ICTs in Education in Africa

Angela Gillian Rose
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ABSTRACT

Africa could become a force in the global economy but to do that it needs a well-educated population. Schools and colleges across the continent, with a few exceptions, are mediocre, to poor. In most rural areas schools are underfunded, with bad teachers, high drop-out rates and limited resources.

One way of improving education could be through the use of Information and Communication Technologies (ICTs). Africa is behind the rest of the world for ICT adoption yet most African countries are boasting double-digit annual growth in Internet and mobile phone utilization (Excelsior TNO Innovation for Life p.15) What the rest of the world takes for granted - computers in the lab; laptops in the classroom; books available on e-readers or mobile phones and of course teachers trained to use them – much of Africa can only imagine.

But there is a deeper more complex question about ICT growth in Africa: how this affects the so-called ‘digital divide’ and how it relates to issues of gender, age, literacy and access. To be able to use ICTs, the user needs to be literate and have regular access and a motivation for using them. Men grow up being more comfortable around technology, usually have more money to acquire it and are more likely to get jobs using it. In African homes boys are more likely to attend school than girls, more likely to get a cell phone early, more likely to go on and get a job where there is new technology and so the pattern perpetuates. The digital divide is not only about the lack of access to ICTs in Africa it is also about the lack of access for women within that group, lack of access for an older generation and those who remain illiterate.

There are plenty of initiatives trying to address this. Several are studied in this paper and others are referenced as being works-in-progress. Governments are investing in the education of their youthful population but it is often a question of priorities between needing infrastructure, power, connectivity and a good system of teacher training as well as ICTs.

Key words: ICT, Education, Africa, Access, Digital Divide, Gender
RESEARCH QUESTIONS

• How do we define ICTs in this context?
• Who has access and connectivity?
• What are the best initiatives taking place and where are they?
• Do ICTs provide an equal playing field for girls and boys or a deepening divide?
• How important is literacy and access to books?
• What are the main challenges and do we know how to overcome them?
• What does all this mean for Africa as a global power, for the so-called ‘Knowledge Society’ and the digital divide?
• And to quote Somekh & Lewin (p.260), “Why is it so difficult to capture the educational benefits of new technologies?”

1. INTRODUCTION

1.1 Purpose and Aim of Project

The purpose of this research is to look at some of the most interesting initiatives taking place in Africa today that involve ICTs. The focus is on ICT use in education and to try and determine what is working and what is not. And from there take a longer view at how ICT use could impact the ‘digital divide’ when ICTs are introduced to children early, in the classrooms, and where there is equal opportunity for girls and boys to use them. This is particularly important at this point in Africa’s history when half the population is under the age of 20.
Selecting which projects were the most interesting was not hard as my aim was to try and find ideas that were unusual for the continent or where there had already been some steps taken to evaluate the performance. 2014 seems a good point to pause and take stock and see what this tells us about the digital divide, gender studies, and ICTs in general.

One of the most interesting projects is the use of e-readers in classrooms. The shortage of books in African schools is acute and e-readers could be the answer. Illiteracy is still a huge problem and can be traced back, in part, to the fact that there are so few books to read. These e-reader initiatives are new, just a few years old, but I was able to find a couple of studies where evaluation of performance was starting to take place and the results, particularly as they relate to gender, were very interesting.

Another area of study was the use of mobile phones for educational purposes. What do they offer and could they be a useful educational tool? Also, a look at a college that has partnered with Google and gone digital and long-distance virtual learning.

If Africa is to have a bright future then the crisis in education has to be addressed. Not all problems are the same. Some countries are doing better than others but there are millions of school-age children on the continent and ICTs could be a means of transforming education in Africa.

1.2 Background – Setting the Scene

With more than 50 countries, the African continent is a mosaic of different cultures, peoples, languages, history, experiences and challenges. They are connected because they all inhabit the same geological landmass, they share many common problems, but they are not joined in other ways. There is often more commerce taking place with countries outside Africa than between countries within.

One issue common to many countries is the ballooning school population. The number of children eligible to attend school has grown disproportionately to the amount of funding allocated to building schools, training teachers and investment in resources. There are three
levels of schooling: primary (elementary) school from about the age of five or six to about 13; secondary school from age 13 or 14 through to 18 or 19; and then tertiary level. In order to improve education at the youngest levels, most Governments introduced an initiative called Education for All (EFA) to provide free primary education. This has resulted in a rapid increase of students enrolled and the ratio of teacher to student can be as much as 100:1 in rural areas in some countries. There were 23 million children at primary school in Africa in 1970 and nearly 40 years later that number has risen to 129 million in 2008 due to EFA (source: UNESCO) but the recruitment and training of teachers has not kept pace. Outside urban areas, particularly in remote villages, the Government does not provide school housing, wages are low and these schools attract the least qualified teachers. According to UIS (UNESCO Institute of Statistics) teacher salaries in Africa have been stagnant for over 30 years. Several countries in Africa have embarked on studies assessing the quality of their education but in the meantime a whole generation of children is falling behind.

When it comes to gender, the problems that beset girls in other parts of the world are true in Africa. If only one child in a family can attend school, it is a boy. Girls have more chores to do at home and often their parents or care-givers do not value education for their daughters as they do for their sons. Early pregnancy, harassment by other students and sadly by male teachers and mandatory marriage is still a mark of many African societies. By the time the students are in secondary school, the drop-out quota for girls is very high.

Despite the ubiquity of cell phones, and the growing number of computers and tablets in urban offices and higher education establishments, in the countryside it is very different. In the study done at a boarding school in rural Malawi (see later section 5.4) only two students said they owned a cell phone and none of the teachers, apart from the Principal, had a computer at home. In general, most rural primary schools (particularly in Sub-Saharan Africa) may own one computer and that is used for word processing by the Principal in the office. In Secondary schools there may be a computer lab although my research shows that these computers are often missing parts, have printers without cartridges or no electricity to power them.
When it comes to higher education, the picture of connectivity is less bleak. In countries such as South Africa, Egypt, Rwanda, Kenya and Morocco, all tertiary education establishments have internet and students are working on computers. In Egypt, for example, the Government has funded broadband connections in schools. In Rwanda the Government has equipped more than 2000 schools with wireless connections. If the base line is how far African countries have come in the last decade, then it shows a steep growth. But if the comparison is with other countries in the world then the progress is slow, uneven, unreliable and contributing to a widening gap between those who are computer literate in the global North and forging ahead in the so-called Knowledge Society and those who are falling further behind. And because ICT projects are more often used in urban schools, where infrastructure is already established, there is a risk that ICTs could further marginalize groups already excluded such as special needs students, learners in remote areas and students from low income communities. (Transformation Ready p.26)

1.3 Economies Growing Quickly

The good news is that six out of the 10 fastest-growing economies in the world are in Africa. (Africa Renewal 2013) The continent of Africa is the second-largest mobile market in the world — smartphones outsell computers four to one. Over the 18 months to February 2012, Facebook had a user growth rate of 165% in Africa, according to the blog ICT works and by 2016, it is estimated that there will be one billion mobile phones in Africa. “Mobile Internet usage in Africa is among the highest in the world. Significant opportunities exist here to use social media in business,” (USAID: Strengthening Education and Research through ICT, 2012 report). Approximately 50% of the decline in child mortality since 1970 is attributable to women’s education and that every additional year of formal schooling for males reduces the risk of their becoming involved with conflict by 20%. (USAID)

To move ahead in the global economy, African countries will have to invest in education for its youthful population to develop skills required to operate in the global ICT world. More emphasis on primary and secondary school education will lead to greater literacy. Then there is more chance of moving on to tertiary education to learn business skills and develop training in
the ICT sector. However, as pointed out by Dr. Francis Nyamnjoh, “the profound technological changes taking place in the field of communication are likely to benefit mainly the people in the West. This is because most already have the tools or equipment that enable them to acquire and use these technologies.” (Nyamnjoh p.7)

As a place to invest, Africa is more attractive now than it has ever been. Foreign Direct Investment (FDI) in the ICT field is trending up; transnational corporations are investing in educational studies - Google, IBM, Microsoft, Hewlett Packard to name a few. (Ernst & Young 2011) Large non-profits and Foundations such as the Rockefeller Foundation and the Bill and Melinda Gates are putting in resources. Major organizations such as UNESCO, USAID, DfID, The World Bank, the African National Bank and many others have been part of major research studies for several years. Around the world, publishers are digitizing inventory so that their books can be accessible on multiple platforms and digital libraries are supplementing traditional books and mortar. In 2011, ICTs contributed around 7% of Africa’s GDP (World Bank Databank – African Development Indicators, ITU Measuring the Information Society, 2011) and the growth is a steep one. There are now local ICT development clusters known as LIDs such as iHub and Nailab in Kenya, HiveCoLab and ApLab in Uganda and so on. These provide spaces for training and content development spurred on by young people. In Africa there are 40,000 new users a day who join the social networking site Mxit. It has already overtaken Facebook in Sub-Saharan Africa. (www.mxit.com and newspaper reports).

1.4 Being Connected

One challenge to what appears to be an exciting trend is reliable and cheap internet connections. According to the World Bank, “the pace at which the African continent increases its access to bandwidth Internet has grown 20-fold in just four years and by early 2013, some 750 million mobile phone subscriptions were in use, covering two thirds of all African adults.” This sounds promising but the reality is that the basic need of connecting to the internet is often expensive and unreliable. Networks, or the fiber optic cables, are limited and this depresses the development of the broad band market in Africa (Excelsior TNO quoting the Infrastructure
There has been investment in building infrastructure and there are private operators in countries like Kenya and Nigeria that are taking fiber optic cables into urban areas to take advantage of dense populations and this is only likely to increase. (Excelsior p.18) The problem is that rural areas are less developed and seen to be less profitable and so do not attract the attention of the private sector. This means that Governments must make them a priority. Overall though, as has been shown in the North, Governments can provide the environment and funding (necessary in rural areas) but often it is a bottom-up process driven by passionate individuals, many from overseas, and communities.

1.4 My Interest in the Topic

I am studying a Master’s degree on Communication for Development at the University of Malmo in Sweden. The use of ICTs in education is an important aspect of C4D.

I also have a personal, non-scholastic reason for researching this topic. I run a non-profit that pays for students to attend fee-paying secondary schools in Malawi and Zimbabwe. Every year I travel to those two countries and meet with students and teachers, talk to care givers and sometimes government officials. In 2013 we introduced the first e reader program in Malawi and kindles, loaded with secondary school curriculum and over 100 books to read, are currently being used in a boarding school. So my interest comes from a grass roots level, trying to understand what works the best and what is not working.

1.5 Previous Research on this Topic

There is a lot of research by scholars on the question of the digital divide and on issues of gender and ICT use. These include Alexander Gwanfi’s Closing the Digital Divide in Sub-Saharan Africa; Wole Michael Olatokun’s Gender and National ICT Policy in Africa; Cecila Ng and Swasti Mitter on Gender and the Digital Economy; Louise Morley on Imagining the Inclusive University of the Future; Cheryl McKewan’s Postcolonialism and Development and Dr Francis Nyamjoh writing on Africa and the Information Superhighway, to mention just a few. (References to all on page 48) Publications such as The Economist, New York Times, The
Atlantic and Journals of African studies have written on the subject, and I was also able to access interviews on public radio.

There are also studies looking into ICT use in Africa from a practical viewpoint. These are studies commissioned by large organizations and NGOs. Lots have the “what if” feel that if A happens then it will result in B. Many large organizations have ongoing studies in this area and conferences are springing up across the continent introducing new players. Some Governments are working on initiatives; others less so. Virtually all reports begin from the starting point that ICTs are good for Africa and that Africans should have them and the sooner the better.

Few organizations that work on the ground have done their own performance and evaluations. One that seems furthest along and most committed is World Reader, a non-profit that provides e-books. Worldreader has put over 721,129 e-books into the hands of 12,381 children in nine African countries. Their partners include the Bill and Melinda Gates Foundation, UNESCO, Amazon and Random House. Another interesting initiative and one that started with great promise is One Lap Top Per Child. The aim was to provide solar powered lap tops, costing about $100 each. But the project has yet to become commercially viable and recent reports suggest that the organization is suffering a few setbacks.

2. RESEARCH METHODOLOGY

2.1 Choice of Research Methods

For this thesis, the best method of research was the mixed method approach involving the “planned use of two or more different kinds of data gather and analysis techniques” (Somekh & Lewin 2005 p.274). These included qualitative interviews and meta-study analysis. Where I could not contact students by either Skype, telephone or email, I used questionnaires. Each method represents a different perspective in order to enhance confidence in the validity of the findings (Somekh & Lewin p. 274). In this combination of methods there are strengths and weaknesses (Pickering, p.61) but a holistic approach was best, combining different methods
that allowed this complex reality to be reflected through the application of various and complementary methods. (Cottle et al, 1998. p.12-29)

2.2 Meta-Study Analysis

Although this type of research methodology is used more often in the health and social science field, it is useful here because of researching multiple reports and documents. Although the hope was to be able to draw some conclusions, this may have been optimistic in terms of the goal here. But it is a useful research methodology that involves “analysis of the theory, methods, and findings of qualitative research and the synthesis of these insights into new ways of thinking about phenomena.” (Sage 2001: Meta-Study of Qualitative Health Research by Paterson et al p.3) It is research about research, looking at existing qualitative research and bringing an interpretation to it.

More than a dozen reports were analyzed (listed in the reference section) as the basis for information about the hard facts. These studies had been funded by UNESCO, USAID, Foundations, the African Development Bank and Corporations. They were all pretty much in agreement with each other and quoted from one another’s research. I did not come across any voluble study that disagreed with another in any substantial way or where the findings were different. However for reports written prior to 2011 the information was not to be entirely trusted as data such as number of mobile phone subscribers, connectivity in schools or costs of an internet subscription is changing fast. But for providing an overview, these reports were invaluable and information is used throughout this paper.

Meta-study, like other research methodology such as content analysis, is criticized for lack of context. It removes the physical and emotional context and there is just a superficial understanding. (Paterson et al p.16) This was another reason to use the mixed-method approach. But meta-study did provide the analytic processes that are part of a “comprehensive research approach to provide breadth and depth.” (Paterson et al p.14) and in this way were very useful.
2.3 Qualitative Interviews

For this thesis nearly two dozen people were interviewed, many for background information and as part of the research and some on the record and to quote from. Deciding who and how many people to interview to get an account that reflected the chosen topic was important (Pickering p.59) and the need for a range of candidates who could offer alternative perspectives. Interviews fell into two categories: those who provided background information that led to other sources of information, and those who provided interviews that had substance and experience required for analysis.

Face-to-face interviews (in this case mostly over Skype) are less structured than off line and online completion questionnaires (Deacon et al p.67) My strategy was to ignore concerns about standardization and control (Deacon p.67) so that there was a more free-flowing conversation with some open-ended questions. Of course the interviewer, in this case me, remains the one in control and can direct the course of the conversation but this less structured form makes the greatest demands on the interviewer (Deacon p.74) People do not tend to answer questions in neat linear ways and they jump around a lot or give ambiguous answers. This is particularly true when the interviewee is in Africa and the interviewer is in Boston and there are different time zones and problems of connectivity to contend with.

Comprehension is an interesting issue and it was not always immediately clear if I was being understood. All interviews were conducted in English and all my interview subjects spoke English although it may not be their first language. I did an online questionnaire form of interview with some of the secondary school students in Malawi who were not in a position to Skype and where the questionnaire was sent to a third party who could print it out, have the students fill it in, and then scan and return to me. The drawback here is not being able to do follow-up questioning. On the other hand, there could be shyness and cultural barriers between the interviewer and these particular students leading to a less free flowing conversation if it is done over Skype. I did not have the luxury of the form of observation known as ethnography. This involves interviewing over an extended period of time (Deacon et al, p.251) and would have been ideal. What this meant also was that I had to rely on some critical
evaluations done by others and not undertaken first-hand by myself.

Anneke Meyer talks about the researcher’s choice of methods and samplings: how easy to skew the results by who is chosen to be interviewed. “Sampling further involves a decision on how many participants to include in a research project,” she says (Pickering p.79) It is not just the size of the group but the structure. How to avoid the yes/no answer and encourage further elaboration: brief and simple questions and avoiding cutting off the interviewee in mid flow. The sample for this paper was critical because we need to hear from those who have access to ICTs such as lap tops and e readers and learn about the difference (if any) it has made to their performance.

As the researcher and interviewer, I tried to avoid making assumptions. Michael Barker says in the chapter “Analysing Discourse” (Pickering p.155) that repeated instances of words assuming specific kinds of causal relations at work within cultures should be avoided. People are apparently “constructed’, ‘impelled’, ‘constituted’. ‘interpellated’, and so on.” It is easy to fall into the trap of asking leading questions or ones that are ambiguous or so generalized that it is hard for the people to know where to begin to answer it. (Deacon et al. p.78, p.79)

After the interviews were completed and transcribed, they were analyzed and in some cases this led to further questions. There is often a degree of positivism where some interviews confirm what has already been understood from the research, and some not. This is what makes the exercise so interesting. Positivism is criticized for deciding which research or interviews are worthwhile and which are not (Deacon et al p.4) but I did not feel it was an issue here.

Transcripts of some of the interviews and questionnaires are in the appendices. Otherwise I have quoted the individuals during this paper.

2.2 Case Studies

The aim was to balance the theoretical with the practical. There is plenty of activity to study but the decision was made also to select what was going on at a grass roots level. Case studies
include feedback from classrooms in Ghana and Malawi; from the African Virtual University and its mandate to provide long-distance learning; and mobile phone use in education. Some of the studies were invaluable but still needed to be treated with a degree of skepticism and an awareness “of the complex forces that come into play when policies are being made,” (Hansen et al. p.68) There were many places where PR might have trumped the truth.

2.5 **Reflections on the Methodology**

There are limitations to any type of methodology and each of these methods brought its own set of challenges. One main challenge to the interview process is time. Often there is one opportunity to get this interview done and to make sure that all the questions get answered thoroughly and ambiguous answers followed-up. Another challenge is that the interview process is open to subjectivity. However neutral it starts out, questions and answers can be led by the interviewer to confirm the existence of information already gathered. This method is open to criticism for that reason. There were also times when it was not possible to do the interview in person either via skype, email or on the phone, often due to no internet/telephone service, and in these cases I drafted questionnaires that were distributed to students and teachers, who filled in the answers and then these questionnaires were scanned and returned. (Some are attached as appendices) The problem is that answers were extremely limited and I suspected that some reflected what they thought I wanted to hear.

When it comes to meta-analysis, the challenge or limitation is context. Looked at with such a rational dispassionate eye, the information is devoid of all cultural context. Also, many of these reports were very long and I discovered that some reports were quoting information from other reports and so if there were mistakes in the research this could have crept in to subsequent other reports. So with all that in mind, I did decide that the mixed method approach to research methodology would provide me with different perspectives and a better outcome.

Of the more than one dozen reports I researched (listed in the reference section), there were two abiding themes: ICTs are good for Africa and the issue of gender and girls having the same access as boys, was rarely touched upon, if at all. Fortunately there have been plenty of papers
written about gender and the digital divide by scholars around the world which I was able to access and use in this paper.

3. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Before starting research, literature that would establish the foundation for the whole project (1998: Hansen et al p.74) was accessed and there was plenty to choose from. It was also important to reflect on theories about Africa at this time in its history and to be careful not to approach the subject purely through a globalized Northern perspective.

Africa is still seen by many through the lens of the post-colonial world. The media contributes to the way we see images, whether it is news coverage of military coups or newspaper advertisements showing hungry children as helpless victims (Schech & Haggis 2000 p.26). The media, defined as a place where meaning is reproduced (Hall 1997 p.3), frames that world.

Seeing these images in the media can create a sense of “us” and “them” referred to as "othering" (McEwan 2009 p.122) where we see people different to ourselves as subordinate to the West, or global North. These are not new ideas. They have been developed over many centuries but the Enlightenment confirmed the idea of the West as superior and more advanced, with Europeans being at the pinnacle of human achievement (McEwan 2009 p.81) The world was defined by Europe. Non-western societies were considered lacking, in need of having the European worldview taught to them for their benefit. The world we live in today has been undeniably shaped by imperialism and colonialism (McEwan p.4) and even though African countries have experienced more than half a century of independence, the way the South is viewed through this post-colonial lens still casts a long shadow.

In his influential book Orientalism, published in 1978, Edward Said criticized European scholars, journalists and writers who promoted the view of Northern domination by showing the fundamental differences between people of the West as "us" and those of the Orient as "them".
He did not suggest that these writers were being racist but that they continued the colonial representation of non-Western cultures, emphasizing traditional societies and those not from the West as being alien, foreign, subalterns. Although he was writing about attitudes towards the Orient it had wider application showing how western writers and scholars continued this discourse in order to dominate and gain authority over Eastern cultures (Schech & Haggis 2000 p.71) and of course control other societies in the global South. The argument holds true today when certain assumptions are made about Africans who through the media, are often dehumanized into stereotypes with quaint traditions and in need of being developed and modernized. (McEwan 2009 p.84)

Not everyone sees Western modernity as the most desirable way of life; in fact some challenge its definition of success because of the loss of sense of community, identity and meaning of life in the process of becoming modern. (Schech & Haggis 2000 p.124) There is ambivalence about the need for modernity and how to achieve it. Jan Nederveen Pieterse writes about it in the context of development (Pieterse 2010 p.27) saying that development is a neocolonial discourse – “where colonialism left off, development took over” (Kothari 1988 p.143 in Pietese p.29) but the problems associated with western concepts of what ‘works’ in society are proving invalid. He goes as far as saying the discourse of western hegemony belongs to the past and is epistemologically and politically untenable. (Pieterse 2010 p.31).

Our knowledge of the world is constructed through experience, what Swiss linguist Ferdinand de Saussure described as a system of signs, and these signs or meanings or representations are open to change. (Hall 1997 p.32) The internet and cell phone video has played a part in how Africa is now represented. The world can see positive images of African life rather than what the (old) media continues to supply. No longer is media passive, with power held by a few international broadcasting or newspaper barons. Social media such as Facebook and you tube where self-created videos are posted, or the activity of communication via email allows the individual to be active and to represent him or herself. ICTs have revolutionized the way we communicate and have unlocked unprecedented engagement and participation (Uimonen 2012 p.66) but it does beg
the question of whether these opportunities are available to all. Unfortunately the access is uneven: rich and poor, young and old, male and female. A rich, young male is much more likely to have access than a female, particularly a poor one and most definitely an old one.

3.1 New Media

New Media is not easy to define. Lievrouw (p.7) defines it as information and communication technologies (ICTs) and their social contexts. This includes physical devices such as a tablet, laptop, e reader, I phone and how they are used in communication and social arrangements. (Lievrouw p.7) These media differ from traditional media such as radio and television, newspapers and magazines, in important ways. “In terms of their design and use, they are continuously recombinant and complexly and dynamically networked; in terms of their social consequences, people now take new media for granted as being pervasively ubiquitous and interactive.” (Lievrouw p.15) New media is everywhere we look in the west and provides conditions for participation (Lievrow p.3), but across Africa the situation is more complex. If new media is simply a mobile phone, then they are indeed ubiquitous. If it is more than that then they are less available.

New media is also talked about within the framework of the network society. (Castells 2007 p.246) “The diffusion of Internet, mobile communication, digital media and a variety of tools of social software have prompted the development of horizontal networks of interactive communication that connect local and global in chosen time.” Whether it is a message on Facebook, an email, a text message or sharing a document, it is horizontal communication, person to person, and no longer vertical.

In the global North there is a sense of ubiquity (Lievrouw p.12). Cell phones, lap tops, tablets are everywhere. And the assumption is that ICTs will soon be available to everyone, particularly as the prices are reduced. They are a valuable tool in education, being interactive and creating a learning experience different to being taught by a teacher or taking a book from the library. This could be extremely valuable if the teacher is poorly trained, as is the case in so many rural
African schools, or there is no library or books to speak of.

As Rao states (Hemer & Tufte 2005 p.271) there are two ways of looking at ICTs: “as an instrument that is affordable and usable ICTs can indeed transform ..” and also as an industry, because ICTs represent a ‘major growing economic sector covering hardware, software, telecom/datacom and consulting services.” ICTs are more than just mere computers or devices. They are about content and the communities that are created. They can provide a basic tool such as text messaging the price of vegetables at a market or sending money by wire transfer as well, of course, as a means to communicate.

New media are also interactive. They are a popular representative of the digital ‘Daily Me’ (Lievrouw 2011 p.13) Exam results can be posted online; pupils can sign up for activities through school websites; teachers can blog about upcoming projects; parents can participate in their children’s education. People are no longer passive receivers of media, they are participants and curators creating media for their own needs and tastes. According to Hansen et al (p.12) while new media is in the communication field, it serves within a wider social context. It now affects almost everything we do. People born after 1990 in the global North cannot imagine a world without ICTs whether it is cell phones, email, i Tunes, Facebook, google, wikipedia or twitter. And in schools ICTs in the form of lap tops or computers are just a natural part of any educational establishment, as ubiquitous as chalk and a blackboard. But in the South this is not the case.

Rao (Hemer & Tufte 2005 p.276) emphasizes the importance of ownership by local communities of ICTs and new media. This can work in community radio and local websites, but it is challenging because it costs money and the need for financial security can sometimes undermine the integrity of the content. Communication networks are largely owned by global multi-media companies (Castells, Communication Power, 2009 p. 424) who are themselves part of the global financial markets. These investors place bets (Castells p.424) according to the expected performance in the global financial market. That is why, particularly in Africa, the public/private
partnership is so important. As seen purely as a financial bet, ICTs in Africa are considered a risky investment.

New technology in any form is neither a force for good nor bad by itself and can be used by anyone regardless of political or social agenda. Even those against the West can see its benefits. Recently Somali Islamist insurgent group, Al-Shabaab, embraced social media by opening a Twitter account, which gained more than seven thousand followers in less than a month. In spite of their previous rejection of all things Western, they now use tweets to mock the Kenyan military and post propaganda on a daily basis. (Uimonen 2012 p.14).

3.2 The Digital Divide

The concept of a ‘digital divide’, a line dividing those with access to information communication technologies (the “haves”), and those who do not (the “have nots”), has been discussed for almost 20 years. The ‘information superhighway’, a phrase used by US Vice President Al Gore (Nyamnjoh p.3) that suggested speed, connectivity and interconnection has indeed linked most of the world and created communities that could never have existed before. Even Marshall McLuhan’s idea of the “global village” could not have imagined quite to this extent that people in remote areas could connect immediately with a tap of a key board. But unfortunately access has not been equal and the changes have benefited those in the North with money and experience, who can take full advantage of what is on offer. It is often simplified into a North/South; rich/poor divide whereas it is more nuanced. It encompasses gender - men/women; race - white/black; age - young/old; education - those who are educated vs those who are not. But what is clear is that just as in a horse race where the lead horses start to pull away from the pack, so the same can be said of the digital divide. Those with access to new technology and who are motivated to use it will pull away from those who do not. And in Africa, we are not even referring to the most up-to-date products (the newest Apple lap top or Android phone) but the most basic ICTs whether as hardware or content.

A.G.M. Van Dijk describes the digital divide (Digital Enlightenment Yearbook, 2012) as inequalities in four successive types of access: motivation, physical access, digital skills and
different usage. “Differential access to information and computer technologies (ICTs) is related to individuals and their characteristics: level of income and education, employment, age, sex, and ethnicity, to mention the most important ones.” (Van Dijk 2012, p.57) The distinction between these groups falling on each side of an invisible line is employers and the (un) employed; management and executive, people with high and low levels of education, males and females, the old and the young, parents and children, whites and blacks, citizens and migrants. And at the heart of this is what Van Dijk refers to as the “categorical inequality of developed and developing countries” North and South.

And long before phrases like the Digital Divide or North and South even existed, there was something similar in the Bible. There is a passage in the Gospel of Matthew that describes the phenomenon of widening inequality: those who have, will continue to get more. Those who do not have, continue to get less.

“For unto every one that hath shall be given, and he shall have abundance but from him that has not shall be taken away even that which he hath. (Matthew 25:29, King James Bible) It is referred to as the Matthew effect.

Having access to reading material is a key component of education and one that contributes to the digital divide. In the years before ICTs, people got their information from books, newspapers and the radio. It is hard to imagine in the globalized North never having owned a book but for many students across Africa, this is the case. They have never owned a book. “Many of the students I work with in Kenya only read in school what the teachers have written on the blackboard and from text books they share. They have never read anything else,” Joan Mwachi of Worldreader in Kenya says. There are often simply no reading books in rural primary schools. And the pedagogy and books that exist are not only solely the books of the curriculum but they are a handful of books to be shared by the entire class.

The UNESCO 2014 study showed that Nigeria had a ratio of one library for every 1,350,000 which is one reason why the illiteracy rate is over 40%. No surprise that poor people have poor reading habits. In the US and Europe, in wealthy suburban neighborhoods, libraries flourish, they stay open until late, they have authors stop by and read from their work, they are bright
cheerful places to read in and have children’s activities. But in poorer neighborhoods, libraries are less welcoming, have shorter hours, fewer books, less activities. And the problem is that even today, books are expensive. But the world is demanding access to books. The Matthew effect is clearly not fair.

UNESCO estimates that worldwide 774 million adults cannot read or write (USI 2013b) and for many of these people illiteracy can be traced – at least in part – to an ability to access texts. Those who cannot access texts are on the ‘wrong’ side of the divide. There is concern that the digital divide between North and South will worsen if the South does not have greater access to ICTs. (Hemer & Tufte 2005 p.15) While everyone agrees that ICTs can aid prosperity, discussions about the digital divide are defined by Granqvist (in Hemer & Tufte, 2005, p.286) as the “uneven global distribution of new technologies, conceived as a major obstacle for the progress of societies regarded as less developed” focus mostly on access.

But not all scholars agree. Some theorists believe that the digital divide is a deeply misleading discourse and that the divide is not digital but socioeconomic. (Jan Nederveen Pieterse 2010: p.167) He believes that this has become the cornerstone of development policy because digital capitalism does not go to places where there are low returns (rural Sub Saharan African, being a good example).

Bock (Cammaerts 2007 p.67) argues that to see the digital divide only in terms of access avoids taking into account humans as sense-making beings for whom the integration of media has to be meaningful in the environment of their wider ‘media menus’. And this ties in with the idea of motivation as a force.

ICT strategies are now incorporated into programs of most foreign aid agencies and many NGOs are focusing on the issue of information technology. (Granqvist in Hemer & Tufte p.285) “Access to information technologies is regarded as the road to a better life for the inhabitants of economically weak regions.” Granqvist goes on to quote Uimomen 2001 and argue that this approach is closely related to the information society discourse, whose underlying belief is that “a total social transformation is predicted and that this transformation is generally a good and
progressive movement” (Uimonen, 2001)

Granqvist is one of a few dissenting voices on this topic saying that the “single most important myth of the ICT-for-development discourse is the ‘digital divide’ - a metaphor for the uneven global distribution of new technologies, conceived as a major obstacle for the progress of societies regarded as less developed.” (Granquist p.286) He says that so many of these reports are “tiresome to read” and it is as if uneven global distribution of material wealth were a new phenomenon. Further, in the words of Uimonen (2001), “by framing this divide in a technocratic terminology according to which progress is inseparable from access to technology, the concept of the digital divide serves to conceal the political nature of technical systems.” But the ‘digital divide’ does impact marginalized or neglected segments of the population and the author agrees that women may experience difficulties with technologies that were designed by men for men (p.292)

Even with growing access to the Internet and to wireless communication, inequality in broadband access tends to intensify the class, ethnic, race, age, and gender structures of domination between countries and within countries (Castells, p.57 he cites Wilson, 2004; Galperin and Mariscal, 2007; Katz 2008; Rice, 2008). This of course directly impacts education and the digital divide between those who have ICTs in the classrooms or at home and those who do not. Even today, the idea of owning a personal computer is still out of reach for so many. And even if they were able to buy one (as prices continue to drop) can they afford everything that goes with it including the internet connection? So new hidden forms of disconnection are emerging. (Couldry 2012: p.10)

The idea of ICTs adopting local languages is sometimes discussed. It is an added barrier to take up ICTs when they are all in English and even instructions are usually in English (and Japanese). Ten years ago Alexander Gyamfi wrote that to help close the digital divide, content would have to be created in African languages, an African language keyboard would have to be developed and needs assessments would need to be conducted for local users. With so many languages and dialects across the continent the chances of this becoming a reality are slim.
3.3 Gender and ICTs

Three out of five young people who lack basic reading and writing skills are young women (UIS www.USI.unesco.org) and 2/3rds or 64% of illiterate adults are women. Women, particularly older women, are perhaps the most marginalized by new technology. They may not understand the importance of the technologies, not have the skills and training to use them, and may be just too busy putting food on the table to learn. However, ICTs are one means of providing a woman with a better life. The problems are deep rooted. Just as we see in the West, in general from a young age girls do not gravitate to or are encouraged to learn math, engineering, science. This is even more pronounced in Africa and it can lead to a resistance or even fear about learning the new skills. “To a largest extent, the traditional pattern of male and female attitudes towards technologies is replicating itself in the development of the new ICTs.” (Olatokun 2008 p.5)

“Sitting before a computer to debate the digital divide will not help unless we are aware of the gender problems facing the community. … Active participation of women is essential.” (Ng and Mitter, Sage 2005) Another factor for women, in particular, is where the new technology is located. If it is all located in an office, and that office is dominated by male workers, then women do not have access. It is best if ICTs relate to the kinds of activities that women do. As we will see later in this paper, it becomes a much more even playing field at school and given the chance, girls show greater alacrity in taking up ICTs when it comes to reading and literacy. Also Kenya’s use of mobile banking has been a welcome opportunity for women.

The motivation to gain access or appropriate this technology is interesting. Some people do not have the same motivation as others, not at the beginning anyway. Gender differences play a part: in the North boys start playing with toys and devices at a young age; girls get dolls. When jobs in the engineering or scientific field come up, boys are already comfortable with the new technology, girls less so. It shows that the stereotypes that we grow up with such as boys are good at math and science and girls are better in the humanities is just conditioning from a very young age. And it is not that different in Africa. The boys start fixing their bicycles while the
girls start work in the fields. And this has an effect on the digital divide. Van Dijk gives the example of a young, single, female, Jamaican teacher living in the UK on a low teacher’s wage. Which side of the divide is she on? Living in England and as a teacher, one would think she is on the “right” side. But look more closely and it may be that she falls on the other side of the divide as she is a woman, low income, maybe cannot afford a computer and internet connection. She might be on the “wrong” side. And alternatively, an older man, working in an office, living in Nairobi might appear to be on the wrong side of the divide because of his location whereas in fact he is doing extremely well. Access to computers and the Internet really matters (Van Dijk p.71) Being able to navigate ICTs and adopt those skills is becoming more and more important and for those who do not have them, then their inequality of skills will keep them further behind and they could become excluded from society.

As ICTs play a larger role in the digital divide then the question of ‘who’ can appropriate that digital technology and ‘how’ becomes a factor. According to Van Dijk, it starts with motivation: motivation to understand it and use it. From the motivation to do this, there comes access, the physical access to a computer and to be able to get online. To get to this step resources are required – money to maintain the computer, power to run it, paper to put in a printer and toner and cartridges. At the same time the user must get skills to operate the machine and learn how it works and create content

Motivation is an interesting compulsion. A study done by UNESCO called Reading in the Mobile Era suggests that certain demographic groups are “more likely than others to read on their mobile phones.” They are motivated to do so. These tend to be females, highly educated and teachers. 95% of those responding to the survey (2014: UNESCO/Worldreader p.65) said that they expected to benefit from mobile reading and it would help them learn. They were encouraged because they had heard good things about mobile reading. “Females in the survey were generally more enthusiastic about mobile reading in the future than their male counterparts. They were more likely to express intentions to read more.”

As discussed, the digital divide can be a gender divide (girls not having the same access) and a class divide (the poor completely shut out.) The inequalities are then compounded into the world
of social networking and, by extension, education. At a very basic level where inequality forces people to seek work away from home and their families, or children to attend schools away from their villages, then ICTs fulfill distinctive needs even if it is just having a pre-paid cell phone or SMS text messaging. (Couldry p.164)

This point is echoed in Media World (2002: Ginbsurg, Lughod, Larkin p.342) where there is a discussion about Zambia and the use of radio. What is telling is that even with radio, the authors say that “economic class is the determining factor” as to who owns a radio and who does not. And the main owners are upper class families and mainly men.

Economic class is a factor, perhaps more so than gender, of who attends tertiary education. In Austria, for example, more than 60% of its population has gone or is going to college. In Tanzania this figure is 1% and in Chad and Ethiopia it is 0.4%. (Morely 2012. p.5) Countries know that they need to increase the number of people who go to higher education and yet, as Professor Morley points out, when we look closely at these statistics we see that there are still “very toxic correlations between access and social identities”. In Britain, she says, only 4% of the UK’s poorer young people enter higher education and only 5% of that 4% enter the UK’s top 7 Universities. But within that Tanzania percentage of 1% there is an interesting story, according to Professor Morley. Tanzania has received funding from the Carnegie Corporation of New York for gender equality. They offer scholarships, particularly for the B Sc Engineering to get more women into Science. “When I have spoken in some countries like Japan they have been absolutely stunned to see that a quarter of the students in Tanzania in BSc Engineering are female.” (Morley 2012 p. 7)

Of course girls in rural Africa have few role models. They do not see examples of successful women so they do not know what they want to aspire to be. At least ICTs can open up the world of seeing women on the screen or reading more books or articles by women. As one girl at our test boarding school in Malawi stated in her questionnaire about what she would like to improve? She said she would like to see “more lady teachers.” (see section 5.4 in this paper for more information.)
Having access to books and reading material, whether from a book or on a device, is not the answer to ending illiteracy. Reading has to be taught. As UNESCO states, “Humans may have a language instinct, but there is nothing natural about reading: it is a skill that needs to be taught and practiced, again and again.” (UNESCO: Reading in the mobile era p. 18) However, the report goes on to say that while it is true that books, by themselves will not remedy the scourge of illiteracy, without them illiteracy is guaranteed.

4. WHAT THE STUDIES SHOW – Meta Analysis

There are many reports about ICT use in Africa. Most are long and filled with facts and figures. There is not much context and because of the nature of the topic they are quickly outdated. Where contradictions occur - how many people in Africa have an internet connection; how many have a cell phone; number of students attending secondary school etc. – it is because the data is changing rapidly. I have been careful about quoting these reports particularly where there are contradictions.

If there are themes that are true for many of them it is these: ICTs are necessary; Governments should do more; and it is a hard area to evaluate. Here I have selected a few of the reports (listed in the reference section) to give a sense of what they report.

“The e-Transform Africa” report (World Bank, African Development Bank, African Union) gives case studies of ICT “transformation in action”. Most of these are connected to mobile phones, the role of Government, and some specifics such as IHub in Kenya. As in most reports, the word “transform” might be considered overused although it often comes with the caveat “potential” to transform. But even this report quoted the frustration at “lack of hard evidence on the links between investment in ICTs and sectoral development” (p.2) and acknowledges that this study involved two major investors in the ICT sector (World Bank and African Development Bank) and that the report is less the end of a study but rather the start of a new phase of growth. And so figures are available: US$150 billion projected ICT market by 2016; 648.4 million mobile subscriptions in 2011. They do agree that there is no “one size fits all model” (p.5) and
although the public sector provided more than US$56 billion in telecom infrastructure investments in the decade to 2008, it was not enough to reach rural markets.

“The ICT, Education, Development and the Knowledge Society Research”, prepared for GeSCI (Global e-Schools and Communities Initiative) in December 2011 talks about the Knowledge Society and its pillars: Education, ICT, Innovation and Science & Technology. Primary and secondary school education is key but it should be about skill building as well as curriculum. It should encompass “the broader societal learning necessary for development.” (p.6) ICT is the enabler for both innovation and education without which a knowledge society cannot be realized. UNESCO and its research on Knowledge Societies, quoted liberally, discusses key trends and challenges. They come close to talking about the digital divide “ICT is tending to accentuate social disparities between rich and poor” (p.15) but then back away. No discussion about gender and ICT use.

“Setting the pace in Africa: How IT leaders deliver on the potential of emerging technologies” was created by IBM who surveyed 180 Africa-based IT leaders across 90 industries. It provided useful information on M-Pesa, mobile telephony and was looking how to accelerate technology adoption.

USAID’s Education Strategy focused on achieving three goals by 2015. The first of these goals is “improved reading skills for 100 million children in primary grades.” Through its study on “Mobiles for Education (mEducation) Alliance (www.mEducationAlliance.org)” it is creating an international collaborative effort between “bilateral and multilateral donors, NGOs, foundations, private sector partners, academic researchers” to explore the intersection between mobiles and education. And it is not alone. The African Development Bank, the World Bank and the African Union are also creators of a report called “Transformation-Ready: The strategic application of information and communication technologies in Africa: Education Sector” on the same topic and USAID’s 2014 “Designing Effective Education Programs Using ICTs” gives an overview for implementing education policy using ICTs. “There is no magic bullet,” it says, “the impact of technology is constrained by many factors.” (p.41)
Infodev created “Sustainable and Replicable ICT incubators in Sub Saharan Africa” (May 2009) and states that “it is important to stress the limitation of any analysis that draws on illustrative examples as a basis for decision-making ..” (p.72) It goes on, “failed initiatives have often been the result of assuming that a good practice in one country can be successfully replicated in another.” The paper does look at opportunities for creating an enabling policy environment and how National policies should be sought. There are comparisons, interesting ones, about countries like Egypt and South Africa. Egypt’s Ministry of ICT established IT clubs (2,163 of them) that were equipped with nearly 26,000 computers. They aggressively trained teachers and linked up with Microsoft and Intel and IBM to help. South Africa also has a goal of universal access to laptop ownership among teachers in public schools. In 2009, 2500 schools had computer centers that were adequately equipped and over 3,000 schools had internet connectivity. (p.76) This report also discusses the use of mobile phones to support learning such as Dr Math, launched in South Africa in 2007. After one year the initiative had 1000 learners while 19,000 children are registered on the server. Also the use of mobile phones to support health education. They also reference a Laptops for Teachers program in Kenya in 2010. While power remains a critical issue, the report is optimistic that this will be less of an issue due to lower power consumption, increased battery life (p.84)

I drew heavily on reports published by UNESCO Institute of Statistics (“Financing Education in Sub-Saharan Africa: Meeting the Challenges of Expansion, Equity and Quality, UNESCO 2011 (http://unesdoc.unesco.org/images/0019/001921/192186e.pdf)”

4.1 Reflections on the Studies

Just a few of the many reports that were analyzed for this paper are mentioned above. To mention or critique all would not be useful for these purposes. They were all useful in their own way and provided data that I could double-check by other means or against other reports. As mentioned earlier, the common theme was that ICTs are good for Africa and that as a continent Africa is making great progress with connectivity, social media, cell phone use and more emphasis on education. But few even mentioned disparities in gender access or the digital divide
or what could be done to compensate for the fact that in some areas of Africa there will be huge segments of the population that will be left behind if action is not taken.

5. READING BOOKS ON TABLETS

Worldreader is a non-profit based in San Francisco that supplies e readers. As of February 2014, it has put over 944,300 e-books into the hands of 13,598 children in nine African countries. And through Worldreader Mobile, more than 335,000 people are reading a wide variety of books on a device they already own: a cell phone.

The organization has undertaken some performance evaluations. It is not easy putting this evaluation into practice. In some ways it is easier to get e readers loaded with content, shipped to the country, have teachers trained and then the devices used in the classroom, than it is to be able to evaluate the performance.

5.1 Evaluation of an e-reader project in Ghana

Evaluating these projects is a challenge. Donors who do the evaluations often hear what they want to hear. This study was the only one that seemed to come close to really analyzing the results. It was funded by an All Children Reading grant from USAID, World Vision and AusAid.

This is how the evaluation worked. Known as the IREAD 2 project, the study evaluated how e readers improved (or not) early grade reading skills. The study compared Ghanaian students in grades one to three in eight schools: four schools were what were called ‘test’ schools and here the students had been supplied with e readers. In the four other schools, the ‘control’ schools, they had not received e readers. In every other way, the backgrounds, levels, language skills, teaching methods were virtually the same.

The study base was 574 students in public schools in Ghana’s Ayensuano and Suhum districts. The main language is Akuapem-Twi, spoken by most of the students and the language of teachers in these schools until grade four. It is not until they get into Grade four that the students
start to transition to English. As this paper is written, the test is moving towards its final evaluation when there will be a final assessment. The test group spent five months evaluating this.

The findings, noted from Worldreader, are as follows:

- After five months, students who had access to the e readers learned to read on average 5.3 words per minute faster (in local language twi) than students in the control schools
- Students improved 30% faster on listening comprehension than the control group

However, “these gains have yet to translate into significant improvements in reading comprehension, due to the fact that students are still reading at a relatively slow rate,” says Worldreader’s report.

Each e reader features approximately 140 titles, 85% of which are age and grade appropriate story books and the remainder being text books.

One interesting fact came up about narrowing the gender gap. Girls and boys improved at the same speed in terms of oral reading fluency in Twi, whereas girls in control schools improved only half as much as boys. When it comes to reading English, the Worldreader students improved over 50% more on both letter sound knowledge and invented word decoding in English, than students in the control schools.

There were some anomalies such as the fact that in one category, the reading comprehension in Twi, the control group (those without the e readers) slightly out-performed the test group. Also that while students at the test school vastly improved on the test, they are still reading fewer correct words per minute than is needed to understand what they are reading. Instead of the necessary 45-60 words a minute, students were reading an average of 26 correct words per minute. While it was faster than the control group and does show a significant gain, it is still below the accepted standard of fluency.
Worldreader says that the study demonstrated that more students in its programs “are crossing the fluency threshold necessary for comprehension, however it also shows that the program must continue focusing on improving students’ oral reading fluency in Twi to see more gains in reading comprehension.”

There were also gains in comprehension with the test students improving by an average of 30% over the control students. They attribute these gains to listening comprehension activities and activity-based teacher training, which includes guidance on reading to students. But when it came to learning and understanding English, the students in the test group outperformed the control group by six to seven points on three of the four subtests. They said that, “in terms of basic English skill acquisition, six months in Worldreader’s programs is equivalent to nine months in a school without Worldreader programs.

5.2 Evaluations in Tanzania

Worldreader also ran tests in two primary schools in the Meru district of Arusha in Tanzania but this was inconclusive and too early. The aim was to create an enabling environment to support ICT in education and to address the shortage of books in school. Each of the two schools received 150 e-readers. The schools were fairly similar- Ngana has between 300-400 pupils and 16 teachers. There is no electricity, no library, no computer lab, seven dark classrooms and six pit latrines. The Nambala school is older, created before independence, has between 350-500 students, 25 teachers, ten classrooms a computer lab building but without computers, and available electricity. Enrollment is on the rise as parents transfer their children to the two schools in order for them to gain access to e readers and also e readers are used as a marketing tool for the schools, says Worldreader. Teachers at both schools say that the students are motivated to read and use the e readers which also contain Ghana’s school curriculum for Mathematics, Geography, English and Swahili. At this early stage, what has been improved is the impact.

5.3 Evaluation of a project in Kenya

Worldreader has also donated e readers to schools in Kenya. Joan Mwachi, Programme and Operations Manager, based in Nairobi, oversees all the projects in Kenya and the larger East
African region. Here in Kenya, Ms. Mwachi is working with both primary and secondary schools, rural and urban as well as private and public. She said that her students enjoyed that they can see lots of books at one time. “They can take them home; access textbooks and revision materials that are generally lacking at school, and it is technology to interact with.”

In these schools, the students are encouraged to take the devices home and share with family members. Worldreader Kenya also has out-of-classroom experiences (OCE) and vacation school. “There are opportunities for students to interact with devices outside the classroom. We encourage each partner to develop activities that include community access to devices after school or over the weekend,” she says.

There are problems with connectivity and power but in certain regions in Kenya this has been solved by situating the Worldreader projects close to power even if they are not directly connected. The devices are charged when needed, which is usually once or twice a month. “In some rural areas we are using solar energy to charge devices. We are currently testing more solar energy devices as a solution for power as we extend into more remote areas.”

In comparing how girls and boys use the devices, the teachers note the same experience as the project in Ghana. “When girls receive e-readers and are encouraged to read, they are more avid than boys. For Worldreader mobile, data shows that females read six times more than males when given the opportunity.”

5.4 Evaluation of e readers in the classroom in Malawi

In May 2013 a secondary school in rural Malawi was given 60 e readers. Each device was loaded with 100 books split roughly between books by African authors (mostly Nigerian but some Ghanaian, Kenyan and a few from Zimbabwe), British authors and American authors. Added to this was the Malawi secondary school curriculum. There was a training session with the nine teachers at the school and the Principal. Then a few tests in the classroom with the students.

There were teething problems with power. The kindles were not being shut down properly at night and the batteries ran down quickly. But once this was resolved, they became more useful.
The school is now a girl’s boarding school but boys can attend as day students. I undertook a survey to see if any patterns were emerging. The questionnaire was filled in by 13 students, six teachers and the Principal. The gender split was roughly 50/50 among students but all the teachers were male as was the Principal.

In Form one, 4 girls responded; in form two 2 boys and one girl, in form three 1 girl and 3 boys and in form four one girl and one boy.

Despite the ubiquity of cell phones, only two students, both boys, owned one. With the teaching staff, none had a computer at home apart from the Principal. There was also no working computer at the school.

All the students said they enjoyed the e readers and that they used them outside hours to read in their dorms. There was a variety of subjects they particularly liked. English, naturally, as this helped with their vocabulary and grammar. But there was also a request for books in the local language Chichewe, a request for more bible studies and more geography and history. Only one book was mentioned as favorite reading and this was The Fantastic Mr Fox by Roald Dahl (a form two male student). Few of the students experimented with all the functions of the e reader but most liked the use of them in study periods and to prepare for class. One issue was that there are only 60 e readers. There are 52 students in Form one: 54 students in Form two, 75 in form three and 42 in form four. What this means is that although it is workable in the classroom, it is not workable if students want to read in their dorms or outside class, as most said they liked to do.

When the e readers were introduced to the school the all-male teaching staff, most appearing to be in their 30s, 40s and maybe 50s, were not as quick as the students in learning. But of those who responded by questionnaire, all seemed to really like the devices. Comments included that they supplemented existing books, they were easy to operate, and several had noted improved performance. There was a range of opinion on where the e readers were most useful, from the English classes to the science subjects. When asked what they would like to see on the devices, one teacher listed the works of Shakespeare.
This survey requires follow-up particularly to drill down on the different reading habits between girls and boys and to try and quantify how many hours of additional reading is taking place because of the e readers. The research did show that there is an appetite for reading and that in the classroom there seemed to be no gender issues with girls reading and enjoying as much as boys. It created a “culture of reading,” said the Principal.

6. ARE MOBILE PHONES THE ANSWER?

6.1 Reading habits

They are ubiquitous and experiments are taking place to use them as educational tools. UNESCO recently partnered with Nokia and Worldreader to put this to the test. Their survey found that over 60% of people interviewed said they enjoy reading on mobile phones. It also helps create a “culture of reading” to be passed to future generations as parents read to their children. And one very interesting finding was to do with gender equality. Nearly two thirds of the approximately 750 million illiterate adults in the world today are women. While it is true that the survey found that more men are reading than women, once women do get their hands on a mobile phone, they read six times more than men.

Mark West, lead author of the report, says, “A key conclusion from this study is that mobile devices can help people develop, sustain and enhance their literacy skills. This is important because literacy opens the door to life-changing opportunities and benefits.”

The report is part of a year-long study that looked into reading on mobile phones to see who was reading, what were they reading and how. The sample was from seven developing countries including Ethiopia, Kenya, Zimbabwe and Nigeria. This is a two part report, the other one called Reading Without Books.

Of course reading on small screens is not ideal but while many people can access books online, according to ITU 2013, 16% fewer women than men are online and in Africa only 7% of households are connected to the internet compared with 77% in Europe. Further analysis would
probably show that the trend is for younger people to read on their mobile phones rather than the older generation.

UNESCO considers it the “most comprehensive investigation of mobile reading in developing countries to date.” Among the findings, people who read on mobile devices read more. Mothers use them to read to their children. Maybe this is the answer – jettison the traditional bricks and mortar libraries and have Governments invest in digital libraries and mobile reading.

One determining factor as to who reads is who owns the phone. In developing countries a woman is 21% less likely to own a mobile phone than a man (UNESCO mobile readers quoting GSMA Development Fund and Cherie Blair Foundation for Women, 2010) and this figure increases to 23% in countries like Malawi. This increases further for phones that can access data. But there is good news: once women start reading on their phones they continue and read more and more and end up spending considerably more time reading on their phones than men. “On average, women spent 207 minutes per month reading on their mobile phones (during the three month study) compared to 33 minutes by men. Women clearly read more when given the opportunity. Reading on a mobile phone is also a young person’s choice. Few people in the survey who were over 24 read regularly on a mobile device. But that may be because older people don’t own a mobile phone. The Pew Research Center’s Global Attitudes Project did an international survey in 2011 and discovered that people aged 50 or older were far less likely to go online on their phone than their younger counterparts, so no surprises there.

6.2 Reading on the Phone

There were lots of reasons given for why people like to read on their phone. In the survey, (Reading in the mobile era, p.38) various people were interviewed, as follows: Tinashe is a student of human resource management in Zimbabwe who likes to read romance and drama on her mobile phone. “Actually I read more on my mobile than I used to. I think it is because I can carry my phone everywhere I go and it is easier than carrying a book, and it is always there when I want to read,” she says. Another interviewee was a teacher in Zimbabwe, Charles, who reads to his class from his mobile phone and cites lack of available printed content as his primary reason for reading on his mobile phone. “We live in a remote area where there are no libraries
and the books I have in my own small library are the ones which I have already read. So this is now giving me a chance to choose from a variety of fiction titles.” (Reading/mobile era p.40)

It is interesting also that people who like to read, read more on a mobile phone and that parents and teachers like Charles are using them to read aloud to others. “One of the most significant findings from this study is that a large proportion of mobile readers are reading books and stories to children from their mobile phones. One in three survey respondents said that they read to children from their mobile phones and further one third said they would do so if more child-appropriate reading materials were available.”(Reading/mobile era p.49)

6.3 The Methodology behind the UNESCO mobile phone study

The methodology behind the UNESCO research was surveys followed up by qualitative interviews over the phone to add to the quantitative findings. The books on the mobile devices are mostly in English but there are some in local languages. Most can be read for free although there is a cost due to the data use that are equivalent to 2 cents (US) for 1000 pages read.

Those taking part were asked what they like to read most and romance was at the top of the list. After romance it was educational and religious books that drew nearly equal amounts of interest. In the educational field it was textbooks that drew a lot of readers to them as well as early phonics readers like Fat Cat and Rat. The Bible and the Quran followed.

Mobile phones can also be important outside the classroom as useful educational tools. The Gates Foundation and USAID (USAID: MAMA-New mobile health partnership launched to save lives at birth - http://www.who.int/pmnch/media/membernews/2011) are using phones to provide information about maternal health. There are similar initiatives such as Text to Change in Kenya and other countries which use text messages to educate people on health-related issues.

7. LONG DISTANCE LEARNING – African Virtual University

One way of bringing education to millions of African could be the virtual way. The African Virtual University (AVU) which has offices in Nairobi and Senegal, is a Pan African
Intergovernmental Organization that aims to increase access to quality higher education and training through ICTs. According Dr Griff Richards, a manager at AVU, it has trained more than 43,000 students across Africa and established the largest network of Open Distance and eLearning Institutions in over 30 countries in Sub Saharan Africa. The way it works is that it partners with existing universities and it is those existing colleges that accept the students into these AVU courses. It has at least one partner per country.

On average only 6% of African students get a post-secondary education compared to about 45% of the population in Europe and North America. The development goal for Africa is 12%. There are many reasons why there are not enough physical colleges built or teachers trained to keep up with the demand due to population growth. According to Dr Philip Altbach, Research Professor of Boston College, Africa was not well-served by UNESCO or the World Bank who put emphasis on primary education and ignored tertiary. “Africa has a problem with access at the bottom, which is where the private/public partnership is necessary. Every good country needs a good research university. It is central to any international strategy. Research universities do not make money so private investing is useful.” Dr Altbach mentioned also that one problem to compound this is that Government officials still often send their own children out of the country to be educated leaving sub-standard universities at home.

Almost all the materials developed by AVU and its partner institutions are made available as Open Education Resources and the focus is on Science Teacher Education, ICTs in Education, and teacher professional development. The materials are produced in English, French and Portuguese. According to Griff Richards from the AVU, “There have been some success stories. In Senegal over 13,000 rural teachers have now attained degrees and certification whereas in Kenya, the University of Nairobi now averages about 65,000 distance students each term.”

Speaking last year, the AVU Rector, Dr. Bakary Diallo, said African universities need to make ICTs an integral part of teaching and learning if Africa is to attain Millennium Development Goals and Education for all. He went on that “at least 12% to 15% of the continent’s workforce should have attained tertiary education. However, the average enrollment in Sub-
Saharan Africa Higher Education is 6%. This is the right time for African Universities to consider using eLearning to address the growing need for quality and affordable education and training.” In an article in the New York Times on April 22, 2010, titled “Building Schools out of clicks, not bricks” the AVU Rector described how the AVU portal (http://oer.avu.org) has contributed to global knowledge and that the portal is not just for Africans, it is popular in Brazil and the USA.

7.1 What AVU provides

Today the portal hosts 219 text books (or modules as they are called) and 91 video tutorials available in the three languages and more than a million people used the site between January 2011 and June 2012 which means that through AVU, Africa is contributing to global knowledge and is therefore not only a consumer of content from the ‘North’. Of those 219 modules, the majority are in Mathematics and Sciences, some in Teacher Education professional courses and then a few in ICT basic skills and in integration of ICTs in education. The portal is interactive and academics and students can access them the materials and then modify them and post them back to enrich the portal.

The AVU provides PCs to each partnering institution so that they can set up a prototype learning center. Griff Richards, Manager, Educational Technology and Learning Resources at the AVU, says that the University of Nairobi is a good example of taking the initiative and they have set up about 20 learning centers in various parts of Kenya. “Learners travel to these sites for exams, to deal with administration and to use the internet if they have no other link. Each partner is different in how they approach this because they have different needs.”

One of the main challenges faced by the AVU, just like universities everywhere, is the ongoing problem with funding. They have a small team that has to fundraise. Other problems include finding people with the rights skills to animate the program, making sure there is reliable power and/or high bandwidth internet connections. Working with Governments and universities is often slow going and the bureaucracy that enables the project can also slow it down. Travel
between sites is expensive and the journeys long with so few direct flights and finally security
and stability. AVU has a project in the South Sudan but, says Dr Richards, it is difficult to set up
a learning center at the university if all the faculty, staff and students have dispersed to safe
havens.

Two years ago, in April 2012, the AVU partnered with the African Union Commission to widen
the use of its eLearning. They jointly agreed to “promote education and the innovative use of
ICT in Africa.” They have also taken a stance on gender equality and addressing how to help.
Scholarships in Science disciplines are awarded specifically to girls.

Last year the AVU launched the AVU Multinational Project II at Kenyatta University. This came
on the heels of other initiatives involving teacher education and computer science programs. I
asked Dr Griff Richards if the AVU had been evaluated and if there was something he could
point to for improved performance? “We are about to revise the first round of modules and
launch production of a new program,” he told me. “The big unknown is who and how these
materials are used. Both direct impact (learners) and indirect impact (changing the way
universities deliver) are vague.” The AVU has applied for a small research grant to allow them to
do follow-up with learners, school teachers and faculty who have benefited from the program.

The AVU may be going some way to addressing issues in tertiary education through the use of
ICTs but Africa suffers from a dearth of good universities in general. According to Dr Philip
Altbach, Research Professor at Boston College, outside South Africa there really is not a good
research university. “Every good country needs a good research university. They are central to
any international strategy.”

8. A COLLEGE GOES DIGITAL: Ghana’s Ashesi University College

Maybe there are different models out there. One such place is Ashesi University College in
Ghana that has partnered with Google and embraced all things digital.
Ashesi University College was founded by Patrick Awuah in 2002. Mr. Awuah, a Ghanaian who studied in the US and returned to Ghana to set up the college, says that the goal is to “train a new ethically responsible educated elite to break the cycle of corruption on the continent. We want to play a role in the renaissance of Africa,” he told the New York Times in 2011.

Despite the country’s relative prosperity and stability, only 5% of the population in Ghana has a post-secondary education. Mr. Awuah was fortunate. He was a student at Swarthmore College near Philadelphia and at Berkeley’s Haas School of Business before working for Microsoft. During his time at Microsoft he realized that students were graduating from colleges in Ghana but had no practical training. “We were churning out graduates who only knew theory, computer scientists who had never done any programming,” he said. “You cannot be a carpenter if you just read about hammers and nails, and never use a tool.” (NY Times)

This private liberal arts college in a suburb of Accra (Labone) has embraced new technology wholeheartedly with a digital library with access to over 20,000 academic texts and journals and on-line databases. They also have a library of over 6,000 books and 200 CD Roms and anticipate that both collections will continue to grow.

Another partnership they have embraced is working with Google. There is the Ashesi Google Club which focuses on the use of google products such as Google Maps and the hi tech company helps organize seminars and lessons around their products.

In April 2014, Ashesi was awarded the Organisation with Best Social Media Presence Award at Ghana’s biggest blogging and social media gathering, BlogCamp 2014. Ashesi also received the award for “Best Facebook Page”, becoming the first university to have received recognition for social media engagement in Ghana.

Although for this paper I was unable to reach Mr. Awuah, I did receive information back from a Professor of African Studies at Harvard, Professor Emmanuel Akyeampong, who had visited Ashesi and pointed to it as a very interesting model for Africa. The fact that the college won an
award for best social media presence and has a relationship with Google suggests that it is much further ahead in embracing new technology than most of its competitors.

9. ONE LAPTOP PER CHILD

One initiative that started with great fanfare but has recently been plagued by reports that have words like “disappointment” or “error” in the first paragraph is the One Laptop Per Child program, started in 2006. The plan was to deliver solar powered laptops to developing countries for the low price of $100 per laptop.

In some ways the idea was ahead of its time. It proved very difficult to bring the price down to $100 and even today, these Taiwan-produced laptops cost closer to $200. There was also a sense that the students would receive the laptops and work out how to operate them and use them to their full benefit. I am sure many did but equally many were unable to. The laptops did not come with teacher training, probably vital to get the most out of their use.

9.1. Performance Evaluation and Test Scores

One Laptop per Child (OLPC’s) literature is full of enthusiasm and optimism. In 2007 some 10,000 students received laptops. As well as being in Africa, OLPC is in other parts of the developing world. A report in The Economist (April 7, 2012) concluded that despite the fact that the country of Peru spent “$225m to supply and support 850,000 basic laptops to schools throughout the country … Peruvians’ test scores remain dismal. Only 13% of seven-year-olds were at the required level in math and only 30% in reading, the education ministry reported last month.”

The Inter-American Development Bank (IDB) decided to do its own performance evaluation and, according to The Economist, “found that the children receiving the computers did not show any improvement in math or reading. Nor did it find evidence that access to a laptop increased motivation, or time devoted to homework or reading. The report applauded the government for
providing much-needed hardware: less than a quarter of Peruvian households had a computer in 2010. But it now needs to improve teacher-training and the curriculum ..” (The Economist, April 7, 2012)

In March 2014 there were headlines that OLPC was a failure and closing down but these were quickly refuted (wired.co.uk) and it would appear that the organization continues and is even developing a $50 laptop that can be used. Further research is required to see if this can still be a viable operation for African schools and when other independent evaluations will be done, particularly in Africa.

10. KENYA – ICT Leader in the Region. What is it doing right?

10.1 Good News, Bad News .. Ignoring the Digital Divide?

It is a strange anomaly that in Kenya today virtually everything can be paid for with a few taps on the cell phone. The service is called M-Pesa. (Pesa means money in Swahili) and it began in Kenya. The country leads the way not just in Africa but across the world. Money is handed over and credited to a phone, rather like a credit card. The phone number is credited with the equivalent of digital currency. What this service does, is it enables people in poor countries to build assets. (Atlantic Magazine, April 2014) And M-Pesa has nearly 80,000 agents or individuals who function as tellers for this increasingly large virtual bank. “Across Sub Saharan Africa, 16 per cent of adults said they used mobile money. In all other regions, including Europe and the Americas, the figure was less than five per cent.” (Olopade. The Atlantic Magazine. May 2014)

Apart from the emergence of M-Pesa, there are other reasons why Kenya has been called East Africa’s “technology gateway” (Excelsior p.35) due to innovation and investment in the submarine cables. This has meant that the cost of a monthly broadband subscription has fallen from US$159 in 2008 to US$39 by the end of 2009. And the Communications Commission of
Kenya reported at the end of 2010 that mobile penetration was 61% in Kenya and Internet penetration 22%, well above Africa’s average. (Excelsior p.35)

What is it about Kenya that has laid the foundation for this kind of activity? What does this mean, if anything for the digital divide? And is the success also apparent at the school level or is it tertiary level and beyond? The answer is a complicated one.

It depends which report you read as to either feel terribly optimistic about Kenya or be more tempered and realistic about some of the issues the country faces. The ICT infrastructure is still weak and although current mobile penetration rates are over 60% and growing rapidly (Excelsior TNO Innovation for Life p.70) like its neighbors, Kenya is operating within its local market rather than with other African countries with no cohesive strategy.

And the reality is that not all Kenyan children attend school. Statistics vary as to the data; however, conservative estimates indicate that only 30% achieve the KCPE (Standard 8) and of these only 50% complete the KCSE (Form 4) levels of achievement. Essentially that means that less than one in five will graduate with a secondary school diploma.

There is great hope for the new Internet Park or ‘silicon city’ known as Konza that will be on the outskirts of Nairobi. According to a BBC News report, it will take 20 years to build Konza Technology City but in the meantime Google, Intel, Microsoft and most recently IBM have offices in Nairobi. Kenya has managed to create public/private partnerships to invest in infrastructure and access. According to a report called “Digital Jobs in Africa: Catalyzing Inclusive opportunities for youth” Kenya added 4.6 million internet users to a base of 13.5 million and another half a million new broadband users in 2012 alone. During the previous four years the country benefited from major foreign direct investment in the ICT sector and today technology is part of all sectors of the economy. The country is also considered user-friendly for both local and international technology companies, according to the report.
Kenya’s Government took the steps to promote ICTs as a driver of economic growth. ICTs were included in the Government’s Vision 2030 plan and the establishment of the ICT Master Plan 2017 which frames ICT as a vehicle to drive broader industry growth, create job and meet citizens’ needs. There was a partnership between government and the private sector and the ability to create a culture of entrepreneurship and innovation. Nairobi is home to nearly two dozen hubs and incubators focused on the role of local content and attracting investors. (ihub research.) But it is not straightforward. In Rwanda every ICT product is zero rated and it is aggressively pursuing new technology. For Kenya, 16% value added tax has been reintroduced for ICT products and this situation, according to its critics, could dampen the enthusiasm for doing business here.

**CONCLUSION**

The purpose of this paper was to look at several interesting initiatives in Africa today that involve the use of ICTs in education and to see what impact ICTs are having on the digital divide and on girls in particular.

What is obvious is that evaluations of projects are difficult to come by and that improvement in education takes time. There are so many extenuating circumstances surrounding these performance evaluations that it is hard to gauge the success of projects on raw data alone. But what we know is that ICTs through e-readers or mobile telephony can bring hundreds of books to a student, the curriculum can be downloaded and available in one place, and students have the ability to communicate with one another and with their teachers. This alone is a major step forward and there is no turning back. While only a tiny percentage of ICTs are being used in rural areas in Sub Saharan Africa there is going to be a push to increase this quickly and private/public partnerships will play a major role.

Problems of extreme poverty, isolated communities that are off the power grid and health concerns that keep students from functioning at their best will continue to plague many
communities but ICTs offer hope. Whether it is cell phones texting health messages or e-readers that offer a world of possibilities in literature, life will be changing fast.

And for girls, there is the added benefit that through the ability to learn more and read more they will see role models of other women who have succeeded. Ask a girl in rural Sub Saharan Africa, whose reading is limited to a half a dozen books over the course of secondary school, what she would like to be in when she grows up and the answer is invariably a nurse. Why? Because a nurse is often the only professional woman she will meet. Access to literature and the internet changes all of that in an instant. Suddenly the world is full of possibilities.

Part of the problem for would-be investors in Africa is confidence that the region will be stable and the work force educated. And African students need the motivation to know that when they leave school there are jobs to apply for. Entrepreneurs and creators will flourish in an environment where education is strong and ICTs can support what is already happening. The private/public partnerships in Africa are key as Governments can provide the enabling environment but as shown, clearly cannot do this alone. There is certainly no shortage of global companies wanting to get into this area and the partnerships will, if properly managed, help defray the costs from Government. However, when money comes in as foreign aid, the agenda should be driven by the local communities and not the donors, as happens so often.

On the one hand, discussion about the surge in local social media, the internet hubs, the fact that Google, IBM, HP etc. have opened offices is very encouraging. Parallels between San Francisco’s early days and the Silicon Savannah of Nairobi bode well. Rwanda and other countries have made wiring schools a priority and there are clusters of real entrepreneurship across the continent. And yet it is shocking to think how many people in Africa today cannot read or write. ICTs in schools will certainly help combat illiteracy although will not help the older generation.

The problems of the digital divide in general, and for women in particular, are real and if they are not addressed then women will fall further behind. Increasingly African governments are
creating ICT policies but issues of gender and location are hardly being addressed. As the
evaluations showed, give girls and women the chance, and they will take them. In fact this
preliminary research from Worldreader pointed to higher motivation from girls than boys when
offered the chance to read.

Two other ways Governments could help themselves is to help make ICTs more affordable in
education through tax subsidies (note the Rwanda versus Kenya example given earlier in the
paper) and increase communication between countries and continent-wide. Even the sharing of
costs of cables connecting remote areas would benefit all. There should also be a push to digitize
and create local content. African students will learn best when reading or connecting to stories
or information that reflect their own lives. Not nearly enough is being done in this area and if
local publishing houses are not being flexible enough, then there should be ways to encourage
them to do so.

What is clear is that ICTs are not the only solution. They won’t make a bad school good and they
won’t make a poor teacher a good one but they are here to stay and have enormous potential. In
tandem with other factors, ICTs can change the way Africa does business and how Africans are
educated.

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Peterson, Mark: Strengthening Education and Research through ICT and Human Capacity Building 2012, USAID
APPENDIX A - Among the reports that were analyzed are:


2. UNESCO Reading in the Mobile Era: A study of mobile reading in developing countries. 2014. Authors Mark West and Han El Chew. 89 pages


7. Excelsior Firm / TNO Innovation for Life (a global strategic and investment advisory group) - 109 pages


7. Mobiles for Education m.educationAlliance.org (USAID)

8. Setting the pace in Africa. How IT Leaders deliver on the potential of emerging technologies. IBM. Jan 2014. 12 pages


10. Digital Job in Africa: Catalyzing inclusive opportunities for youth. Rockefeller Foundation. 19 pages
11. UNESCO - ICT-enhanced Teacher Development Model - 29 pages


APPENDIX B – INTERVIEW TRANSCRIPTS

For this paper, I conducted a number of interviews by phone, skype, email and by sending some questions in the form of a questionnaire that was filled in, scanned and returned to me. Not all the interviews have been transcribed but here are some of them.

1. Interview with Joan Mwachi, Programmes and Operations Manager, Worldreader. We did this over skype.

Q: What are your duties with Worldreader and how long have you worked there?

A: My title is Programmes and Operations Manager and my responsibilities include overseeing all our projects in Kenya and the larger East African region. I am based in Nairobi and I run all aspects of the Kenyan office-Administration, Finance, Operations. We are a small staff- two permanent and one consultant. I am responsible for business development and partner relations as well. I have been doing this job at Worldreader for just over 16 months.
Q: Where were you before this?

A: Before joining Worldreader, I worked at Bridge International as a Regional Academy Improvement Manager overseeing 137 schools (at the time) and a staff of over 1000 teachers, Academy Managers and Field Support Managers.

Q: What kind of schools are you working with? Primary or Secondary? Rural or urban? Private or Public?

A: We are working with both primary and secondary schools, rural and urban schools as well as private and public schools. In our library model, we are extending book access to patrons of all ages from young to old.

Q: All primary school education is free in Kenya, correct? And is it the same for secondary or are some schools fee paying?

A: Primary school education is free in public schools. There are various activity levies these students are required to pay so education is not quite “free.” Private primary schools pay school fees. Both public and private secondary schools pay school fees.

Q: What do your students like best about the e readers?

A: The students like the fact that it is technology they can interact with. They can access textbooks, revision materials that they generally lack at school. In one go they can access lots of culturally relevant books and they can take them home. It’s like having a library at home. They can actually read. Many of these students only read in school what the teachers has written on the board and text books they share at school. The book ratios vary with schools and direct access to reading material.

Q: Do they use them outside the classroom too?

A: We encourage all our students to take devices home and share them with their family members. We also have Out-of-Classroom-Experiences and vacation school. These are
opportunities for students to interact with the devices outside the classroom. We encourage each partner to develop activities that include community access to devices after school or over the weekend.

Q: Do you know which books tend to be the favorite ones to read?

A: Favorites are dictated by demographics such as age, gender, rural or urban settings. The most common theme is identification with content. There is a direct relationship between culturally relevant reading material and favorite books. As students read more, they begin to explore material from international sources as a new experience. Avid readers, read everything.

Q: How is the power in Kenya? Are you OK for electricity in the schools and can you easily charge the devices?

A: The power grid is extensive in certain regions in Kenya. All our projects are situated near enough to power even if they are not directly connected. Devices are charged on need basis, which is once or twice a month. The devices we use have a battery life of about 3 weeks for regular use. Our partners in somewhat remote areas are using solar energy to charge their devices. We are currently testing more solar energy devices as a solution for power as we extend into more remote areas.

Q: I am very interested in how the e readers might benefit girls. Do you notice any differences between how girls use the e readers and boys?

A: When girls receive e-readers and are encouraged to read, they are more avid than boys. For Worldreader mobile, data shows that females read 6 times more than males when given the opportunity.

Q: How do the teachers feel?

A: Teachers appreciate and embrace the device. At first some were averse to using the device. Once they learnt how to manipulate it, they warmed up to it. The e-reader is an easy resource to
incorporate into daily lessons. Teachers use the e-readers extensively to research reference materials and for revision of content prior to exams.

Q: I am trying to get a sense of performance / evaluation. Do you have any facts/figures to show how the e readers have improved performance, exam results, literacy etc? Anything at all?

A: There is an evaluation from schools in Ghana and that seems to be the best one to use for now. We have another report focusing specifically on literacy gains, exam results, attendance and retention at school. Unfortunately I am not at liberty to share this because it has not yet been disseminated by the Ministry of Education to the public.

2. Interview with Dr. Griff Richards, PhD, Manager, Educational Technology and Learning Resources, African Virtual University

Q: I notice that you have offices in Kenya and Senegal. Why those two locations?

A: A presence in Dakar helps us be sensitive to the linguistic needs (French) and time zone differences to West Africa (3 hours behind Nairobi).

Q: How many students are there at AVU? Where do most of them come from?

A: AVU is a virtual university that works with universities rather than directly with students - we currently have no academic students of our own- they are all in joint programs with host universities that respond to regional needs across Africa. We do offer some non-formal online programs.

Q: What is the criteria for being accepted - they have to have completed Secondary school but is there a specific exam?
A: each university is autonomous and sets their own admission requirements.

Q: Do most students come on scholarships?

A: We do provide about 500-600 scholarships each year targeted at women and disadvantaged individuals to enroll in basic ICT courses at participating institutions. Most of these individuals are teachers, although most of them have little academic preparation to be teachers. The basic ICT skills gets them knowledgeable out how to use the teacher and provides them with the skills needed to access distance education courses online.

Q: I see that students can study purely online or do a mix of online and face to face or just face to face. What tends to be the most popular?

A: It really depends on need, access and availability of courses. I noticed in a recent visit to a F2F university that they are encouraging their students to take at least one on-line course so that they can maintain professional development after graduation. Remember only 4-6% of Africans get to access F2F campuses - access is highly competitive, but there are millions of people who could still benefit from online courses. As well not all universities offer all courses, so for some learners online is the only option.

Q: How much does it cost a student, approximately?

A: Tuition is entirely up to each participating university and their national policy. Given the highly competitive nature of entry, many countries (e.g. Ethiopia) have free tuition to public universities.

Q: How do you select your partner institutions and who are they? Mainly universities and spread across Africa?
A: We strive to have at least one university per participating country in our projects, sometimes we have historical partners as well so we will have 2. The nomination is interest-based - we send invitations to the ministries of education in proposal stage, and they will either nominate directly a university, or they will solicit expressions of interest from their universities.

Q: What would you say are the strengths of the curriculum?

A: The strength of the curriculum 1) many universities collaborate to come up with a unified curriculum - this means the credits and degree are more transferable for learner mobility, and the degree is more recognized. 2) the university professors collaborative write and peer review the course materials - this spreads expertise in content areas to universities that might not have had their own expert in a given area, 3) textbooks are generally unaffordable in Africa - the publishing of the curriculum as OER makes it available to anyone who wants to learn whether in the project or not, 4) the publishing of the curriculum enables recognition of the academic expertise that is here in Africa.

Q: What are the challenges you face? Funding, maybe? I noticed the list of funders/donors and imagine that the is probably something that needs to be constantly worked on.

A: Funding is always an issue - we have to do a lot with a small team and draw on the goodwill of academics who see value in building the community and sharing knowledge. Also human capacity (finding people with the right skills and knowledge to animate the program is difficult); Basic infrastructure like reliable power or high bandwidth internet connections is not always available. Also bureaucracy that enables the project can also slow the project. Africa is a big continent so it is expensive to travel to bring people together to build community, or to travel out to service the partnering institutions. It can be faster to travel from Nairobi to San Francisco, than from Nairobi to Cape Verde. There are often problems with security and stability. For example, South Sudan is in our project, but there is a war going on there, so it is difficult to set up a learning center at the university if all the faculty, staff and students have dispersed to safe havens.
Q: What ICTs are used at AVU? Do most students work on laptops from home? Apple? Do they have special software? Do they skype with teachers?

A: We do not provide computers to students, we provide PCs to each partnering institution to set up a prototype learning center. Then they take it from there - for example the University of Nairobi has taken off on their own and set up about 20 learning centres in various parts of Kenya. Learners travel to these sites for exams, to deal with administration and to use the internet if they have no other link. Each partner is different in how they approach this because they have different needs.

Q: Do you rely on a lot of digital books or are traditional books and a traditional university library still an important part?

A: We are essentially a collaborative producer of digital books - we call them modules. The professors take these modules and turn them into courses. I like the analogy of a cake mixes on the shelf - just add a professor, and students and a means of communication and you can custom build a course that meets local needs. We currently produce our materials in English, French and Portuguese.

Q: Are cell phones used in an educational manner?

A: According to a study by the World Bank 80% of internet users in Africa access the web via a mobile device. AVU is setting up a Mobile Learning Lab to find ways of optimizing this channel.

Q: Are you based in Kenya or Senegal and what is the internet connection like? Reliable, fast and cheap?
A: AVU's Center for Virtual Education Innovation is in Nairobi, Kenya. The internet connection is adequate, it is not cheap, and there are times when the bandwidth seems to simply disappear. Most large cities of Africa are now connected to the internet by optical fiber that meets the undersea cables that circumnavigate the continent and connect with Europe and North America. In the last year the fiber has been pulled in Nairobi and just about every main street has been trenched 2 or 3 times, once by each provider, to pull fiber. So access and bandwidth are improving, but price has not dropped. Fiber is only part of the picture - the hubs need upgrading of switching gear to take advantage of the potential speed. There remains much to be done, but it all costs money and there is a shortage of high tech talent.

Kenya is particularly well advanced when it comes to mobile. Interestingly, the mobile providers are making a large proportion of their money through provision of mobile banking services. The banks are very conservative and old fashioned, so the mPesa electronic money system has become the de facto banking system for poorer people especially those in outlying areas who had no access to banks before. mPesa provides an opportunity to store capital beside owning a goat. Just about everyone has a mobile phone.

Q: what do you think are the main challenges to education in Africa?

A: Access and cost. For example many governments have recently made primary education free for all, but they have not increased the number of schools or teachers. In the Kengame slum area of Nairobi there are 94 informal schools, probably about 200-300 students each, that receive zero government support. These schools are entirely paid for by parents with help from various charities. With almost zero budget many of the teachers are poorly trained or simply volunteers. The half life of a teacher in Africa is about 2.5 years. Better trained teachers can almost earn a living and teach longer. This is why AVU targeted science teacher training - in Senegal almost 13,000 school teachers have earned credentials through the use of AVU materials and a coordinated response by their ministry of education.

Q: What is working and what is not?
A: If like Senegal you can get all the ducks to line up - good materials, teachers to be trained, school encouragement, channels of communication, professors, government policy things can work wonderfully. It is not always possible to get all the ducks to line up.

Q: Is education directly linked to the Government ie. the need for strong Government support or should it be a public/private partnership?
A: It varies. Some countries considered economic drivers nowadays started from a low point in their history: Taiwan, for example; Singapore. Their governments invested in education and despite having few natural resources they forged ahead.

Q: So what is preventing many African countries?
A: political chaos, corruption, geography, infrastructure, lack of human capacity, basic food, and health needs, and urban/rural divides.

Look at how many people live in Singapore and the size of the city. Very easy to build infrastructure there. Also Singapore is almost an ethnic monoculture so very easy to have strong government and enforce cohesive policy. I think it's Gambia that has been very successful - but it is relatively small like Singapore. Much of Africa is still fragmented by competing tribal cultures, and threats of Islamic extremists. In NE Nigeria, schools, students, health clinics, and even inoculation teams have been targeted by Islamic terrorists. There are probably about 2 million Somalis in Kenya, half of them recent refugees, and probably half of those undocumented - there are groups that benefit from creating and propagating such instabilities, and this distracts from investment in schools and growing the economy. In NW Kenya there are tribes that continue to raid one another’s cattle, and push them off settled land - this has been the way of life for several hundred years.
APPENDIX C – QUESTIONNAIRES

In Southern Malawi a Boarding School for Girls called Namalomba, that also has male day students, is experimenting with e readers in the classroom. I was unable to skype or speak to the students and teachers but I sent some questionnaires for them to fill in. Here is a random selection from some of them:

- Name: **ALINETI MATAYA**
- Form: 1A
- Age: 12
- Which part of Malawi do you come from: South
- Favorite subjects to study at school: English, Biology, Math, Chichewa, Physical Science.
- When do you use the e reader? Which classes?: During lessons and during studies-prep periods
- When is it most useful? In which classes is it least useful?: when I am want to read during prep periods
- Do you share the e reader with one other student or two or more in the classroom?: Yes
- Do you use the e reader outside the classroom and in the dorm?: Yes
- How many students are there in your classes?: 54
- Have you found physically using the e reader easy?: I do not know how to switch off
- Do you experiment with all its functions?: No
- Do you own a cell phone?: No
- There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added? No, lack of time to read the novels
- Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, I manage to find answers of some questions and improve spoken as well as written English
• If you could change anything about your education, what would it be? ; To be a good example in education-role model

• Name: ADAM DAILESS
• Form: 3
• Age: 19
• Which part of Malawi do you come from: South
• Favorite subjects to study at school: English, Biology, Math, Geography, Physical Science.
• When do you use the e reader? Which classes?: During lessons and after classes in Form 3

• When is it most useful? In which classes is it least useful?: During my free time, all classes need the e-readers
• Do you share the e reader with one other student or two or more in the classroom?: Yes
• Do you use the e reader outside the classroom and in the dorm?: Yes
• How many students are there in your classes?: 75
• Have you found physically using the e readers? No
• Do you experiment with all its functions?: Yes
• Do you own a cell phone?: No
• There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added?: No! because of not having enough time to read novels
• Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, I have improved my performance
• If you could change anything about your education, what would it be?: to work extra hard in my studies so that I can perform much better in school
• Name: DOROTHY CHUNGA
• Form: 2
• Age: 14
• Which part of Malawi do you come from: South
• Favorite subjects to study at school: English, Physical Science, Math
• When do you use the e reader? Which classes?: Mostly after classes
• When is it most useful? In which classes is it least useful?: when learning in class
• Do you share the e reader with one other student or two or more in the classroom?: Yes
• Do you use the e reader outside the classroom and in the dorm?: Yes
• How many students are there in your classes?: 54
• Have you found physically using the e reader easy?: not necessary difficult
• Do you experiment with all its functions?: No
• Do you own a cell phone?: No
• There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added?: Yes we can by Barak Obama and I would like literature books to be added
• Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, because some books do not enough information and there is a lot that we can read
• If you could change anything about your education, what would it be?: To be more serious with studies and become one of the successful students

• Name: CHIMWEMWE MASONA
• Form: 4
• Age: 18
• Which part of Malawi do you come from: South
Favorite subjects to study at school: English, Bible Knowledge, Chichewa.

When do you use the e reader? Which classes?: During lessons and after classes in Form 4

When is it most useful? In which classes is it least useful?: During my free time, all classes need the e-readers

Do you share the e reader with one other student or two or more in the classroom?: Yes

Do you use the e reader outside the classroom and in the dorm?: Yes

How many students are there in your classes?: 42

Have you found physically using the e readers?: No

Do you experiment with all its functions?: Yes

do you own a cell phone?: Yes

there is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added?: No! I have enough time and there is need to add Geography and Social Studies

Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, I get adequate information from the e-readers in addition to increasing number of books/library

If you could change anything about your education, what would it be?: Need to work extra hard read more.

Name: HALIMA YUNUSU

Form: 3

Age: 16

Which part of Malawi do you come from: South

Favorite subjects to study at school: English, Biology, Math, Geography, Physical Science, Chichewa and History
• When do you use the e reader? Which classes?: During classes and during prep periods
• When is it most useful? In which classes is it least useful?: During free time, all classes need the e-readers
• Do you share the e reader with one other student or two or more in the classroom?: Yes
• Do you use the e reader outside the classroom and in the dorm?: Yes
• How many students are there in your classes? 75
• Have you found physically using the e readers? Yes, how to change the font size of diagrams?
• Do you experiment with all its functions?: Yes
• Do you own a cell phone?: No
• There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added?: Yes! ‘Yes we can’ by Barak Obama. Geography and History books should be added
• Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, to get books that are not available in the library
• If you could change anything about your education, what would it be?: To have more of these e-readers for every to access them

• Name: **YAMIKANI BANDA**
• Form: 2
• Age: 17
• Which part of Malawi do you come from: Central
• Favorite subjects to study at school: English, Biology, Math, Geography, Physical Science
• When do you use the e reader? Which classes?: During lessons
• When is it most useful? In which classes is it least useful?: when I am not in class
• Do you share the e reader with one other student or two or more in the classroom?: Yes
• Do you use the e reader outside the classroom and in the dorm?: Yes
• How many students are there in your classes? 54
• Have you found physically using the e reader easy?: some e-readers have voice which I am not aware how to control
• Do you experiment with all its functions?: No
• Do you own a cell phone?: No
• There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added?: Yes, ‘Fantastic Mr. Fox’ by Roald Dahl’ some books on social studies
• Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, because this has added shortage of books in the library and accessibility of books that may have taken by other students
• If you could change anything about your education, what would it be? ; To be a good example in education-role model

• Name: PRISCA MATOLA
• Form: 1B
• Age: 14
• Which part of Malawi do you come from: South
• Favorite subjects to study at school: English, Biology, Math, history, Physical Science.
• When do you use the e reader? Which classes?: During studies-prep periods after classes
• When is it most useful? In which classes is it least useful?: when I am want to read during prep periods, all classes need the e-readers
• Do you share the e reader with one other student or two or more in the classroom?: Yes
• Do you use the e reader outside the classroom and in the dorm?: Yes
• How many students are there in your classes?: 52
• Have you found physically using the e reader easy?: I do not know how to switch off
• Do you experiment with all its functions?: No
• Do you own a cell phone?: No
• There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added? Yes, I read ‘Magic Tree House
• Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, I have known a lot in Biology and some vocabulary using the dictionary
• If you could change anything about your education, what would it be?; To be a good example in education-role model

• **Name: SALOME PAUL**
• Form: 2
• Age: 16
• Which part of Malawi do you come from: South
• Favorite subjects to study at school: English, Biology, Math, Geography, Physical Science, Social Studies
• When do you use the e reader? Which classes?: During lessons and during studies-prep periods
• When is it most useful? In which classes is it least useful?: when I am want to read during prep periods
• Do you share the e reader with one other student or two or more in the classroom?: Yes
• Do you use the e reader outside the classroom and in the dorm?: Yes
• How many students are there in your classes?: 54
• Have you found physically using the e reader easy? I do not know how to make it speak
• Do you experiment with all its functions? No
• Do you own a cell phone?: Yes
• There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added? No, some books on social studies and bible knowledge should be added
• Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, I manage to discover some points that might be omitted during lessons
• If you could change anything about your education, what would it be?: To be a good example in education-role model

• Name: EMMIE THOM
• Form: 4
• Age: 17
• Which part of Malawi do you come from?: South
• Favorite subjects to study at school: English, Biology, Math, Chichewa, Geography and Social Studies
• When do you use the e reader? Which classes?: During lessons and after classes in Form 4
• When is it most useful? In which classes is it least useful?: During my free time, all classes need the e-readers
• Do you share the e reader with one other student or two or more in the classroom?: Yes
• Do you use the e reader outside the classroom and in the dorm?: Yes
• How many students are there in your classes?: 42
• Have you found physically using the e readers? No
• Do you experiment with all its functions?: Yes
• Do you own a cell phone?: No
There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added? :No! I have enough time and there is need to include books in social studies and Chichewa.

Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, I get information that cannot be found in other books/library.

If you could change anything about your education, what would it be?: to work extra hard in my studies and have more lady teachers.

Name: TIME JAMES
Form: 3
Age: 20
Which part of Malawi do you come from: South
Favorite subjects to study at school: English, Biology, Math, Geography Physical Science.
When do you use the e reader? Which classes?: During classes and after classes-form 3
When is it most useful? In which classes is it least useful?: During my free time, all classes need the e-readers.
Do you share the e reader with one other student or two or more in the classroom?: Yes.
Do you use the e reader outside the classroom and in the dorm?: Yes.
How many students are there in your classes?: 75.
Have you found physically using the e readers? Yes, how to adjust font size.
Do you experiment with all its functions?: No.
Do you own a cell phone?: No.
There is reading material/novels on the e reader. Have you read some of them? What did you enjoy most? If you did not, what was the reason? Not enough time or you did not like the choice of books? Which books would you like to see added? Yes! ‘Kwame Nkrumah’ Geography and History books should be added.
Do you think having e readers in the classroom have improved your education? If they have, in what way?: Yes, I get information from the e-readers on those books that are not available in the school library

From Alfred Magumbala – Principal
What is the benefit of the e readers? Has relieved the school of the burden of procuring a lot of books every year, which do not last long. The e-readers are handy, durable and convenient. (mobile library)
In which subjects does it work best? English, Sciences and Mathematics
In which subjects is it less useful? History, Geography and in Social & Development studies
Any comments about the content that is loaded on the devices? Need to include more information regarding social science subjects
Any reading material/novels you would hope to have in the future? English literature books, that is both European and African Novels
Do you find them easy to operate? Very easy
Have you noticed any differences in performance with the students who use them regularly? Yes, there is great improvement. Hence the e-readers have cultivated the reading culture in learners which was dying, as this a modernized device.
Now that you have had them for nine months or so, do they feel very familiar? Yes, everyone would like to have an e-reader whenever a teacher is not available
Are they useful in supplementing your existing books? Very useful since they contain information which is relevant to their studies.
Do some students perform better than others with them and if so, why? Yes, because those that have interest in reading explore more information that may not be available in some books
I know about the earlier problems with the charging but are there any other problems you would like to share? No
Do you have a computer (s) at school now? No
Do you have a computer at home? Yes
From teacher Henry Malunga
What is the benefit of the e readers? They have brought curiosity and interest in reading
In which subjects does it work the best? Physical Science, Biology, Mathematics, English
In which subjects is it less useful? Chichewa, Social Sciences subjects
Any comments about the content that is loaded on the devices? Relevant
Any reading material/novels you would hope to have in the future? Social science subjects and English Literature.
Do you find them easy to operate? Yes.
Have you noticed any differences in performance with the students who use them regularly? Yes, there is improvement especially in those that read e-readers.
Now that you have had them for nine months or so, do they feel very familiar? Yes.
Are they useful in supplementing your existing books? Yes, because assignments are easily done using the e-readers.
Do some students perform better than others with them and if so, why? Yes, they are rich in knowledge.
I know about the earlier problems with the charging but are there any other problems you would like to share? No.
Do you have a computer (s) at school now? Is it for the office only or can students use it? No.
Do you have a computer at home? No.

From teacher Samuel Mkuli
What is the benefit of the e readers? They provide essential information about school curriculum.
In which subjects does it work the best? Biology, Mathematics, English.
In which subjects is it less useful? Chichewa, Social studies, Geography, History, Bible Knowledge.
Any comments about the content that is loaded on the devices? Relevant to curriculum.
Any reading material/novels you would hope to have in the future? Social science subjects and English Literature.
Do you find them easy to operate? Yes. 
Have you noticed any differences in performance with the students who use them regularly? Yes, there is improvement in those that read e-readers. 
Now that you have had them for nine months or so, do they feel very familiar? Very familiar. 
Are they useful in supplementing your existing books? Yes, because they ease congestion in the library. 
Do some students perform better than others with them and if so, why? Yes, because they are rich in information. 
I know about the earlier problems with the charging but are there any other problems you would like to share? No. 
Do you have a computer (s) at school now? Is it for the office only or can students use it? No. 
Do you have a computer at home? No.

**Interview with Priscilla Agyapong, Student from Ghana who attends Princeton University in the USA**

Q: Where did you go to school? 
A: I went to elementary and middle school in Ghana - the basic education of K through nine. In 2007 the Government made public school free and this helped swell the enrollment numbers.

Q: What were the challenges with the curriculum? 
A: Literature. Just being able to read. There was little time devoted to reading for enjoyment or finding additional books to read. We did have some African literature at school - Chinua Achebe, of course, and others, but were not given the time to read. In contrast to other schools (mine was private) our library was quite well stocked.

Q: You went through the Ghanaian school system and are now at the Woodrow Wilson School at Princeton University. Are your friends in Ghana as technologically savvy as you? 
A: People of my age in Ghana, particularly in the urban areas, are up-to-speed. Facebook, twitter, all kinds of social media. You have to have money though as the internet is through a phone and is pre-paid. So people of my parent's generation are not on social media at all.
In fact I don't think Ghana was really computerized until about 2000. My father had the advantage of being in an office but, as it turned out, his secretary did all the correspondence and so was probably better equipped than he was with computers.

Q: What are some of the issues holding back Ghana in this new global economy?
A: Although we have teacher training colleges, there is still not enough emphasis on education. Curriculums are outdated. We need teaching methods to change. We did have a computer lab at my school but that is unusual. The teachers did not make an effort for us to learn computer skills and instead preferred that we played games on it.

Q: Do you see any profound gender issues?
A: I was lucky and many people I grew up with ended up going to international schools and then on to universities abroad. One issue is that there are a lot of students coming out of Ghanaian colleges with rather mediocre liberal arts degrees. One really interesting school is the Ashesi college. It is innovative and has a different approach to the use of technology.

Q: I assume that mobile phones are everywhere?
A: Yes, everywhere. Also there are lots of mobile phone shops now to support them. We tend to like the Samsung, Nochia i phones. There are cheaper alternatives from China but in Ghana they are not as popular. I guess we are rather brand conscious!