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## CAPABILITY OUTCOMES FROM EDUCATIONAL AND ICT CAPABILITY INPUTS – AN ANALYSIS OF ICT USE IN INFORMAL EDUCATION IN KENYA

**Mathias Hatakka**

Örebro University School of Business,  
Sweden

[mathias.hatakka@oru.se](mailto:mathias.hatakka@oru.se)

**Sarah Ater**

CORDIO East Africa,  
Kenya

[sater@cordioea.net](mailto:sater@cordioea.net)

**David Obura**

CORDIO East Africa,  
Kenya

[davidobura@gmail.com](mailto:davidobura@gmail.com)

**Brigid Mibei**

CORDIO East Africa,  
Kenya

[bmibei@cordioea.net](mailto:bmibei@cordioea.net)

### ABSTRACT

In the field of Information and Communication Technologies for Development (ICT4D) ICT use in education is well studied. Education is often seen as a pre-requisite for development and ICTs are believed to aid in education, e.g. to make it more accessible and to increase its quality. In this paper we study the access and use of ICT in a study circle (SC) education program in the south coast of Kenya. The study is qualitative reporting results based on interviews and observations with SC participants, government officers and SC coordinators and teachers. The study builds on the capability approach perspective of development where individuals' opportunities and ability to live a life that they value are focused. The aim of the study is to investigate the capability outcomes enabled through the capability inputs access and use of ICT in education as well as the factors that enabled and/or restricted the outcomes. Findings show that many opportunities have been enabled such as an increase in the ability to generate an income, learning benefits, community development and basic human development (e.g. literacy and self-confidence). However, conversion factors such as a poorly developed infrastructure and poor IT literacy prevent many of the individuals from taking full advantage of the ICT and the opportunities it enables.

**Keywords:** ICT supported education, education, study circle, the capability approach, ICT4D, ICT access, ICT training

### 1. INTRODUCTION

This study is situated in the field of Information and Communication Technologies for Development (ICT4D) which broadly can be defined as the development and use of Information and Communication Technologies (ICTs) to foster national and/or individual development (Heeks, 2008; Unwin, 2009). In development, education is often seen as a key factor and a pre-requisite for development (Bada & Madon, 2006; UNDP, 2006; WSIS, 2008) and ICTs are believed to be able to aid in e.g. improving the accessibility and quality of education (Semenov, 2005; UNESCO, 2007). In the field of ICT4D, ICT use in education is well studied. The focus of the studies is on e.g. access and use of learning resources (Hatakka, 2009; Willinsky et al., 2005); ICT training and literacy (Carte et al., 2011; Lynch & Szorenyi, 2005), and; pedagogical issues (Andersson, 2010; Andersson et al., 2009). The studies are, however, often being conducted without a specific development perspective and they focus on a limited part of the ICT supported education.

Education can have both instrumental and intrinsic values (Drèze & Sen, 2002; Robeyns, 2006; Unterhalter, 2003) and expand individuals' capabilities on different levels (Saito, 2003; Walker, 2005). For example, students can learn basic capabilities such as

reading and writing, but they can also learn more complex capabilities such as empathy, morals and deliberation. Outcomes of education should, hence, not only be measured by the students' ability to learn a specific subject. The focus should rather be on different types of outcomes and both instrumental and intrinsic (to know something just for the sake of the knowledge) values are of importance for individuals' development. Instrumental values include both economic and non-economic values. Instrumental economic values can be e.g. the ability to get an employment or to gain an understanding of her or his economic situation (Robeyns, 2006). The non-economic role of education includes areas that can improve an individual's life but that are not related to the economy (Robeyns, 2006) such as knowledge in health, the environment or language so as to be able to communicate.

Implementation of capability inputs (computers, Internet, mobile phones, IT training and adult education in this study) can have both intended and unintended consequences (Sen, 1999). Meaning, the outcomes of the capability inputs may not only relate to the intended purpose of an intervention. In the case evaluated in this paper it means that we not only look at the intended educational outcomes of the ICT implementation. We rather assess all the outcomes that the ICT has enabled, independent of if they are directly related to their education or not. Users will appropriate the capability inputs to their specific context. In our evaluation we have therefore chosen to take a holistic approach to the evaluation of the capabilities enabled. The aim of the study is to investigate the capability outcomes enabled through the capability inputs access and use of ICT in education. In so doing we also investigate the factors that enable and or restrict the outcomes. The context for the study is a study circle (SC) education project in the south coast of Kenya. SCs are a participatory form of learning where people with common interests get together to learn specific topics. As a theoretical framework for the study we use the capability approach. The main research question for the study is:

- How can ICT enable individuals to improve their livelihoods and ability to generate an income?

The question is operationalized through two sub-questions:

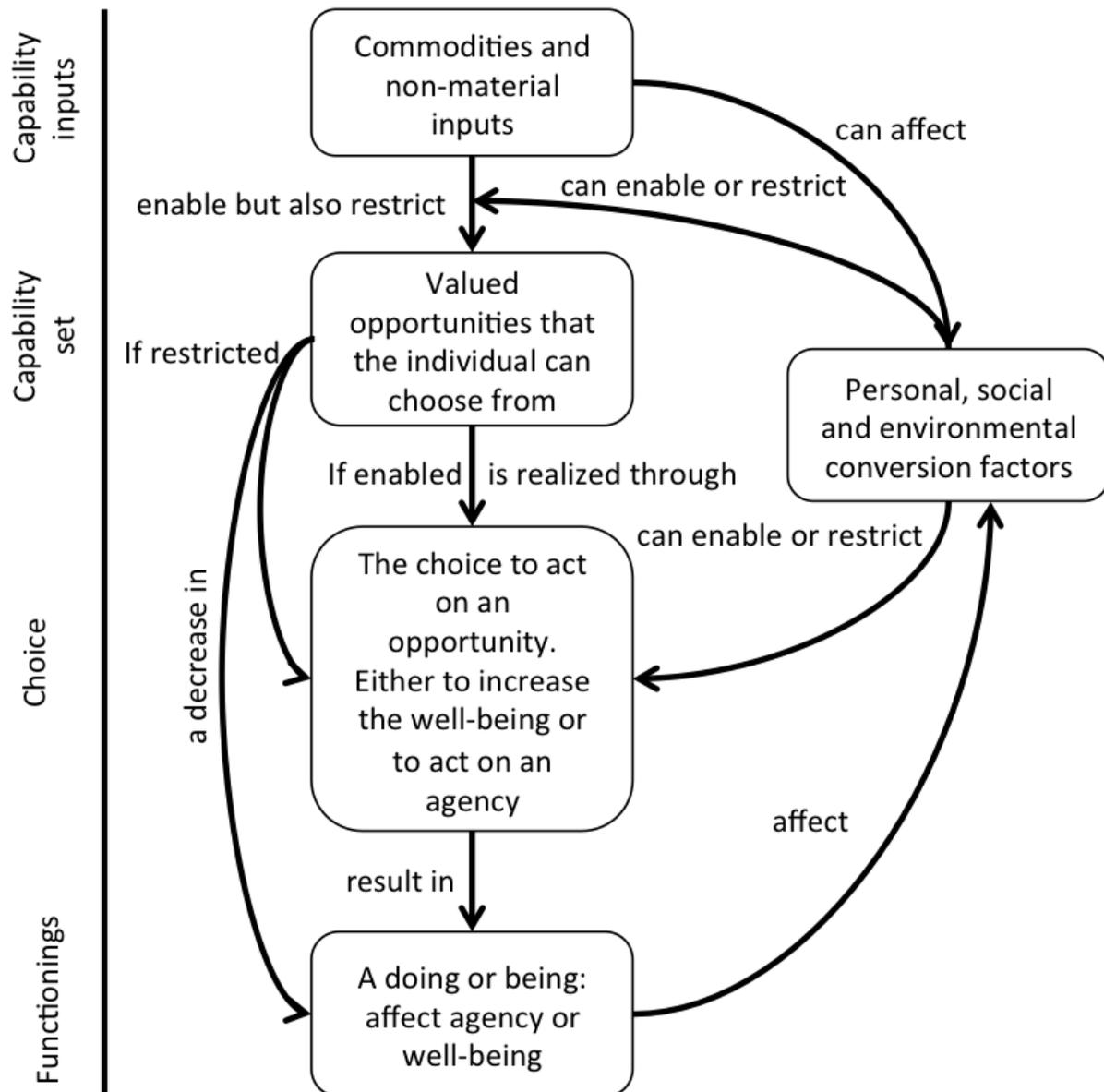
- What capability outcomes are enabled through the introduction of ICT in a SC education?
- What are the factors that enable and restrict the outcomes from being enabled?

## **2. THE CAPABILITY APPROACH**

The theory used for the study is the capability approach that focuses on the individual's ability to choose a life that he or she has a reason to value (Sen, 1999). The focus is on the expansion of people's freedom that either can be done by making new freedoms available or by removing unfreedoms (Sen, 1999). Freedoms involve the process of development and the opportunities that people have given their local conditions and both need to be included in the analysis of development. When focusing on both the outcomes and the processes it is important that both the instrumental effectiveness as well as the outcome results are included in the analysis (Alkire, 2008). In ICT4D the uptake of the capability approach was slow but since 2006 there has been an increase in studies using the approach. The introduction of the capability approach in ICT4D research is said to have the potential to provide us with a new way of thinking about development and in what way ICTs can contribute to development (Zheng, 2009). It also offers an alternative to economic growth theories which are seen as too narrow to be able to capture the potential impact of ICTs (Kleine, 2010) and helps us move away from superficial variables of use and access (Madon, 2004).

At the core of the capability approach is an individual's capabilities and functionings. Capabilities are the individuals opportunities that they can chose from so as to improve their lives. It can be the ability to earn an income, provide food for the family and get an education or any other valued opportunity. The capabilities are enabled through different capability inputs that either can be material (e.g. technology) or non-material such as cultural traditions and societal arrangements (Otto & Ziegler, 2006; Robeyns, 2003). The capability inputs are the means to development. The outcomes are the capabilities and realized functionings that are the results of an individual's choice to act on an opportunity in her or his capability sets. A functioning is a person's doings or beings (e.g. to be educated, to be fed, to work) and represents how a person lives (Gasper, 2002). The capability approach hence highlights the distinction between means and ends to development as well as the ability to achieve and actual achievements (Robeyns, 2005). The distinction between capabilities and functionings is” [...] between the realized [functionings] and the effectively possible [capabilities]” (Robeyns, 2005, p.95). In its most basic sense a functioning can be to not be hungry by eating and the capability is then to have the means to avoid hunger (Sen, 1984).

In the capability approach, individuals are seen as active agents of change. When individuals are provided with opportunities they have the power to shape their own lives and help each other to fulfil their lives (Sen, 1999). Individuals have the ability to act on their agency (seen as the freedom to pursue one's own goals) given the opportunities that they have and the context they function in. The individualistic character of the approach is based on an ethical individualism which means that the only concern in an assessment is the individuals and we must hence evaluate what our interventions have on an individual level (Robeyns, 2005). However, that the focus is on individuals does not mean that the surrounding society does not have an effect on the individuals. The enabling of opportunities for the individuals and the individuals' choices are restricted by different conversion factors that are both personal and dependent on the surrounding society. The conversion factors can be personal, social or environmental (Robeyns, 2005; Sen, 1992). Personal factors are the traits of the individuals such as literacy, economy, health etc. Social factors include the arrangements that the societies make for the individuals such as rules, norms, practices, policies and traditions. Environmental factors relate to environmental issues such as the climate but also availability of infrastructure and recourses. One of the strengths of the capability approach is that it allows for individual diversity (Zheng, 2009). Because of the differences in the ability to utilize functionings (due to conversion factors) the context of the individuals needs to be included in the analysis. Figure 1 summarizes the main concepts in the capability approach.



**Figure 1: Main concepts in the capability approach and their relations (Hatakka, 2013, p.114)**

### 3. CASE DESCRIPTION

The study area - Kwale County - is on the southern part of the coastal region of Kenya. It has high poverty and low literacy levels compared to the rest of the country (especially among women) as well as high drop-out rates from schools. Tourism-related activity such as hotel business is the main economic activity supplemented by mining. The locals in Kwale County are mainly engaged in fishing (those living close to the coastline) and subsistence farming (those living inland). The communities are, however, faced with many challenges such as increasing population (the current population is 650,000), declining marine resources and the need to adapt to the impacts of climate change. The infrastructure in Kwale is poorly developed and access to reliable Internet connections is rare outside the main cities.

CORDIO East Africa has been implementing a project to promote adult education, the use of ICT and a variety of income generating projects. The goals of the project are to: i) make basic literacy available through provision of learning resources that meet the learners' needs; ii) introduce ICT as a practical tool for everyday life such as communication,

marketing of products, a learning aid and a knowledge repository; iii) promote alternative income generating projects as a way of reducing pressure and reliance on marine resources.

In the first phase of the project, women self-help groups were targeted while the second phase of the project has focused on youth groups. The study circle (SC) concept was introduced to the group members, together with literacy and numeracy learning opportunities if needed and followed by computer training. The SC was adapted for the Kenyan context from a Swedish educational method of participatory adult learning. In the education there are groups of 7 – 12 people drawn together by common interests and a desire to improve their overall well-being. Together, they identify goals and guidelines of engagement e.g. where, when, for how long to meet as well as topics to cover. The SCs are participatory in nature, promote democracy and high levels of reflection at individual and group level. In spite of initial challenges, such as comprehending how SCs operate and the cultural norms such as the hierarchical nature of the community, the SC concept was embraced. Group members in the SCs have been successful in improving their basic skills with some of the SC members learning to read and write or use a computer or mobile phone for the first time.

The SC activities (including literacy learning, exchange visits and facilitation of different topics by invited experts) were mainly carried out in Swahili. Participants learnt how to read and write in Swahili and gradually progressed to English. The use of icons made it possible to memorise and recall different computer and mobile phone functions thus facilitating the use of computers and mobile phones. Learning content (for XO computers) was provided in both Swahili and English and supported with auditory aids.

During this first phase a total of 10 groups (of which 75% of the participants were female) were included over a three-year period. The second phase of the project (almost ending) primarily targeted youth self-help groups. Four groups were included in the second phase. Three of the 4 groups consist of primarily young males who are literate (at least on a basic level) and they have a great interest in learning how to use computers and Internet. The fourth group comprises of women with lower literacy levels and the focus of the women group has been on mobile phones instead of computers and Internet. Most of the groups from phase one have access to their own computer whereas the phase two groups have weekly access to computer and Internet during computer lessons. Additionally, an online interactive portal is being developed to provide information on themes ranging from literacy and computer training to natural resources and sustainable living. While the SCs have been successful the uptake of the ICT component has proved to be more challenging.

#### **4. METHOD**

In this study we conduct an evaluation following the interpretative case study methodology (Walsham, 1993, 1995). The evaluation is participatory and the evaluation object is understood in terms of participants' concerns (House, 1980). Meaning, we see the individuals' wants and needs as the factors for success or failure and the SC education and ICT use as the contributing inputs for the evaluation. As a framework for the evaluation we use the capability approach and it has guided the whole evaluation process, i.e. the design of the evaluation, the data collection, the analysis and the reporting of the results.

##### **4.1 Data Collection**

The data for the study was collected during two field trips to the Kenyan south coast in 2012 (in May and October). The study is qualitative and the data was collected via individual- and group interviews. 9 individual interviews and 15 group interviews were conducted with a total of 130 informants (109 SC members, 10 Government officers/SC leaders, 3 Public access providers, 2 Support/development staff and 6 project staff). Each interview took between 30 minutes to 1,5 hours. The interviews were recorded except for the interviews with

government officers where we took notes instead. All recorded interviews have been transcribed. The language for the interviews was either English or Swahili. For the interviews where the participants were not able to, or comfortable with, speaking English the interviews were translated between English and Swahili by one of the authors of the paper.

All interviews were semi-structured (Patton, 1990) and we used an interview guide with questions designed to capture the different aspects of the capability approach. During the first field visits we interviewed 6 SC groups and 9 government officers or SC leaders. Different interview guides were used depending on the stakeholder group, but they all followed the same general themes - 1) their opinion about the SC education, 2) their ICT use, 3) the value of ICT in their education, 4) restricting factors for their ICT use and SC participation, and 5) enabling factors for their ICT use and SC participation. During the second field visit we re-visited four of the SC groups and also visited two additional groups and 1 additional government officer. The interview guides for the second field visit were based on the findings from the first trip and the aim was to further explore the issues found. For that reason we also decided to interview other actors that could aid in the success of the SC education. The other actors were managers of public access Internet sites (cyber cafés), a computer maintenance firm and a software developer contracted to develop a platform for dissemination of learning material to the groups. In addition to the interviews we also did several observations where we observed a SC session. We also visited different sites such as youth resource centers in order to gain an increased understanding of the SC participants' contexts.

#### **4.2 Analysis**

The analysis of the data was done in several steps. 1) We marked the quotes from the transcribed interviews and interview notes based on if the statement was related to a capability for the SC participants, a capability input or a conversion factor. 2) We broadly categorized the capability depending on what aspect of the individual's life it affects (e.g. to directly generate an income, to aid in the education). 3) Next we looked at the broad categorization to find which capabilities that contributed to the broader categorization (e.g. to generate an income is enabled through the opportunities to get an employment and to provide services). 4) After the categorization we looked at which activities that the individuals undertake for the specific capabilities (e.g. to be employed is achieved through the activities to learn IT skills needed for employment, to search for jobs online and to contact businesses). 5) We analysed how the ICTs enabled the capability (e.g. ICTs enable the capability to be employed by providing access to ICT and Internet and to provide IT training). 6) The conversion factors were categorised based on if it was a personal, social or environmental factor. 7) Finally, we analysed how the conversion factor affects the individual's opportunities and choices (the ability to get an employment is e.g. restricted by an individual's IT literacy and poor access to Internet).

The analysis has been iterative and we have constantly switched focus from the quote to the context in which it was said. Since we collected the data on two different field visits, and did an analysis of the data between the visits, we were also able to clarify some of the statements from the first visit where we were unsure about e.g. how a factor restricted their opportunities, whether or not an opportunity "only" is enabled or if it is also valued by the SC participants etc.

#### **5. FINDINGS**

The SC education project has enabled many new opportunities for the community members on different levels.

“The project is a success, it has benefited to the community. Added electricity, knowledge of computers, some has got an employment, some have learnt how to read and write.” (Government officer)

In the analysis we found capabilities that ICTs as capability inputs have enabled for the SC participants in 5 different categories. The categories are: 1) direct income generating capabilities; 2) indirect income generating capabilities; 3) learning capabilities; 4) community capabilities; and 5) basic human capabilities.

### 5.1 Direct Income Generating Capabilities

ICTs have enabled 2 opportunities that increase the SC participants' choices to generate an income: to provide ICT services to the community and the opportunity to get employed (see table 1).

**Table 1: Direct Income Generating Capabilities**

Capabilities	Activities/States
To provide services	<ul style="list-style-type: none"> <li>• Provide a photocopy service</li> <li>• Document typesetting</li> </ul>
To be employed	<ul style="list-style-type: none"> <li>• Provide access to Internet</li> <li>• Learn IT skills needed for employment</li> <li>• Search for jobs online</li> <li>• Contact companies</li> </ul>

In the communities where the SC participants live there is a lack of technology access in general. There are few public computers that the communities can access and there is, hence, a market for provision of services to the communities that the introduction of ICTs have enabled. Although there are a variety of services that could be provided, the focus of most of the SC groups is in providing photocopying and printing services. The photocopying service is used by the community members to e.g. make copies of their national identification cards and government documents, while the printing service is used to print wedding invitations and by teachers to print lecture notes for their students etc. By charging a small fee for the services the groups are able to make an income from the computers. Other services that some of the SC groups are exploring are to type documents for others and provide the communities with computer and Internet access (an internet café).

“If they use the computer they must pay because the printing and Internet cost money. That is how we can make some money if we have a computer. Because if you are printing one page as an example it will cost me to go to the shopping centre and Ksh50 to print one page.” (Study circle participant)

All groups see the potential of making money by providing services; the computers have increased their choices and opportunities to make a living. However, there are also factors that make it difficult for them to make it sustainable. As an example, for the photocopying service they have to be able to cover the costs of the printing cartridges as well as making a profit. Using ineffective printers that are meant for home-use makes the cost of printing high and the risk is that the community members cannot afford the service or choose not to use it.

“The printer cartridges are very expensive and the printers are very slow. The cartridge can only produce very few copies and the people cannot pay for the cost of the printing.” (Study circle participant)

The problem is the same for other services, the fee has to be low enough for the community members to use the service but it has to be high enough to cover the costs of the groups (e.g. electricity). There are also differences among the groups who benefit from the services and how effective they are in generating an income. The persons in the groups that manage the computer are direct income beneficiaries as they get a salary or an allowance. The income from the actual service belongs to the entire group and should ideally be shared between the members. However, the profit after the cost for the groups is usually low and there is hence not much to be shared.

Another way that the ICT and training in IT can increase the SC participants' choices to make an income is that IT literacy increases the opportunities that the members have to get an employment. Many jobs require at least basic IT skills and several of the SC participants, especially the younger women, see a way to improve their lives by getting a job in an office instead of the tiresome jobs in agriculture or fishing. In addition, the technology access in combination with the IT literacy make it possible for the SC participants to find jobs using Internet and also to contact the companies electronically using e-mail.

“We can find more information. Find job information, opportunities. It is important to know computers when you search for a job.” (Study circle participant)

## 5.2 Indirect Income Generating Capabilities

In addition to the activities that directly increase the SC participants' choices in getting an income there are also several enabled capabilities that indirectly can help them to increase their opportunity to make a living (see table 2).

**Table 2: Indirect Income Generating Capabilities**

Capabilities	Activities/States
To promote and market services and products	<ul style="list-style-type: none"> <li>• Advertise their businesses online</li> <li>• Communicate with customers</li> <li>• Design and print labels</li> </ul>
To manage activities and the economy	<ul style="list-style-type: none"> <li>• Budgeting and accounting</li> <li>• Store business and project documentations</li> </ul>
To learn professional skills	<ul style="list-style-type: none"> <li>• Access information about their projects</li> <li>• Find organizations and experts</li> </ul>
To apply for funds	<ul style="list-style-type: none"> <li>• Find funding opportunities</li> <li>• Write proposals</li> <li>• Find and contact organizations</li> </ul>

Most of the groups have an income generating project such as agriculture, poultry farms, soap making or eco-tourism. In order to increase the profit from the projects the groups have to be able to market and promote their products and services. The introduction of computers and Internet has provided them with an opportunity to reach a market outside their own communities. Through Internet they can advertise their businesses and reach a market that they previously were unable to. The two SC groups that focus on eco-tourism also see an opportunity to use e-mail and a website to communicate with customers and tourists. Previously the group members had to travel to a public Internet site to be able to do that.

“We have a camp in the village and we want to interact with the tourists and to get them to visit us. We have to contact them via Internet and to do that we have to travel to where there is Internet and that is costly in terms of traveling and time” (Study circle participant)

In addition, the groups that produce products can also use the computer and the printers to print labels for their products. One group, for example, uses the printer to label their soaps. This can increase the visibility and appeal of their products. Another opportunity that has been enabled that could increase the groups’ productivity is the ability to better manage their activities and economy. Previously the groups had to write all their business information, business plans, budgets and accounting on papers but with the introduction of the computers they can now store it electronically. Most of the skills needed are fairly basic such as typing, saving and retrieving text files from a hard drive whereas others require more training. For example, to manage their own budgets and do their own accounting they not only need business knowledge they also need to learn how to use e.g. a spread-sheet application such as MS Excel. However, the budgeting skills needed to more efficiently run their projects are fairly basic and it is often enough for them to be able to keep records and do basic calculations.

“You can use the computer to record the meetings and also to keep records of our sales. If one gets Ksh1000 for coconut oil and another something else we can use it for easy calculations.” (Study circle participant)

The computers have, hence, increased the SC groups’ chances to efficiently manage their projects, which can help with the productivity and profitability for the groups. Many of the groups have undertaken projects that they previously were not proficient in which means that they need to get training on the different subjects related to their projects. Most of the training is done without the use of ICTs with subject experts visiting the groups to teach them different skills (such as agricultural and fishing techniques and methods). However, ICTs can aid them in learning the professional skills needed in two ways. First, the richness of information on Internet means that they, themselves, can search for and find information about their specific projects. They have more choices in what material to use for their learning. In addition, they can also use Internet to find organizations that they can contact and ask for support. The main hindrance to this is the poorly developed infrastructure, which limits their abilities to use Internet. The groups are self-sufficient in their learning but without access to information they are of course limited in the skills that they can learn. The poor Internet infrastructure is a major restricting factor for many of the potential opportunities for the groups. A possible solution to the lack of Internet access is to provide the groups with printed materials instead and a learning portal is being developed where content for both online and offline access can be provided to the groups. The system is also being developed based on the groups’ local context, technology access and skill level.

“The system only requires basic knowledge from the users since they have low computer literacy. It has to be easy for the users to use it with a computer or a mobile phone. On the field there are at least some users that are IT literates that can help the others.” (System developer)

The funds for the groups are also very limited. Through the SC project they have been provided with a computer and a printer (most of the groups), access to teachers, some stationaries as well as some additional support depending on the needs of the group. However,

the funds seldom cover the expenses that the groups have and they are in need of additional funding from other organizations. Some of the groups have also received additional funds. For example, one group has a fish farm as a project that was funded by the Kenyan government and another group has a forest preserve that is funded by a UN organization. However, finding and applying for funds is of course not easy, but with access to Internet they are able to locate opportunities that they can apply for. In addition, they can also use the computers to write their proposals and communicate with the funding organizations.

### 5.3 Learning Capabilities

Since the main aim of using ICTs in the SC project is to support the SC education there are surprisingly few capabilities that have been enabled that are directly related to their learning capabilities (see table 3).

**Table 3: Enabled Learning Capabilities**

Capabilities	Activities/States
To get access to information	<ul style="list-style-type: none"> <li>• Search for information online</li> <li>• Access to learning resources</li> </ul>
To use the technology for their learning	<ul style="list-style-type: none"> <li>• Use applications as a tool for learning</li> </ul>

The main benefit for the SC participants' education is that they, through the introduction of ICT and Internet, have more choices in what material to use for their education. They can access Internet to find electronic learning material about basic skills such as literacy but also more advanced material about the environment, women's rights and health information etc.

“By using ICT when they are having a discussion on a particular topic they can find information. For example if they are talking about a particular crop they can use the ICT to finding more information about that particular crop, to benefit and get access to more information.” (CORDIO EA Staff)

Some of the groups that were part of the first phase of the project had access to XO computers with preinstalled electronic learning material. The material was much valued by the participants as they found it tailored to their needs. Also, by being able to interact with the content and compare the information to the real world it helped them to deepen their understanding of the specific topics. However, the SC members' abilities to choose which material to use differed a lot between the groups and between members in the groups. Low IT literacy together with a poor infrastructure made it problematic. Most of the groups do, however, have at least one member that can help the others with searching for relevant information. In one SC group, as an example, one of the members has an Internet enabled mobile phone that he uses to search for information and to teach the others how to do it.

In addition to using ICTs to find information some groups also use the applications in the computer or mobile phone to learn skills - most commonly by using word-processing programs to learn to read and write or the calculator to learn numeracy and basic mathematics.

“You can learn some things like a, b, c, d. You can also use the calculator, so you can learn the numeric and the a, b, c.” (Study circle participant)

The SC participants do not, however, have any specific educational tools on the computers so their choices are limited.

### 5.4 Community Capabilities

With community capabilities we refer to capabilities that not only benefit the members of a SC group, but also benefit the communities as a whole (see table 4).

**Table 4: Enabled Community Capabilities**

Capabilities	Activities/States
To provide access and knowledge	<ul style="list-style-type: none"> <li>• Community use of the computer</li> <li>• Sharing of technology knowledge</li> </ul>

The introduction of computers in the communities has not only benefited the SC members. While there are differences between the groups, most of them mean that the computers and IT knowledge that the groups get access to and learn also benefit the communities. As previously mentioned, the computer access is low in the communities where the groups function and many of the groups let the rest of the communities use their computer. How this is organized differs, usually the community members that want to use the computer have to pay a small fee to do so. This is needed since the groups have to be able to pay for the electricity for the computer use. In one of the women groups, however, the children in the community are allowed to use the computer for free. Another trickle-down effect of the computer introduction is that the IT knowledge is shared within the communities.

“It helps the whole community as the SC spreads the information to the rest of the community.” (Government officer)

This is true for most of the skills that the SC groups learn; the skills that they gain also benefit the rest of the communities since the groups teach others how to do things once they themselves have learned it. Some of the groups also let non-group members participate in the meetings if they want to, so as to increase the number of community members that benefit from the teaching and to increase the skill levels of the communities as a whole.

### 5.5 Basic Human Capabilities

Basic human capabilities relate to needs for individuals that are not necessarily related to any specific activity but rather to the individual’s well-being (see table 5).

**Table 5: Enabled Basic Human Capabilities**

Capabilities	Activities/States
To be IT literate	<ul style="list-style-type: none"> <li>• Gain computer knowledge</li> <li>• Gain mobile phone knowledge</li> </ul>
To communicate	<ul style="list-style-type: none"> <li>• Communicate with e-mail</li> <li>• Be part of social networks</li> <li>• Reach out to other groups</li> </ul>
To use electronic services	<ul style="list-style-type: none"> <li>• Transfer of money</li> <li>• Business transactions</li> </ul>
To be self-confident and empowered	<ul style="list-style-type: none"> <li>• Feel comfortable around technology</li> <li>• Not having to rely on others for technology use</li> <li>• Finding information (e.g. women’s rights)</li> </ul>
To be modern	<ul style="list-style-type: none"> <li>• Being part of the world</li> <li>• Being advanced</li> </ul>

The most commonly mentioned benefit with the IT training is that the SC participants have gained IT knowledge and are, at least on a basic skill level, IT literate. In a computerized world IT knowledge is essential so as to enable more choices for the individuals. In most countries more and more services are being available electronically and so also in Kenya. In Kenya for example, the voting registration system is being made electronic and:

“[...] this registration of voters and how we are going to vote, it has taken a path that no one will know how to work with that if they do not know computers. So young people are asked to learn how to use a computer instead of doing other things. If you do not know how to use a computer you will be disqualified.” (Study circle organizer)

By not being IT literate people risk being excluded from freedoms such as participating in the political discourse. Before the SC project only few of the SC participants had used a computer and the project has, hence, given them opportunities that otherwise would have been out of their reach. There are also other tasks that are being computerized such as the pay slips for public sector workers that now are being distributed via Internet. The computerization of societies can hence result in the exclusion of those that are unable to, or unwilling to, use computers and Internet. The training in IT literacy has therefore not only resulted in new choices, it has also helped the members to retain the choices that they previously had but now require IT skills to act upon. Being IT literate and gaining access to mobile phones, computers and Internet has also increased the participants' opportunities to communicate. Many of them have friends and family that live far away and with e-mail and social media they can now keep in touch with them. There are also electronic services that the SC members now can use that can simplify their lives. By learning how to use the technology and getting education in electronic services they can use e.g. Internet/mobile banking and use the mobile phone for money transfer. As an example, one of the groups had a M-Pesa dealer that came and taught them how to use the mobile phones for money transfer. While there are still other ways they can use to transfer money the M-Pesa education provided them with an additional option that the group valued.

Another capability that the introduction of ICT and IT training has enabled is increased self-confidence and empowerment for many of the SC participants. Before they learned how to use technology they felt inferior and uncomfortable around computers.

“Previously when I was sitting beside someone who used a computer I felt a bit inferior, but now, since I can use a computer, I feel confident. Computers make you have confidence.” (Study circle participant)

This is especially true for the women who previously had to sit beside their husbands when they used technology without being able to partake. Now they feel at par or even that they surpass their spouses' skills and that makes them feel empowered. Many participants also feel that they have gained self-respect and are more self-reliant since they do not have to rely on others for technology use. They have the skills themselves to handle situations that previously were difficult for them.

“When you go to a hospital you need to know how to push the buttons [a keyboard]. So if you do not have the knowledge on how to push the buttons it is difficult when you go and visit a doctor. You are there but you do not know where to press.” (Study circle participant)

The functioning, to be self-confident, hence, increases both the participants' agency and well-being. Many of the female SC participants feel more empowered now that they can use technology. This is related to the issue of self-confidence, but also to the ability for them to gain access to information. As an example, the women groups can use Internet to find information about women's rights, the Kenyan constitution etc. They can learn about the legal rights that they have in the societies and empower themselves with that knowledge.

The last capability enabled is to be modern and part of a modern world. Some of the SC members said that they liked the computer because they felt modern and part of the advanced world now that they also had access to a computer.

“Because in the world people are communicating through computers. So if you do not have a computer you are behind the world. At least when you have a computer you are advanced and we need to advance our people.” (Study circle participant)

## 6. DISCUSSION

The results above show the wide variety of outcomes that the introduction of ICTs has enabled for the SC participants. While the outcomes differ between SC groups and individuals the potential of ICT use is clear. The results show that the capabilities that are enabled are both of instrumental and intrinsic values. For example, to be employed or to be able to provide services are of personal economic instrumental value for the participants; to be IT literate is of personal non-economic instrumental value for the participants; and, to be modern is of intrinsic value for the individuals. The outcomes also differ between the SC groups and depending on the demography of the group they rate different capabilities as more or less important. Women, for example, value the opportunity to gain access to information so that they can learn their legal rights. They also, to a higher degree than the men, value that they can become more self-reliant in the ICT use and to feel comfortable around computers. Younger participants (both men and women) value that they, through IT training, have an easier time to find work and they also feel that it is important to be modern, to be part of the advanced world. Which capabilities that the ICTs enable for the participants, hence, not only depend on the conversion factors, but also on the valuation aspect of the individuals, i.e. which capabilities that they value vary.

While the aim of the ICT part of the project is to use ICT to support the SC education the findings show that the majority of the outcomes are enabled through the groups getting access to a computer or by receiving ICT training as the capability inputs. The outcomes that directly can be related to the ICT use for their learning are few. That ICT can be useful for them in their education is however clear. The groups that had access to localized educational content in XO computers were enthusiastic about the benefits it provided to their learning. However, currently the groups have to rely on information on Internet that is not tailored for their specific needs which makes it more difficult for them to benefit from it. Content development for the project is currently in progress and will most likely increase the educational choices for the groups. Even though many of the enabled capabilities were not intended by the project the individuals adopt the technology to their situations and needs.

In the study we have focused on the ICT capability inputs, but there are of course also other non-technical and non-material inputs that also contribute to the ICT related outcomes - for example, the SC education in itself, the provision of teachers, the provision of income generating projects etc. Most of the capabilities can only be enabled through a combination of capability inputs. To be able to (electronically) communicate the individuals of course need access to the technology, but they also need basic ICT training (i.e. learn how to use e-mail, social networks etc.). To improve their learning by getting access to additional electronic

resources they need to use it in their education, they need the computer and Internet to access the content and they need training in how to find the resources. Ignoring one of the capability inputs will most likely result in the removal of the opportunities that are dependent on it.

While there are many opportunities that can be enabled for the individuals there are also many conversion factors that can make it difficult for some of the groups and individuals to take full benefit of the ICT implementation. How the conversion factors affect the individuals differ, but for all SC participants there are factors on a personal, social and environmental level that affect their choices. On an environmental level the most apparent restricting factor is the poor access to Internet. Many of the potential functionings are enabled by Internet access - for example, to search for jobs online, to market their products online, to use social media to communicate, to search for electronic resources etc. The lack of Internet access, hence, not only limits their choices it removes some of the opportunities from being enabled for the individuals that lack Internet access. On a social level there are e.g. social norms that regulate the choices, lack of a support structure etc. The personal conversion factors include e.g. poor IT literacy that makes it difficult to benefit from the ICT access and the personal economy prevents some individuals from being able to attend the training. The individuals have different conversion factors that enable or restrict their ability to choose to act on the opportunities. The personal factors will of course differ between individuals but how the social and environmental factors affect the individual also differ depending on the personal traits. For example, for some of the women social norms restrict their choices.

“There is a problem of accessing Internet for women. Where we are the ladies are not allowed to browse the Internet for their husbands.” (Study circle participant)

In this example the effect on the individual's choice due to the social norm is dependent on the gender of the individual, how empowered the individual is etc. Hence, even though factors can have an effect on all participants, how restricting they are will depend on the individual.

Using the capability approach for the evaluation meant that we got a frame for our investigation. We could be clear with what we meant by development and we could be systematic in how we investigated it. The capability approach also sets the mind-sets so as to focus on the individuals; what they value, the capabilities that are enabled for them and the choices that they make. The close relationship between the concepts in the capability approach means that if we are to explain the whole process from the capability input to the capability outcome (in the form of a realized functioning) we need to include all concepts in our assessments. For example, we cannot expect to be able to explain the individuals' choices without including all three levels of conversion factors. While we in this paper focus on the capabilities we could not have done so without the inclusion of the other concepts (e.g. capability inputs, functionings, choice, conversion factors). The approach provided us with the tools needed to get a holistic picture of the development process for the individuals.

Some of the concepts found have, however, been difficult to explain in any detail. For example, the role gender played in the restriction of conversion factors such as social norms was difficult to explain in any depth. The reason is that while the capability approach provides us with the frame it lacks the detailed tools to investigate specific issues. The approach lacks mythological guidelines to investigate e.g., the conversion factors impact on the individuals' choices. In this case the approach could have been supplemented with e.g. gender theories so as to expand our toolbox. The individualistic character of the approach can also be problematic. While we, in the study, clearly could see the effects from the ICT use in the SC

for the individuals, it was more difficult to investigate what effect the individual outcomes would have for the whole communities.

## 7. CONCLUSION

The research question for this study was “How can ICT enable individuals to improve their livelihoods and ability to generate an income?” This has been evaluated by studying the capability outcomes for SC participants in an educational project on the Kenyan south coast. The opportunities that ICT use in the studied project can enable for the individuals include an increased ability to generate an income (directly and indirectly); learning benefits such as increased access to information; community development by an increase in access to computer and sharing of knowledge; and, basic human development such as increased IT literacy, means of communication and empowerment.

The study shows that while the learning benefits are few from the ICT use, the access to ICT and ICT training (most often in combination) has in several ways improved the livelihoods and income generating abilities of many of the SC participants. However, the effect that the project has had on the individuals differs and many have difficulties in benefitting from the full potential of the increase in opportunities. There are several conversion factors that restrict the outcomes from being enabled and restrict the individuals' choices. For example, a poorly developed infrastructure have a negative effect on many of the SC groups ability to use Internet; lack of support structures meant that many groups were unable use get their computers repaired; the lack of IT teachers, the low IT literacy and a poor economic situation for the individuals also restrict their abilities to choose to act on the opportunities even if the opportunity was enabled for them.

For research, the study shows the impact that ICT can have on development and how it can be evaluated using the capability approach. It shows the link between the capability input (ICT in this case) and the capability outcomes and how the link can be restricted by different factors. For practice, the study shows that for expected outcomes to be enabled from an ICT intervention there are many factors that need to be considered before the implementation. We cannot ignore one factor in our project planning and expect success. In addition, the study also shows an alternative or supplementary way of evaluating ICT4D projects by using the capability approach.

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