the students are the aspects of a future job and career opportunities. Almost all students let us know they want to develop their computer skills and they tell us it is a necessity in today's world. Our observations in the computer classes showed the students' commitment in learning about computers. During the theoretical classes the students were very focused and during the practical they were eager to try. The common belief among students is that use of ICT, computers and Internet in general, will provide job opportunities that then will lead to a better life. Therefore they feel it is important to be computer littered.

> "I have understood that when I take computer classes there are so many carrier opportunities with computers. There are computer engineers, network administrators, computer administrators. So there are many opportunities when you have the knowledge" (boy, school D, 19 years old, form IV, urban home).

One of the components from the City of Vancouver's definition of social sustainability is basic needs such as income (Davidson, 2009). Basic needs and income are affected by the opportunity of a good job, which means that there is a link between increased use of ICT and social sustainability.

When discussing the future importance of ICT there seems to be a difference between boys and girls. Many of the boys mention that they will need ICT in their future job and mention careers like engineer, lawyer and doctor. The girls also mention that ICT can promote their job opportunities but are not as specific as boys.

This is the only big difference that can be derived to gender. The majority of the boys take much more place and have bigger visions about their future. The girls are more unobtrusive and insecure about their future possibilities. This is clearly noted during observations and interviews. We noticed a big difference between interviewing a boy and a girl. First it was harder to get a girl to agree to do an interview compared to the boys that gladly spoke to us. Second, when the girl interviews were conducted the communication was constrained and it was much harder for us to gain their confidence. When doing our observations on the girl school we experienced a different approach among the girls. When they were together and not in companion with boys

they were much more forward and they were bubbling with questions. The difference between boys and girls seems to be a result of the norm of the society. This is not just something in school, in all of Mutomo the women are more introverts than the men. The fact that the boys embrace ICT in a greater way can lead to they gaining priority in taking advantage of ICT. This will only broaden the gap between the genders.

6.3 Motivation

To the questions about the students' motivation for learning about ICT we get answers that it is considered very important to have ICT knowledge to be a part of the modern world.

> "When I'm in school where I can use computers I feel in the current affairs, not left in
> the ancient time" (girl, school A, 17 years old, form IV, urban home).

One student is substantiating this by telling us why he chose to continue with computer classes up to form four.

> "I was introduced to computers in form one. And then I told them I am very interested
> in the subject because we are living in a global village" (boy, school D, 19 years old,
> form 4, urban home).

From all our interviews we noticed that most students are eager to learn more about ICT and they seem to think it is an interesting and important subject. Most of the rural students from schools without computers have plans on how they will get the knowledge after they finish secondary school. Urban students at schools without computers are already learning about computers at home or in town. All students think it is impossible to be successful without the computer knowledge.

> "The first month after I finish school I will go to the mission hospital and learn. Be-
> cause I know they will have it" (boy, school C, 17 years old, form II, rural home).

Gatchoka's et al. (2006) article means that ignorance and cultural attitudes is one core reason why ICT integration is so low in schools. Our experience from the students indicates the opposite. The

students may be ignorant about some of ICT's advantages and area of use but they are all well aware of the importance of having knowledge on how to operate the technologies of ICT. As shown above the students with some knowledge point out their ambition to learn more and they see it as a requirement for the future. Almost all students with very little or none experience of computers and Internet convinced us that they desire to learn.

It is also obvious that some of the students are well aware of the importance for Kenya as a country to be ICT littered otherwise they will fall behind in the global world, just like Andoh-Baidoo et al fears (2006). Torero and von Braun (2006) mean that for developing countries to achieve poverty reduction they have no choice but to invest in ICT. ICT is needed to be part of the emerging global economy and avoid the cost of exclusion. By analysing our interviews we can discern that this theory has transpired to a micro level.

The adaptability indicator for social sustainability (Davidson, 2009) we consider benefit from the implementation of ICT in the students' life. With these new technologies the students are frequently exposed to new influences and experiences which affect their ability to respond appropriately to change. Our interviews and observations show that the students are already accepting this change and welcome it!

We also discussed with the students how life has changed, how they think it will continue to change and what opportunities they identify with an increased use of ICT. Mentioned first and most often among the students is that ICT has improved their life. According to the students the most evident change is the time efficiency by faster communication and ways of sending information.

> "They [computers and mobile phones] make work more efficient because there will
> be no time wasted, because currently a lot of time is wasted moving from one office
> to another. But computers can organise small networks and information can be send
> from one office to another. And with mobile phones communication will be eased"
> (boy, school D, 19 years old, form IV, urban home).

Students feel that life has changed to such an extent that access to ICT is necessary to attend university, get a qualified job and be part of the digital world.

> "You know, we are in a digital world. Everything should be in a digital form" (boy,
> school C, 17 years old, form II, urban home).

We get the feeling that some of the students are stressed about all the knowledge they need to master not to be left out of the modern world. We asked one of the students what will happen if she is not a part of the digital world:

"Oh, life will not be easy" (girl, school A, 17 years old, form IV, urban home).

The big change the students experience is a result of the spread of mobile phones. The number of mobile phones available among students is varying, but independent on how many phones they have access to, they experience a change in the ways of communication. This is positive in relation to the indicator of social sustainability about equity (Davidson, 2009). All students we have been in contact with have in some way access to mobile phones that for the students can facilitate their participation and collaboration to some extent. Even though it is not a fair distribution, as the indicator demands, access to mobile phones has to be classified as a sufficient resource and among our students all of them have more or less access.

If the development continues with the same speed as today more and more will get access to Internet and computers. These technologies are more expensive and resource consuming than mobile phones and we assume that the spread will not reach everybody in the same way that mobile phones do. This means that the computer part of ICT rather will have a negative effect on the equity indicator.

6.4 Negative aspects of ICT

We also discussed with the students if they see any obstacles or negative effects with an increased use of ICT:

"Yes, for the teenagers, they get so addicted to let's say Facebook. And when they get
so addicted it gets hard to concentrate on the books. They get distracted" (girl, school
C, 17 years old, form IV, urban home).

One negative effect that almost all students mentioned is the fact that they can get distracted from schoolwork or even addicted to always being connected. All the students we have interviewed

bring up pornography as a bad aspect of access to computers. They also mention how mobile phones can be bad for their moral. An example of this is that you can lie about your age to get access to bad information. They are also concerned about their spiritual growth:

> "If you watch movies you can not grow spiritually" (girl, school A, 17 years old, form IV, urban home).

The students are also worried that people in the society without access to ICT will be left out:

> "It is more complicated for them, they don't know how to use them quite well. So it is complicated. As for me it is not complicated. But for old people it is hard" (boy, school D, 16 years old, form I, urban home).

One student is mentioning one group of society that already have problems to access the world of ICT:

> "You know, some just use phones for calling because a big number has phones but they are not littered, so they use them to call. After the call they put it on the table and wait for the next call" (boy, school C, 17 years, form II, urban).

As mentioned before one risk with increased use of ICT is wider social divides. This phenomenon can be discerned in some of the interviews. The students above express concern for older and not littered persons' ability to be able to take advantage from ICT. Torero and von Braun (2006) state that to reduce poverty ICT needs to be prioritised at the same level as other investments like education and health. With this statement comes a problem as Andoh-Baidoo et al. (2006) summarise in their article. They mean that you need to reach a certain level of education and health before it is beneficial to invest in ICT. If not littered the benefits with for example information flow is beyond the reach even with access to computers.

The students mention some negative effects of ICT regarding their moral, spiritually growth and ability to concentrate. These factors we consider as a measurement on learning and self-development (Davidson, 2009). In this case, ICT seems to have a negative effect on the second component of social sustainability.

This boy identifies more negative aspects of ICT use:

> "Computers sometimes may cause eye strain because of the brightness also computers are very expensive. And they also consume a lot of power" (boy, school D, 16 years old, form III, urban home).

A second boy has a different view on the same aspect:

> "But now we have mobile phones, we can call anytime. Because it only requires network and money" (boy, school C, 18 years, form III, rural).

The biggest difficulty concerning increased ICT use is the cost and need of resources for implementation. The students are aware that these aspects restrain the investments of ICT. Even the schools that invested some in ICT are still facing a lot of problems. As seen during the observations the teachers have problem educating the subject due to lack of sufficient means. It is obvious that it is difficult to show students how a computer works without having a computer to actually show it on! The fact that very few of the students can practise their computer skills outside of the computer classes is another example of when the origin to the problem, gaining more computer knowledge, is lack of resources.

Some students identified the amount of resources needed for ICT as the main problem, while one boy sees the fact that ICT only requires money and network as an advantage.

7. Discussion and conclusion

In this chapter follows a summary and discussion of the findings from the study. The first part of the study was a mapping of ICT use among secondary school students in Mutomo, a local, rural place in Kenya. All students that were interviewed have to some extent access to mobile phones. Twelve out of 25 students have their own mobile phone and the rest access mobile phones through family and friends. Mobile phones are first and foremost used for communication. The second area of use is entertainment and the Mpesa service. About half of the interviewees can access Internet from mobile phones in their surroundings and when done it is usually for finding and sending information. Regarding use of computers, only a few students have access to computers at home so the use is limited to computer classes in school or to visits at computers

schools in town. Due to limited access to computers the area of use is mostly mentioned as taking notes. Although most students wish to be computer littered to be able to go to university and to find good jobs.

The difference in patterns of use of ICT among secondary school students in Mutomo can be derived to factors regarding gender and background i.e. if they are from a rural or more urban home and the profession of the parents. The most influencing factor on students' level of contact with ICT is derived from their background. The difference among the gender is the boys' greater visions regarding ICT's impact and the fact that the girls are more unobtrusive. In this study there were no findings indicating a difference between students at different ages and forms regarding ICT use. Even though the schools differ in levels of ICT use no patterns can be derived to students from different schools since all schools, except for school E, have a mix of students from urban and rural homes.

This study shows many opportunities with increased ICT use among secondary school students. The main opportunity we identify is the possibility of finding and spreading information. With more accessible information we believe that shaping and establishment of shared institutions are easier achieved. Therefore ICT can be seen as an organising tool through which students can create cohesion. We consider shared institutions and cohesion among the students to be a decisive factor in breaking the patterns of poverty.

One instant opportunity with the increased use of ICT is the possibility to become computer and Internet littered. In today's society being ICT littered is a necessity when it comes to higher education and many careers. Therefore increased use of ICT provides the students with the chance of reaching a higher level of living standard.

In Mutomo, the girls often stand in the shadow of the boys. As mentioned above the boys are more forward when it comes to ICT use. But there is an opportunity for the girls if they can assimilate the benefits of ICT. ICT can provide the information and the knowledge needed for the girls to take place in a society dominated by men. One risk with this is that ICT can give the boys an even larger advantage.

The main challenge we identified with an increased use of ICT among secondary school students is the wider gap between students with access to ICT and students without. From this study we can see a difference between the rural students and urban students in level of access and knowledge. If this differentiating continues the inequality will increase giving new problems

for the society to handle. The big challenge with ICT in Mutomo is to provide everybody with access.

Both schools and students are unaware of the full potential of ICT and can therefore not take part of all the benefits with ICT in education. This in addition to the fact that students lack knowledge in how to use it makes schools reluctant to invest. This challenge is a question about knowing the full potential of these technologies and realise that ICT is important for their future.

In Mutomo they have a lot of problems with health, education and poverty and it is understandable that these things are prioritised since it requires a lot of funds to invest in ICT. We believe that an investment in ICT can help communities to overcome these problems because ICT can promote economic growth, information flows and the creating of shared institutions. We consider it ignorant not to utilise ICT for improvement of health, education and poverty reduction. In the end it all comes down to what one considers ICT to be worth.

As shown in our result ICT has a big impact on social sustainability in the area of Mutomo. The spread of mobile phones has a positive effect on the equity indicator and students access to sufficient recourses. The equity indicator can however be affected negatively if the spread of computers and Internet do not include and reaches all segments of the population.

The spread of mobile phones has a positive impact on the indicators of social inclusion and security since the students get increased accessibility to services. Even the indicator of adaptability is positively affected since ICT implies many changes that the students must embrace.

Poverty reduction, as a part of social sustainability, is affected favourable by ICT. Increased ICT leads to decreased migration pressure, easier management of information and the possibility to be part of the global economy. ICT requires heavy investments, which may fail, and in that case a lot of time and funds will be wasted.

In conclusion an increased use of ICT is beneficial in most aspects of social sustainability. Equality and equity are currently the challenges with increased use of ICT in Mutomo, which lie ahead of them. We believe it is beneficial for Mutomo to invest in ICT and we believe that they have the will to embrace these technologies. As the computer teacher said:

"The ICT is moving very fast. We will be there soon. Sawa? Sawa?"

8. List of references

Aker, J C. & Mbiti, I M. (2010). Mobile Phones and Economic Development in Africa. *Journal of Economic Perspectives,* 24(3), 207-232.

Andoh-Baidoo, F K., Bollou, F., Morawczynski, O., & Ngwenyama, O. (2006). Is there a relationship between ICT, health, education and development? An empirical analysis of five west african countries from 1997-2003. *The Electronic Journal on Information Systems in Developing Countries,* 23(5), 1-11.

Crang, M. & Cook, I. (2007) *Doing Ethnographies*. London: SAGE Publications Ltd.

Davidson, M. (2009) A potential for politics. *Local environment: the international journal of justice and sustainability 14(7), 607-619*

Fangen, K. (2011). *Deltagande observation.* Malmö: Liber AB.

Ghahramanpouri, A., & Lamit, H., & Sedaghatnia, S. (2013). Urban Social Sustainability Trends in Research Literature. *Asian Social Science,* 9(4), 185-193.

Gillwald, A., & Stork, C. (2007). *Towards an African ICT e-index: Towards Evidence Based ICT Policy in Africa.* Johannesburg: The Link Center.

Gachoka, M., Kaemba, M., & Kessy, D. (2006) The Reasons for Under Use of ICT in Education: in the Context of Kenya, Tanzania and Zambia. *Technology for Education in Developing Countries*, 83-87.

Hopwood, B., Mellor, M., & O´Brien, G. (2005). Sustainable Development: Mapping Different Approaches. *Sustainable development,* 13, 38-52.

McKenzie, S. (2004). *Social Sustainability: Towards Some Definitions*. Hawke Research Institute, Working Paper Series No. 27, University of South Australia, Magill South Australia.

MDI: Kenya
https://mobiledevelopmentintelligence.com/countries/KEN-kenya (2013-12-05)

Mutomoprojektet: Befolkning.
http://www.mutomo.se/layout/list.php?p=4&gp=14&level=1&id=14 (2013-08-05).

Mutomoprojektet: Hälso- och sjukvård.
http://www.mutomo.se/layout/list.php?p=4&gp=17&level=1&id=17 (2013-08-05).

Mutomoprojektet: Infrastruktur.
http://www.mutomo.se/layout/list.php?p=4&gp=15&level=1&id=15 (2013-08-05).

Mutomoprojektet: Klimat.

http://www.mutomo.se/layout/list.php?p=4&gp=12&level=1&id=12 (2013-08-05).

Mutomoprojektet: Utbildning.
http://www.mutomo.se/layout/list.php?p=4&gp=18&level=1&id=18 (2013-08-05).

Nylén, U. (2005) *Att presentera kvalitativa data.* Malmö: Daleke Grafiska AB

Rotary, www.rotary.se (2013-08-05).

Sjöberg, K. (2011) *The ethnographic encounter: fieldwork among the Ainu, The Lubikon Cree and Wall street brokers.* Lund: Sekel bokförlag.

Torero, M., & von Braun, J. (2006). *Information and Communication Technologies for Development and Poverty Reduction: The Potential of Tele-communications.* Baltimore: Johns Hopkins University Press.

Wilson III, E J., & Wong, K. (2003). African Revolution: a Balance Sheet. *Telecommunications Policy,* 27, 155-177.

UNWCED: United Nations World Commission on Environment and Development (1987). *Our Common Future* (Brundtland Report). Oxford: Oxford University Press.

Appendix

Interview guide

About IP

What is your name?

How old are you?

Where do you live and with whom?

What do your parents work with?

How do you communicate with you family?

Does anyone in your family have a mobile phone or a computer?

How are you using computers, Internet and mobile phones today?

> When are you using it?

> Where are you using it?

If not using computers, Internet and mobile phones: why?

How often are you using computers, Internet or mobile phones?

How and where do you learn to use computer, Internet and mobile phones?

How are computer, Internet and mobile phones used in your surroundings?

About ICT

If you had the opportunities to use computers, Internet and mobile phones more – what would you use it for?

What are the benefits with computers, Internet and mobile phones?

How would increased use of ICT affect your village, family and friends?

How has the life for you, your family and your village changed since computer, Internet and mobile phones were introduced?

What opportunities do you see with an increased use of when it comes to:
- Education?
- Future jobs and income?
- Seeking knowledge?

Is it important for you to learn more about computers, Internet and mobile phones?

Yes: What motivates you to learn more about computers, Internet and mobile phones?

What negative effects can you identify with an increased use of ICT?