

ICT for Low-Literate Youth in Ethiopia: The Usability Challenge

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Abstract. How much can you do with a computer if you are not able to read or write like many people in Africa? This paper discusses the preliminary outcomes of a study into how Information and Communication Technology (ICT) can be made more usable for low-literate youth in Africa and help to empower their lives. It is based on fieldwork undertaken in Ethiopia in 2006 and 2007 and focuses especially on the challenges associated with designing and implementing such fieldwork, as well as some preliminary results.

1 Introduction

It is immensely challenging to enhance the basic education, literacy and livelihood of poor people. In January 2002, the United Nations General Assembly proclaimed 2003-2012 to be the United Nations Literacy Decade in which the commitment was made to achieve a 50% improvement in adult literacy by 2005, given that there are 860 million illiterate adults in the world.

But what does it mean to be literate in a world fundamentally transformed by technology? In the past the concept of literacy was primarily defined in terms of people's abilities to read and write, but with the emergence of new technologies it has come to encompass a broader range of human competencies needed to access and manage information, analyze and interpret this information, critically evaluate its relevance and credibility and use information to solve everyday problems [1].

More importantly, what impact does a lack of literacy skills, such as reading and writing, have on the use of ICTs? In order to be used, many ICTs require their users to have certain literacy skills. Poor and marginalized people in developing countries often lack these skills and are therefore not able to benefit fully from ICT, one of the reasons for the so-called "digital divide". The lack of literacy skills is often considered to be at the heart of this problem and therefore eradicating illiteracy is seen as the key remedy - in other words transforming people to fit the technology. However, another way to approach this problem is to determine how the technology can be made to fit this specific user group - in other words developing ICTs that can easily be used without literacy skills.

In order to fit technology to a specific user group and make a positive contribution to their lives, it is critically important to have a clear understanding of the abilities and needs of this group. It needs to be explored who the users are, what their daily lives look like, the kind of skills they already possess, the skills they would like to acquire, the knowledge they already have about ICT and how these could potentially

contribute to their lives. This paper is about shaping a methodology to obtain such an understanding, with the ultimate aim of identifying optimal ways in which ICT can contribute to empowering low-literate youth in Africa. It forms the first part of a comparative study between two countries, focusing in this instance on the design and implementation of the initial field survey in Ethiopia.

2 Interaction Design and Literacy Context

Both in designing computer-based interactive systems in the field of Human-Computer Interaction and in designing other interactive devices in the field of Interaction Design, there is a considerable concern regarding the usability of the final result; whether people can use them efficiently, effectively, safely and with satisfaction. Therefore prospective users should be carefully taken into consideration in the design process, such as who will be using the device and where it will be used. In addition to this it is vital to understand the kind of activities people are doing when interacting with the device.

Identifying user needs is not simply a matter of asking people “what do you need?” and then supplying it, because people do not necessarily know what is possible. Instead it is a matter of trying to translate who the users are, what they are doing and why they are doing it into possible innovation [2]. Moreover the design should be relevant and appropriate for the user cultures and languages [3]. Nonetheless up to now HCI research has mainly been Western dominated and limited to culturally homogeneous populations [4]. Knowledge about the usability of technologies for people in developing countries is still scarce. But technology development efforts in developing countries are likely to fail for the same reason products fail in markets anywhere: lack of awareness of what user needs really are, the failure to develop products that meet those needs and to continue relevant product support.

It is not only technological development which requires greater awareness of user needs, there are many examples of literacy campaigns that have failed because they were not functionally appropriate to the needs of the people [5]. As with HCI research, studies of literacy acquisition are heavily Western dominated and surprisingly little research has been undertaken in developing countries [6]. Many “literacy experts” and planners are often making assumptions about the needs and desires of future learners that may not be correct or appropriate. Local meanings and use of communicative and literacy practices may require alternative approaches in the design of literacy programs than those that may appear ‘obvious’ from outside. Therefore also in developing literacy programs, the first step should be talking and listening to people in order to find out what the needs are [7].

But what is literacy? For more than half a century the definition of literacy and how to measure it has been debated without much agreement being reached. Regardless of the definition used, in all cases literacy needs a social context from which to derive its existence and at the same time literacy itself has implications for its social context. In other words someone’s level of illiteracy is the extent to which this person falls short of the demands for literacy current in his or her society [8].

At the same time the concept has not remained untouched by the quirks of new technologies. The use of ICT is currently transforming the literacy practices of people in many countries around the world and literacy and technology are more and more becoming interdependent [1]. With the new possibilities offered by ICT, a broader understanding of the concept of literacy that goes beyond the traditionally limited concept of functional reading and writing has become necessary [9]. Literacy in the digital age, among other things, means the ability to comprehend and critically analyze all that is read, viewed and listened to, engaging with the many forms of receptive and expressive symbol systems of the various multimedia sources, whereupon making rational decisions in the context of one's personal life [3]. Text, visual representations and sound are combined to give a new understanding to what it means to be literate.

When literacy and technology are becoming more and more interdependent, it is pertinent to ask what this means for all those lacking the traditional literacy skills such as reading and writing (in this research indicated as "low-literate"), something that is very common in developing countries. If they are not able to use ICT that has so far mainly been developed for industrialized countries, they might even get further behind. Therefore possibilities should be explored to design technologies that support people in their everyday and working lives, but do not require "traditional" literacy skills to use them. Progress in Artificial Intelligence is already making interaction with computers easier and more 'natural', which creates the potential opportunity for people with minimal reading and writing skills to some day be able to send and receive complex "written" communication via computers with only minimal input (possibly through voice commands) from their side [10].

3 Methodological Challenges

Worldwide Africa has the highest number of people lacking literacy skills, which was the most important reason why this continent was chosen as a research focus. Moreover because young people are the users of the future, the research particularly focuses on young people between the age of 10 and 20 years old. To obtain an understanding of the abilities and needs of this specific user group of low-literate youth in Africa, a three month field study was undertaken in two different parts of Ethiopia in late 2006 and early 2007. Young people participated in a combination of qualitative research methods, first in collaboration with Forum on Street Children Ethiopia (FSCE) in the urban setting of Nazret and then with the help of Action for Health, Education and Development (AHEAD) in the rural setting of Shakisso. Because research methods that require literacy skills, such as questionnaires, are not suitable for people without good literacy skills, a consideration had to be made what methods best to use. Three methods were eventually chosen: 153 semi-structured interviews and 18 focus groups with 6 participants each were held and 32 participants interacted with a digital camera. Five main challenges that are discussed in this paragraph were of particular significance in developing this study: sampling, answering behavior, visual representations, translation and the research setting.

3.1 Sampling

An initial challenge of this research was finding and selecting the proposed user group: low-literate youth in Africa. A first step in this direction was choosing Ethiopia as the country to undertake the field study. The EFA Global monitoring report 2006 [11] estimates a youth (15-24) illiteracy rate of 42.6% in Ethiopia. However the percentage of low-literacy is even higher than this, because these statistics still contain a number of people who are considered literate, but whose literacy skills are very limited. This means that by random selection in Ethiopia, the chances of selecting an individual with limited literacy skills are already quite high. Because subjecting participants to a reading and writing test before participation was ethically unfeasible, other strategies were used to ensure that low-literacy would likely be high among the selected participants. For example by working with street children who were less likely to have had good education and accessing participants in the lowest grades of schools, the chances were considerably increased.

Another challenge was selecting individuals in the targeted age range (10-20) of the research. Some individuals who were very eager to participate would adjust their age in the hope to be selected. Participants in rural areas often did not know their exact age and would just mention the guess from their parents or an age similar to their peers. Moreover particularly rural women were very reluctant to expose their real age (for reasons of preferable marriage age) and would preferably subtract a few years. In the rural setting this resulted in an accumulation of participants who stated to be around 15 and a low number stating to be over 16. This unreliability of the age range needs to be taken into account in any more quantitative analysis of the data.

A limitation of the selection methods used in this research was that it was somewhat biased towards certain subgroups and did not necessarily reflect the whole range of low-literate youth. In Nazret most participants were attached to Forum on Street Children Ethiopia that is running an ICT program. Because of that most of the participants were familiar with computers something that was not representative for most people of their age. In Shakisso, accessing participants via the primary school enabled the selection from lower grades, making low-literacy skills more likely, but on the other hand this approach excluded all those who were not enrolled in school and might have a very different profile. Therefore some street boys were also included in the research, but it was difficult to gain access to out-of-school girls who were usually involved in all of the household activities they have to fulfill.

3.2 Answering Behavior

One general observation was that, instead of trying to come up with something new, if they would get the chance most participants preferred to copy something already existing in their answers. Therefore it is not surprising that participants were struggling with questions that required creative thinking, such as inventing a new machine. For this reason, both in the interviews and focus groups, the researcher had to be very careful with clarifying questions with examples, because the participants were then likely to give the example or something related to it as their answer.

More importantly this behavior had a significant impact on the focus group dynamics. It was not uncommon that once the most talkative person from the group

had answered, five identical answers would follow, even if the given answer did not make much sense. Therefore undertaking six individual interviews generally resulted in much more interesting and various data than if one focus group with the same six participants would have been undertaken. Although the focus groups nevertheless resulted in very interesting data, for example about gender inequality, in countries where there is a tendency to conformity focus groups require careful consideration and planning to prevent the group from conforming to the talkative group members.

3.3 Visual Representations

Singhal and Rattine-Flaherty [12] argue that pencil sketches and photos represent important tools for communication research and praxis, providing rich, descriptive insights into local worldviews and realities, as well as providing an alternative to 'textocentrism' – the privileging of text, writing and the lettered word as a mode of comprehension and expression. When working with people with low-literacy skills this truth may be of even greater consequence. Therefore in this field study an attempt was made to, apart from verbal interaction, include ways of visual representation.

First of all, in the interviews a set of cards depicting different ICTs was used to find out which of the technologies participants were familiar with and how they favored them. In practice the cards turned out to also be of great value throughout the remainder of the interview. Because participants had more difficulty answering questions in which they had to come up with something new than answering questions that addressed something concrete, referring to the pictures on the cards made it easier for the participant to imagine and greatly improved their responses.

Secondly, at the beginning of each focus group participants were asked to draw a visual representation in order to discuss the drawings in the group. Almost all participants, with the exception of those did not know how to hold a pencil, because they had never been to school, were able to express themselves in terms of drawings. Because coming up with something themselves was again a challenge, similar drawings produced in one focus group were not uncommon. Starting the focus groups with a drawing exercise turned out to be a good way for the participants to loosen up a bit before the real discussion started.

Finally some participants were invited to work with a digital camera and take pictures in the nearby environment. Participants were given a very short instruction about the functionality of the camera and would then be left to take pictures in the way they wanted. Usually participants easily grasped how to operate the camera and also stated afterwards that they did not experience any problems in using the camera. Not only did participants express their appreciation for being able to immediately watch the pictures on the screen, this functionality also gave them direct feedback about taking pictures, which accelerated the learning curve. Pictures, in which the head of someone was cut of, were usually immediately redone.

Ideally participants would be asked to capture things in terms of pictures instead of a verbal explanation to a question as also Singhal & Rattine-Flaherty [12] did, but in this field study this turned out to be difficult. Because a digital camera is a valuable object in a country like Ethiopia, particularly in the urban area there was a too high risk in letting participants just move around wherever they wanted. In the more rural areas the safety of the camera was less of an issue and participants could sometimes

visit their nearby home environments and returned with very interesting collections of photographs. Despite precautions taken still an attempt was made to steal the camera in which a male participant was attacked by a group of boys. They failed in their attempt, but the camera got slightly damaged.

3.4 Translation

One of the challenges of undertaking the field study in Ethiopia is also of great importance in terms of usability, namely linguistics. In Ethiopia at least 70 different languages are spoken and Amharic, the official language, is only spoken by 30% of the people. In the urban Nazret, where Amharic is the dominant language, an Amharic translator was sufficient, but in the rural Shakisso the linguistic situation was more complicated. Although Oromic is the mother tongue of most people, Amharic is usually spoken in the streets and therefore there are many bilingual people in town. At the same time people only speaking Amharic or Oromic can be found and occasionally even people only speaking one of the other languages. Therefore a bilingual translator proficient in both Amharic and Oromic was required.

Getting a good translator turned out to be quite a challenge. In the urban area there were enough people speaking some English and interested in earning money, but in many cases their English was adequate for conversations but too poor for research purposes. An extra complication in the rural area was that apart from the need for a bilingual translator in Amharic and Oromic, the level of English in such areas is less advanced than in urban areas, limiting the choice for potential translators to well educated people who usually already have a fulltime job.

In addition to language proficiency, the translator's attempts to interpret what was said instead of providing a direct translation had a significant impact on both the interviews and focus groups. This was especially apparent when the translators made assumptions regarding participant's answers and asked questions on their own initiative. Particularly "interpreters" with limited knowledge about the possibilities of ICT can be very restrictive for the research and require an alert researcher.

Finally age and gender need to be taken in consideration in choosing a translator. In a culture where respect for older people is very important, the age of a translator may have significant influence on the responses of young participants. Apart from that, the gender of a translator can also impact the responsiveness of participants; as one female participant expressed how she felt uncomfortable about expressing herself freely in presence of the male translator.

3.5 Research Setting

In order for participants to express themselves freely the chosen research setting is very important. Even though the research was usually undertaken around a school environment, a quiet place in the surroundings would be sought and the interviews or focus groups were undertaken informally sitting on the ground. Getting and keeping this environment where participants could feel free was often a significant challenge. Willing school directors would ask whether they had to select the best students of the school to participate, instruct the participants not to fail in the research and bring comfortable chairs just for the researcher and translator, assuming that the participant

could simply sit on the floor. More disturbing however, were all the curious and persistent people interested to observe and communicate with the white researcher. When they would get the chance they would approach the research setting or call from a distance, continuously disturbing the research in progress. Even when hidden somewhere in the bushes the research setting would always be found and then disturbed. Only when the presence of the white researcher became more normal after a while, the curiosity and the disturbance it provoked slowly faded.

4 Preliminary Results

Although the data from the field study still requires detailed analysis, there are already some clear patterns and observations that will be discussed in this paragraph.

1. There was a clear difference observable between the urban and the rural areas regarding familiarity with the technologies and use within the home. Even in the rural area there was a clearly observable difference between those living in the town and those living in nearby villages. ICT clearly does not have that much impact yet in rural environments as it has in the more urban area.
2. Currently the biggest contribution of ICT to people's lives is the ability to communicate with others over a distance and to provide information, for example about the country and the situation in the world. News broadcasts were often mentioned to provide information about disputes in the country, enabling people to move to safer places if necessary. Some participants explained how they preferred television over radio or tape, because television presents things audiovisually, whereas radio and tape can only be listened to.
3. Of all the ICTs the mobile phone was the device that was the most widespread and popular. Even in rural areas without electricity that are covered by a mobile network there are people who possess mobile phones, enabling them to contact people at a distance without traveling on foot. Interestingly, particularly in the rural areas many participants made reference to male relatives or other men when talking about mobile phones, which indicated that mobile phones are usually possessed and used by men rather than by women. In addition to enabling contact with relatives and friends, a very common answer was to use the mobile phone in emergency situations to call for help or to report the death of a relative.
4. Several participants who recognized the computer correctly ranked it quite high in their preference even though from their answers it was clear they had little knowledge about what it could actually be used for. They explained either that they had heard from others that a computer is something useful, that it can be used for educational purposes or that being able to use it can increase job prospects.
5. Technology was often perceived as something only to be used by educated people, because uneducated people are likely to damage it. Not only uneducated people, but also children seemed to be potential damagers of ICTs, a significant concern for parents, often resulting in children being forbidden to touch the devices. Thus even with exposure to technologies at home, many children have never operated any of them, or perhaps have only done so in secret without parental knowledge. As one of the participants remarked after he was given the digital camera "my heart started beating, because here people never give such things to children".

6. In addition to being educated, knowledge of English was often mentioned as a requirement for ICT use. Most technologies in one way or another require the ability to read in English, whether in reading the texts printed on the technology itself, being able to read the manual or the menus of, for example, the mobile phone or computer. So far there is little use of any of the Ethiopian languages with the technologies, not even the national language Amharic. Something explicitly mentioned by some of the participants as a point for improvement.
7. Several participants complained about the sustainability of ICTs. They explained how the technology market is saturated with fake versions of famous technology brands that usually break down very easily. Knowing that most of the technologies cost many people the equivalent of several months' salary their disappointment is quite understandable. The earlier discussed parental caution about children using the technologies might also be prompted by their financial circumstances rather than general unwillingness.
8. Reading and writing were among other things perceived as useful for education, for obtaining new knowledge, to write and read messages to relatives and friends and for better job opportunities. In addition it enables the possibility of secret written communication without requiring the help with reading and writing that would expose the secret to others.
9. Most participants had a tendency to copy what other people said and found it difficult to come up with new ideas. Because of this, questions about improvements to existing technologies and new inventions for the future were often too challenging. Also regarding ambitions for the future other than doctor, teacher or pilot, not many professions were aspired. As one participant responded "I actually never thought about this before". Particularly in the rural area the biggest talent of children was obeying their parents (as revealed in one focus group, disobedience is followed by physical punishment) and following their instructions. Children did not seem to be encouraged by their parents to make their own choices or to be asked for their ideas, but are taught to conform themselves to their parents will, perhaps a significant reason behind the children's limited ability to think in an innovative manner.
10. Particularly in rural areas people in daily life people are exposed less to impulses than in developed countries, which might be another reason for the limited ability to think in an innovative manner. The daily activities mentioned by participants in the rural areas are mainly focused around farming and household tasks, such as cleaning, cooking, fetching water, collecting firewood and looking after the cattle. The majority of new impulses these people are facing are actually coming from ICTs such as radio and television. Nowadays even in a small rural town in Ethiopia most people are familiar with Arsenal and Manchester United and there are people understanding Hindi who are translating Bollywood movies.

5 Usability Challenges Ahead

Data from this field study still need to be analyzed in more detail, but already five main preliminary recommendations can be made about developing usable technologies for low-literate youth in Ethiopia. Further work needs to be undertaken

to see whether these are generalisable across Africa, and the second stage of this research will be to replicate the methodology in a different African context

Verbal communication and communication by means of visual representations did not cause any problems for the participants, regardless of their proficiency with literacy skills. Therefore designing ICT in such a way that they only use audiovisual representations is likely to improve usability for people with low-literacy skills.

In the Ethiopian education system there is not much attention for the individual learners, leaving particularly those with learning disabilities or other problems such as hearing or sight impairments behind. For example tall students with hearing impairments were found in the back of the classroom and students whose mother tongue is different from the teaching language already spent three years in school without understanding anything of what the teacher was saying. The rise of new technologies opens up many new opportunities for people with special needs. A well-designed educational system in the future will be one in which no two students follow the exact same route through the learning experience. In other words, there must be enough alternative routes so that learners will be able to find the support they need to master the content [3]. Therefore big gains can be made with educational technologies targeting those that remain unnoticed in the current education system.

Something that was often mentioned as a disadvantage in the rural context was the lack of electricity that is limiting the possibility of ICT use. Currently mainly things running on batteries like tape recorders, as well as mobile phones were being used in the countryside. Therefore developing technologies that run on alternative energies such as solar power could probably create a high demand in rural areas. Also in places with electricity people might favor these technologies, because they do not need to be plugged into a socket, decreasing the risk of electric shock that was a common complaint about ICT.

Further high prices of ICT were a common complaint which is not that surprising in a poor country like Ethiopia, where several technologies are more expensive than in Europe. At the same time because many of the technologies turn out to be not very sustainable, they can be a big burden for people who have invested several monthly salaries for the purchase. Designing technologies that are more break proof and have a higher life expectancy can therefore greatly improve the potential of ICT. Although it remains to be seen how people can distinguish them from the fake versions that will probably continue to exist.

Finally the linguistic diversity in a country like Ethiopia will inevitably ask for consideration in future designs. Currently most technologies are still dominated by English, disadvantaging those who do not master this language. Perhaps one day it will be possible for everyone in Ethiopia to operate their mobile phone in their mother tongue.

6 Conclusion

In order to get a good understanding of potential low-literate technology users in developing countries there is still a lot to be overcome and many challenges to be faced. As this research shows several issues such sampling strategy, visual representations, translation, answering behavior and research setting, need to be taken

into account in designing and implementing the methodology. In addition to this, several cultural habits, the researcher might initially not be aware of, further influence the methodology.

ICT is already empowering the lives of low-literate youth in Ethiopia by providing information and means of communication for example through radio and telephone. It has the potential to do even more so in the future, for example through cheap, sustainable and audiovisual interactive devices. This will however require thoughtful design and consideration of how ICT can make a positive change in their lives.

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References

1. Wagner, D.A., Kozma, R.: New Technologies for Literacy and Adult Education: a global perspective. In: UNESCO, Paris (2005)
2. Preece, J., Rogers, Y., Sharp, H.: Interaction design – beyond human-computer interaction. In: Inc. John Wiley & Sons, New York (2002)
3. Withrow, F.B.: Literacy in the digital age: Reading, writing, viewing and computing, ScareCrow Press (2004)
4. Day, D.L.: Shared values and shared interfaces: The role of culture in the globalization of human-computer systems. *Interacting with Computers* 9(3), 269–274 (1998)
5. Downing, J.: Comparative perspectives on world literacy. In: Wagner, D. (ed.) *The Future of Literacy in a Changing World*, pp. 29–54. World Hampton Press (1999)
6. Wagner, D.A. (ed.): *The Future of Literacy in a Changing World*, World Hampton Press (1999)
7. Street, B. (ed.): *Literacy and development*. In: *Ethnographic perspectives*, Routledge (2001)
8. Lewis, M.M.: *The Importance of Illiteracy*, George G. Harrap & Co, London (1953)
9. Wagner, D.: IT and Education for the Poorest of the Poor: Constraints, Possibilities and Principals. In: *Technologia*, pp. 48–50 (July/August 2001)
10. Raskin, V.: Naturalizing the Computer: English Online. In: Tuman, M.C. (ed.) *Literacy online: The Promise (and Peril) of Reading and Writing with Computers*, pp. 189–210. University of Pittsburgh Press (1992)
11. EFA Global monitoring report: Literacy for life. In: UNESCO, Paris (2005)
12. Singhal, A., Rattine-Flaherty, E.: Pencils and photos as tools of communicative research and praxis. *International Communication Gazette* 68(4), 313–330 (2006)