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Mobile Learning in Africa

Texting the Way to Distance Learning

Mobile learning in Africa: Texting the way to distance learning

Elearning in Africa – With an education reform to a "Harvard MBA like" education level

By

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Content

1 - Texting the way to a revolution: education in Sub-Sahara Africa.

Mobile learning is increasingly seen as an essential tool in improving learning opportunities in Sub-Sahara Africa. It is the long-range missile in education technology's growing armoury. For many reasons, the infrastructure and accessibility of traditional education are often inadequate. Schools are overcrowded and under-resourced, and teachers lack essential training. Despite attempts at improving the system, retention of both pupils and teachers is low, and learning outcomes are poor. Education is essential for economic development, innovation and growth. But it can also be expensive and hard to get access to.

Africa has a young population. Approximately 50 percent of the populace are under 15, and there are around 200 million young people between the ages of 15 and 24. Added to this, Sub-Sahara Africa is home to some of the world's fastest growing economies. These young people will be the driving force behind sustainable growth across the continent. But, an unskilled and uneducated workforce is a stumbling block to both further growth, and to maintaining it. With this in mind, it is more important than ever to invest in education and training. For the area to maximise the potential of its economic growth, it needs to expand educational opportunities and cut its price. This is where the possibilities provided by the advancements in edtech come into play.

M-learning - what is it?
The definition of m-learning, and its difference from e-learning, is not well-defined. It can mean different things according to its application. In general, e-learning is rooted on expensive computers and internet access, often a problem in Africa; and m-learning is based on SMS and the simple mobile phone. The rise in general mobile phone use means many Africans are now able to directly access learning applications. Text messages enable the delivery of training to people living in remote areas and areas with a weak educational infrastructure. This is important; education standards are directly linked with increasing innovation and wealth.

SMS support in school.
The interactive nature of mobile technology means it can offer support and back-up for students and teachers in school. Information can be broken down into small pieces and sent as a regular text message, helping teachers deliver the curriculum. Or messages can be sent straight to the students. Both teachers and students can interact with their peers via messages, helping them to feel supported and to stay motivated. Importantly, this form of m-learning is often a free service. With mobile text packages becoming more and more affordable it means learning should not incur extra costs. Social networks can also be accessed for sharing lessons and for peer support. This should lead to better retention of students and staff and better learning outcomes. Providers of SMS based learning are Eneza Education in Kenya, and Rethink Education and Obami, both in South Africa.

Texts to aid exam preparations.
The nature of m-learning makes it suitable for exam preparation. Bite sized revision aids can be texted to students, enabling learning to happen, even in small windows of opportunity. A text can be quickly read on a break at work or when on the way to somewhere. They can also be stored and revisited as a useful revision tool. Once

again, many companies do not charge for this service and with bundled texts, this form of mobile learning should not incur the student any extra costs. These services can be accessed from Nigeria's Prepclass.com.ng, Ghana's ecampus.camp and Togo's Okpabac.

Online courses for university students.
MOOC, Massive Open Online Courses, move education back into the realm of e-learning. The availability of smartphones makes it the most sophisticated, and expensive, form of mobile learning. MOOC delivery requires internet access and the ability to download large amounts of data. Access to a PC, Notebook or a smartphone is essential. These online courses can offer support during current university studies as well as allowing access to other topics.

MOOC also offer a possible alternative to traditional university study in Sub-Sahara Africa, and many universities have seen the benefit of this. They can deliver a course to more students and advancements in edtech mean there can be direct interaction with tutors and access to online resources. They may also appeal to students who might not have considered or been able to access college or university before.

Although MOOC opens up a wealth of learning potential, it also raises the issue of cost; whether it is too expensive for students? Smartphones and computers are still luxury items for many, and data can be costly. In addition, some of the courses carry a cost for their services. African online course providers are Kotivu.ng (Nigeria), Chalkboard Education (Ghana), Dapt.io (South Africa), and Samaskull (Senegal). However, there are also global edtech providers offering online courses for university students: Udemy, Coursera and Ed2go are all USA based.

SMS learning - how to spread the message?
After reviewing mobile learning, the United Nations Educational, Scientific and Cultural Organization, UNESCO, concluded that it held "significant potential for resolving the region's educational challenges." And the continuous developments in edtech mean companies now offer a range of flexible and effective mobile learning opportunities in Sub-Sahara Africa. However, the challenge is how to familiarise students, adult learners and teachers with these possibilities. The website, apps-for-learning.com, provides a useful guide. It presents an overview of the market and allows comparisons between the apps offered by both global and regional African e-learning and m-learning providers.

2 - The power of M-learning in East Africa

What is the potential for e-learning via smartphones via online courses such as MOOC and other mobile based edtech solutions (collectively known as m-learning strategies) for East Africa? Home to key mobile phone using economies such as Kenya and Egypt, East Africa has great potential to start off with. But, how might mobile based learning change the educational landscape of East Africa? East Africa is a varied region of Africa, comprising some booming economies and others that are struggling, some of Africa's top economies and some countries that are classed as very low income. So, one key question to ask here is whether it is advisable (or even feasible) to implement a region wide solution for all of East Africa or to take things on a country by country basis.

Mobile phone use in East Africa

Globally, more and more people are accessing the internet through their smartphones and other mobile and touch screen devices, preferring the convenience and flexibility that this provides. Obviously, this has implications for m-learning too: as populations become more and more au fait with app based technology and mobile sites, people can learn and gain qualifications wherever they are using e-learning technologies. Smartphone usage is climbing by around 50 percentage points a year at the moment in both the Middle East and Africa, and Sub-Sahara Africa (including East Africa) is a growing market.

In terms of East Africa in particular, the subscriber base of mobile phone users has grown by 21% in recent years. In addition, the East African mobile phone provider OneM has (in 2016) developed technology that enables even mobile phone users who do not have smartphones to access the internet (for example, pages such as Wikipedia) for a small fee. So, the future definitely looks very promising for the world of e-learning and online courses such as MOOC in Sub-Sahara Africa.

Integrating m-learning with the existing educational infrastructure in East Africa

Access to traditional classroom style education has been improving in East Africa over the past few decades, as data collection from UNESCO shows. Nevertheless, it is still the case that only around half of school age children actually attend school in several East African countries. This is reflected in literacy rates. In Madagascar, for example, UNESCO found that the overall literacy rate amid school age children was still only 65%. On the other hand, in the Seychelles, school attendance has been very high over the past couple of decades with over 99% of children consistently in school and literacy rates of over 99% as well.

Thus, it is clear that whilst some East African nations are very much in need of an additional boost to their education infrastructure, in others, this is not the case. In countries such as Madagascar, Tanzania and Uganda, for example, factors such as child labour, child marriage, poverty and poor educational facilities mean that very few children attend primary level education - let alone secondary education. Here, perhaps remote learning would help to boost literacy levels as children and adults could both learn at home.

The future of m-learning in East Africa

In many ways, it is difficult to discuss the future of m-learning in East Africa as a whole as this region of the continent is so varied.

As we have seen, we have Kenya on the one hand which is home to several thriving tertiary education institutions such as Kenyatta University and Mount Kenya University. On the other hand, some rural areas of Uganda have literacy levels that are well below the half way mark.

Thus, it seems that edtech will need to be adapted to suit the particular location. However, the growing trend of mobile phone usage in East Africa as a whole looks very positive. So, it is definitely safe to say that mobile platform based e-learning can be a very useful feature of the East African educational economy. However, as the countries in this region differ so widely from each other in terms of their educational infrastructure, the sophistication of their knowledge based economies and their school attendance and literacy levels, there will no doubt need to be adjustments made.

3 - M-learning in Tanzania: Huge Potential for Change

With wealth increasing in Sub-Sahara Africa, now is most definitely the time to explore the potential for edtech to revolutionise e-learning in this region of the continent. This article explains some of the implications of recent studies and statistics relation to edtech in Tanzania, and formulates some strategies for implementing m-learning technologies in this country.

Education infrastructure in Tanzania

Tanzania has a well established education infrastructure, in terms of both its secondary and its tertiary institutions. What is more, student bodies are increasing in numbers. The University of Dar es Salaam, for example, which is one of the 30 public universities in the country, had a student body of just 2, 000 back in 1991. Today, that number has increased more than tenfold to around 15, 000 students. The story is similar across the Tanzanian education system. What is also notable about this university, however, is its committment to e-learning.

In fact, Dar es Salaam university has just opened an 'Open and Distance Learing Centre' around 80 km from the main campus. The purpose of this centre is to provide opportunities for remote e-learning, for instance via online courses and technologies such as MOOC. It is safe to say that this adaptability, this willingness to take part in the m-learning revolution, has contributed substantially to the continued success of this university. Crucially the Open and Distance Learning Centre is used not only for remote learning for people who cannot reach the main campus, but also for self-learning for people who are enrolled in the main campus. This demonstrates the flexibility and versatility of edtech solutions.

Connectivity rates in Tanzania: potential for success

Mobile phone and satellite coverage is already increasing in Tanzania, as it is through much of Sub-Sahara Africa. The laying down of the Seacom fibre optic cable along the east coast of Africa, moreover, will also help to improve internet access throughout the country. Though only around 6% of the world's smartphone users (a study from the World Bank shows) are situated in Africa, that number is increasing all the time. That means that the foundations for m-learning and other forms of online learning ought to be laid right now, so that the online educational infrastructure will be ready to use as more and more young Tanzanians feel the need to do so. Over the next few years, more and more regions of Tanzania will get connected to the Seacom fire optic cable and this will open up more and more opportunities for taking part in MOOC and other edtech.

E-learning: driving economic development

As Africans living in very rural areas continue to struggle to afford smartphones, many commentators suggest that e-learning initiatives ought not to be implemented until the economy has developed sufficiently in these remote areas to enable populations to buy the technology that they need in order to take part in online courses. However, I suggest that there is another way to think about this matter - i.e. by reversing the factors of economic development and m-learning technology. Particularly with respect to Tanzania, it is the case that implementing new technologies for remote learning right now will actually help to stimulate positive economic development. So, rather than waiting for economic development to happen

before we can start the m-learning revolution in Tanzania, we should implement mobile learning right now so that (on the contrary), the economy will start to pick up.

Summary of the potential for mobile learning in Tanzania

This overview of mobile learning in Tanzania has produced two key conclusions. Firstly, existing education infrastructure in the country, particularly at the tertiary level, is already starting to integrate e-learning with its more traditional pedagogical strategies. Secondly, online courses and other remote learning opportunities can actually drive positive economic development in this country rather than simply rely on it. This suggests that Tanzania is a country whose population is ready for mobile learning, increasingly savvy with MOOC and other educational technology, and ready to use new pedagogical technologies to make a positive difference in the economy of both Tanzania and of the region of Sub-Sahara Africa as a whole.

4 - How Rwanda's Education Technology Penetration Measures Up

Introduction Rwanda

Rwanda is a small country in Eastern Africa, near but not a part of the Horn of Africa. In the 1990s it suffered from the effects of a civil war involving genocide, but like many countries following a war, it has holistically made attempts to recover.

One form Rwanda's recovery manifests in is improving education for its people: President Paul Kagame has allocated about 20% of the national budget to education.

This, combined with Rwanda's desire to modernize and improve in other areas, has resulted in its synergistic adoption of edtech such as online courses, even MOOC (massive open online courses).

Improvement of education system

The goal of the President's plan is primarily to improve the education level of most citizens so they can get high-income jobs. If national outcomes are any indication this plan is working well, with Rwanda steadily on course to become a middle income country by 2020.

Part of the reason the government's education efforts have been so effective is because of ICT, its plan for information and communications technology. This plan, together with the desire to increase accessibility of education, has resulted in a surge in the use of e-learning in Rwanda.

E-learning and online education
The key benefit is that physical inaccessibility is not a large obstacle when communications technology is used to bridge the gap between prospective students and teachers.

This means many different areas of Rwanda can access e-learning, particularly m-learning, which makes use of ultra-portable devices such as tablets to deliver access to education to all areas of Rwanda.

Rwanda also benefits from East Africa as a whole becoming more tech-savvy. The M-Pesa service, which provides access to digital financial transactions in its origin country of Kenya and many others, is one example of Africa's tech growth.

Thus, with its neighbors also enjoying technological growth, Rwanda is uniquely poised to take advantage of edtech, and is definitely doing so: online courses are available for a wide variety of purposes, with the variety of courses expanding alongside technology in Rwanda and Africa as a whole.

The University of Rwanda has in fact integrated an e-learning module into its supply, signalling that as time goes on, e-learning and m-learning will become a significant part of university education in Rwanda as well.

Currently, the largest roadblock to education in Rwanda is a lack of teacher training. Teachers are not exceptionally common in Rwanda, and teachers qualified to provide

m-learning are not common even in certain high-income countries.

Benefits of e-learning market in Rwanda

  This makes Rwanda an excellent choice for private education businesses, or individual teachers willing to learn the necessary skills. Educators who come to Rwanda are well-supported by the government, and those from first-world countries in particular bring skillsets that Rwanda needs in its time of educational growth.

Due to the online nature of edtech, some companies can even provide education services to Rwanda without much or any physical relocation. For example, a company that provides MOOCs in the US can take steps to do the same in Rwanda, which will ultimately benefit both company and country.

Even when not directly providing their own services to Rwanda and its citizens, educators can profit from providing necessary knowledge to educators in Rwanda. For example, a small business that helps manage exam results in the United Kingdom could potentially aid a Rwandan online school in learning to perform exam preparations.

And once again, it's important to keep in mind that there is a huge student base in Rwanda. Online courses are increasingly able to reach citizens in the Rwandan frontier who previously had absolute no Internet access. This has naturally resulted in increasing demand for all manner of education-related services.

Future prospects of edtech in Rwanda

In other words, with Rwanda, we are looking at a country where m-learning is bridging the gap between citizens and paying jobs, and where edtech allows knowledge to cross continents and empower a growing country. And due to the government's excellent support for online learning, educators interested in Rwanda are generally looking at a very, very good ROI.

Overall, Rwanda is doing very well for itself, particularly in education but also in areas such as health care, and edtech is a major stepping stone to improving life for many of Rwanda's citizens, from the bottom up. Both for profit and for humanitarian reasons, online course providers and other education businesses would do well to look at their options in Rwanda.

5 - Quick guide: The Potential for M-Learning in Nigeria

Learning through mobile phones is a revolutionary new type of edtech that enables people to learn remotely. M-learning is particularly useful in countries where literacy rates are low, and where school children struggle to complete their education - whether due to poor school facilities, the prevalence of child labour or poor transport infrastructure making it hard for children physically to reach the classroom. Through their mobile phones, learners can engage with all kinds of courses, such as adult education courses, exam revision, diplomas, language qualifications and MOOC.

Thus, m-learning has great potential for improving a population's access to education in any region of the world. In West Africa and Sub-Sahara Africa in particular, mobile learning and edtech offers some very exciting possibilities.

But what about the specific case of Nigeria? Knowing whether or not these types of technology will have a positive impact on a given country will depend on many factors, including the population's mobile phone use rates, existing educational facilities, the economic situation of the country and the quality of telecommunications infrastructure. So, let's look more closely at each of these factors for Nigeria.

The Current Situation of m-learning

Nigeria has a well-established and wide ranging mobile and satellite phone network, especially when compared to other countries in the region of Sub-Sahara Africa. With its telecommunications industry having recently been deregulated, Nigeria offers both many new opportunities and many new challenges for mobile and e-learning. Mobile phone penetration rates in the country are currently at 30%, which of course will limit the numbers of communities that can access online courses and other e-learning materials through their mobile phones. However, these penetration rates are forecasted to improve over the coming years, with the number of mobile phone users in Nigeria predicted to exceed 23 million by 2019. Those people who do have smartphones are generally au fait with a wide range of smartphone based technology, including apps.

In terms of the affordability of mobile based e-learning technology, this will differ for different sections of society. Nigeria has one of highest economic growth rates in the world (averaging at 7.4%) and yet it has poverty rates that are very high. Around a third of the Nigerian population is defined as living in poverty, with over 100 million people currently attempting to get by on less than $1 every day. Elites tend to be concentrated in urban areas, and it is in urban areas that the best mobile phone coverage, and highest rates of mobile phone use, are concentrated. As such, new solutions for e-learning will need to be found for the impoverished populations of Nigeria (i.e. those people who arguably stand to gain the most from the introduction of m-learning initiatives) and especially those who live in areas with poor mobile phone penetration rates.

In terms of its education system, Nigeria has what is known as a 6-3-3-4 system which means that students spend 6 years at primary school, 3 years each at junior and senior secondary school, and 4 years at university. Nigeria's education is well established and it has some of Africa's best universities including the University of Lagos, the University of Nigeria and the University of Benin.

Overview of the Future of m-learning in Nigeria

MOOC, online courses and other edtech to be accessed through mobile phones has great potential in Nigeria. One way that it can be used is to complement the existing education system. Nigeria's well established universities, for example, could implement online learning opportunities for remote learners. However, in terms of increasing literacy and education rates among Nigeria's poorest populations, there are several challenges to overcome. The first is the low prevalence of smartphone use among many Nigerians, a third of whom are (as we have seen) living in poverty. The second is the low rate of mobile phone penetration in the country. Economic solutions are needed alongside eductional ones in order to meet these people's needs. However, statistical forecasts suggest that mobile phone use in Nigeria is going to continue to increase over the next few years, thus providing more and more opportunities for mobile based learning to be implemented in this country.

6 M-Learning- A Powerful Tool For Kenya

   M-learning, or 'Mobile Learning', has become increasingly popular in recent years with students participating in courses from all around the globe. The platform allows students to partake in courses offered by top universities and gain recognized qualifications through distance learning. Sub-Sahara Africa has come a long way in terms of development and education with more residents gaining a level of education which was almost unattainable in the past.

What is M-learning and E-learning?
M-learning means to take part in online courses through mobile devices, E-learning is a general term for all online courses that are available via electronic devices such as computers. Both of these revolutionary methods of education are imperative in the development of education in less developed societies with a lack of educational infrastructure. With M-learning or E-learning, individuals from such communities with access to the internet can sign up to a MOOC, MOOC stands for Massive Open Online Course, these are flexible courses offered by well-established universities. Other types of E-learning and distance learning courses are available including those recognised at Bachelors and Masters level.

The Edtech Sector And Mobile Penetration
Edtech is a growing sector that assists those from less developed communities with access to mobile devices and apps gain an education with relative ease. Areas like Sub-Sahara Africa can benefit greatly from Edtech advances due to its rapidly expanding mobile economy. By 2020 it is estimated that 540 million smartphones will be used in Sub-Sahara Africa, equating to a growth of approximately 380 million when compared to statistics gathered in the latter part of 2015. Mobile penetration is predicted to rise exponentially with the penetration rate of connections reaching 93 percent by the year 2020.

The mobile ecosystem in the area is expected to have created 2.7 million jobs by 2020, which is a huge progression in areas that have been subject to deprivation for many years. It is also predicted that 20 billion dollars will be contributed to public funding as a result of the success of the mobile ecosystem. Between 2014 and 2015 there were 15 new 4G networks launched including in areas that had no longer had access to this type of connection before, this included Kenya, Rwanda, and Ethiopia.

Apps & The Population
Since the increase in connections, the popularity of apps has risen. Kenya is seeing a huge rise in download figures in regards to mobile devices. The Sub-Sahara is gaining significant interest from app developers of all kinds with huge corporations making momentous penetrations in the market. Mobile is currently the biggest platform providing internet access to Sub-Saharan populations.

Affordability - Financial & Social Inclusion
Although there has been a decline in Application Service Providers (ASP), the effect that this has had on affordability of mobile devices has been positive. In 2015 a Chinese company introduced smartphones into Malawi retailing at approximately 20 US dollars. The phones had the capability of providing residents with video calling, and internet browsing, a huge step in assisting the country to contribute to the mobile market. Poorer countries are still slightly more behind in the mobile market than countries with a larger middle-class population. This is due to the taxation applied to

mobile devices and the pay gap between men and women in these areas. However, with an increase in residents with access to the internet, online education is still becoming much more available. There are a number of top universities offering courses free of charge, although these courses tend not to be recognised qualifications, they do provide knowledge and education to those in less developed communities. This can not only have an effect of the economic growth of these areas but also educate residents in a way that was previously unattainable.

Although there has been a good level of growth in poorer areas, mobile devices and e-learning would appear to be more affordable in more densely populated areas with a larger middle-class. Secondary and tertiary educational institutions are becoming more technologically advanced in some areas, for example, all public secondary schools in Botswana have internet access which is enabling students to benefit from e-learning in an educational environment.

What Does The Future Hold For M-Learning in Kenya?

Kenya is becoming a very well established and developed nation, with its increase in mobile infrastructure and rising middle class it is probable that M-learning will becoming hugely popular. The middle class in Kenya makes up around 45 percent of the population and is rising each year. The literacy rate in Kenya is estimated at nearly 90 percent of the population. Although this may seem low when compared to more developed societies, it is an excellent figure that would appear to be on the rise. With more individuals participating in all types of learning, the economy and general public wealth should show a steady growth. This will allow more Kenyans to participate in online learning with a higher access to mobile services and overall wealth as a result of growth in the economy.

Online courses when undertaken through distance learning are generally much more affordable than gaining the qualification through campus based learning. Online learning is a fantastic tool for those in the Sub Sahara that wish to educate themselves in a variety of different subjects that lead to professional and fulfilling careers. With the mobile penetration rate showing a positive growth, the future of Kenya in terms of online education seems both plausible and probable.

7 - M-Learning in Ghana, the perfect educational solution?

Ghana is a country that does not have a coherent policy for education infrastructure. At the same time, rising rates of mobile phone use among the population make this country ripe for an m-learning revolution. School infrastructure in Ghana can be very poor, with inadequate ventilation, security features (for example, for laboratory equipment) safety for flooring and other issues. These conditions can make it especially difficult for learners with disabilities either to make it to school in the first place or to learn in comfort once they are there. M-learning is a viable nation wide solution to these defects in Ghana's present education infrastructure. M-Learning has the potential to reach all students in the country through the simple medium of their mobile phones. As a result, it would surmount the difficulties inherent in Ghana's less than perfect current educational infrastructure.

The power of m-learning in Ghana: the current situation

Ghana has one of the best developed mobile phone markets in all of Africa. In fact, most Ghanaians do not only own a mobile, they also prefer to use their mobile instead of using a landline. Most Ghanaians also prefer to access the internet through their mobile phones rather than via a fixed wifi or cable internet system in the home. Though 3G coverage in Ghana is relatively new, this is also growing as well, which again suggests that the future of m-learning in Ghana will be a very positive one. MTN Ghana, Vodafone, Tigo and Airtel are the four largest mobile phone providers in Ghana, with MTN Ghana being by far the biggest provider (having cornered around 50 % of the market). With both affordable pay as you go and sim packages readily available in Ghana, m-learning has the potential to reach the whole of the country's population. Ghana is currently classed as a middle income country, which means that its citizens are usually able to afford items such as mobile phones. In addition, app literacy in Ghana is very prevalent, with exciting new apps for both learning and leisure (like Esoko and RetailTower) being developed in the country every year.

Integrating m-learning with secondary and tertiary educational institutions in Ghana

The secondary education system in Ghana is known as Senior High School, and it can often be supplemented or even (in parts) replaced by m-learning. What is particularly pertinent to know is that ICT is actually part of the 'integrated science' section of the SHS curriculum, which means that new generations of Ghanaians are growing up with the skills that they need to learn via the web. Though the buzz of the classroom environment can be something that benefits learners, as mentioned above, not all schools in Ghana are totally fit for purpose and thus m-learning is a viable alternative to both the SHS curriculum and to TVET (vocational training) curricula that are offered after completion of the SHS.

When it comes to tertiary education, Ghana has 49 private universities and 6 public universities. Many of these institutions are focused around a specific subject, such as Agriculture. E-learning is already well integrated into the curricula of many of Ghana's top universities. For example, the University of Ghana has recently created the KEWL - Knowledge Environment for Web Based Learning - initiative. Many online courses are also available as part of the rise and rise of e-learning in the country. In addition, the edtech phenomenon of MOOC has really been taking off

throughout Ghana and Sub-Sahara Africa. MOOC is an initiative which offers an online course to a large number of people and it is usually free of charge. This initiative is, as may be expected, particularly useful for low income or very poor communities in Sub-Sahara Africa for whom financial factors would otherwise pose a significant barrier to their ability to access education. As a result, mobile learning projects could simply adapt and build on the existing e-learning infrastructure in Ghana's tertiary education system.

Estimation of the future of the power of M-learning in Ghana

The future of the power of m-learning in Ghana looks very bright. This is due to two key factors. Firstly, the existing educational infrastructure is - particularly at the secondary level - often physically and materially inadequate for students to learn successfully. As such, there is a clear problem here that mobile learning could solve. Secondly, Ghana's population is made up of some of Africa's most skilled, savvy and frequent mobile phone users. The ubiquity of mobile phones means that the uptake of m-learning strategies would likely be very high. Add to this the fact that many tertiary education institutions in the country are already using e-learning platforms and other edtech to teach students remotely (for example, through online courses) and the future of m-learning across the country looks very positive indeed.

8 - M-Learning: a fantastic opportunity for Senegal

The use of m-learning - education disseminated and accessed by means of mobile devices such as smartphones - is one exciting potential way to boost the Senegalese education system. Senegal is one of several countries in Sub-Sahara Africa with an education system that is not accessible to all. This is reflected in the statistics relating to the Senegalese education system. Recent UNICEF statistics show, for example, that female literacy in Senegal is as low as 56.2%. Net enrolment in primary school is just over 76% with not all students making it to the end of their primary school studies. When it comes to enrolment in secondary school, the rates are just over 30% for both male and female students. Something needs to be done in order to ensure that literacy rates improve, especially for girls, and that all students get full access to education. Mobile based learning is a powerful edtech tool for solving this problem. Before we can understand the benefits of m learning in Senegal, though, it is crucial to understand why the education infrastructure as it is is not working for all.

The need for m-learning: education infrastructure in Senegal

Several factors impact negatively on the education infrastructure in Senegal. Child labour is a key one, with many children being encouraged by their families to work to earn a living instead of going to school. This is due to high levels of poverty in Senegal, which is classed as one of the main low income countries in Sub-Sahara Africa. Around 37% of children do some form of work. In addition, the shortage of schools throughout the country (and especially in rural areas) means that many children need to walk many miles each day to get to school, which can make the journey to school seem less than worthwhile. Poor sanitation and healthcare can also mean that children miss many days of school, though healthcare initiatives from NGOs and other organisations are seeking to change this by providing vaccinations and treatments free of charge. When it comes to female students, high rates of child marriage also mean that many girls are taken out of school at a young age to stay in their husband's family home instead. As many as 1 in 3 women and girls in Senegal are, or were, married as a child. It is clear, then, that simply introducing a free mobile learning edtech initiative to Senegal (or indeed any online platform such as MOOC), will not solve Senegal's problems with its education system unless it is also accompanied by initiatives that counter poverty, child labour and child marriage.

Is m-learning a viable solution for Senegal?

Mobile learning and e-learning such as MOOC will only work in a given country if citizens of that country have the technology available for them to take advantage of these new online courses and other initiatives. Senegal has a very good telecommunications system, and when it comes to mobile phones in particular, subscribers to mobile phone services increased tenfold between 2005 and 2012 from 1.3 million to 13.3 million. Given that there are roughly 13 million inhabitants in Senegal, this suggests that a large percentage of the population has access to a mobile phone and all of the features that come with it such as educational apps. Nevertheless, in more poverty stricken areas of the country, initiatives providing free mobile phones to anyone who needs one to ensure that m-learning will be for all in Senegal. Interest in e-learning in Senegal has been growing, particularly as more and more cyber cafes spring up in Dakar and more and more institutions start offering online courses based in the country. These e-learning institutions are most usually not universities, but rather language schools or skills based institutions offering diplomas and e-learning experiences often in the short term.

The future of m-learning in Senegal

Something is needed to address the crisis in Senegal's education system, and mobile based learning could well be an important part of that. M learning looks particularly promising when we consider the strengths of the Senegalese telecommunications network. However, it will be vital to integrate any new educational platforms introduced in Senegal with measures to combat the key educational hurdles facing young people including child marriage, child labour, poverty, and a shortage of schools and universities. Only then can mobile based learning truly work for all.

9 - Massive potential for mobile learning in Ivory Coast

M-learning enables mobile phone users to access online courses (including free courses such as MOOC) and gain qualifications remotely via their smartphones. With many experts hailing mobile based learning as the educational technology (edtech) of the future, it falls to us to ask: what are its implications for the Ivory Coast? The education system in the Ivory Coast is certainly ripe for a shake up as statistics paint a worrying picture. Studies from 2000 showed, for example, that only 48.7% of the total population of the country was literate, with literacy rates being lower for females than for males. Child marriage, poverty (and its result, child labour) and poor healthcare means that many children in the Ivory Coast either miss many days of school each year or abrogate their school studies early in order to work or marry. As such, mobile based learning and other e-learning solutions for the Ivory Coast would have to be part of an integrated solution that sought to improve healthcare and to combat child marriage and child labour. Only then can the full potential of m-learning be realised for the people that stand most to benefit from it: i.e. the country's poorer communities.

The education system in Ivory Coast

The education system in this country consists of primary, secondary and tertiary education. However, less than a quarter of primary school leavers go on to secondary school, and only around a quarter of secondary school students actually graduate with the Baccalaureate qualification. Nevertheless, Ivory Coast is notable within Sub-Sahara Africa for its abundance of highly qualified and skilled teachers, so the potential is definitely there for improvement, given the right e-learning technology. When it comes to tertiary education in Ivory Coast, the country has three universities. In the economic capital of Abidjan we have the Université de Cocody, whilst Bouaké is home to the Université de Bouaké and the political capital of Yamoussoukro has the Institut National Polytechnique Félix Houphouët-Boigny. In addition, there are several vocational training colleges in the country (mainly in its two capital cities) and plenty of institutions offering short online courses and short term diplomas online. In this region of Sub-Sahara Africa, then, the infrastructure is there for students to get a good education: what is hampering them is poverty, poor transport networks, child labour, poor healthcare and child marriage. Could m-learning help to provide a solution?

The use of mobile phones in Ivory Coast

Mobile phone usage in Ivory Coast rose from there being 2.2 million cellphone lines in 2005 to 19.8 million in 2012. In 2012, Ivory Coast was named the country that is 49th in the world for mobile phone use, and it could be set to rise through the ranks in the future. In addition, the mobile phone industry is, to date, the third largest in all of West Africa. That means that the industry and the infrastructure is there to disseminate MOOC, e-learning apps and other types of edtech throughout the country. Though around 68% of the country's economy remains devoted to agriculture, the mobile phone industry looks set to grow in future years - in keeping with an overall increase in the country's GDP. Statistics show that as of 2014, there were 8.8 million Orange users in Ivory Coast (Orange being the most popular mobile phone provider there) as well as 8 million subscribers to MTN and over 3 million users of Moov. This looks very promising for the uptake of m-learning in Ivory Coast.

The future of m-learning in Ivory Coast

Ivory Coast can be described as a region that currently has a rather poor success rate with its education system but that does have massive potential. Skilled teachers, educated directly by government departments, and a growing mobile phone network based economy mean that mobile e-learning could well be the learning style of the future for many inhabitants of Ivory Coast. What is crucial, though, is to ensure that any developments in mobile based learning for Ivory Coast happen in tandem with initiatives to tackle child labour (and its cause, poverty), poor healthcare, child marriage for girls and attitudes towards girls that do not see education as a priority for them. These are some of the root causes of the country's low literacy rates, and once these issues are being tackled, the country will have a firm foundation on which to promote new mobile based learning models.

10 - Distance Learning Moves Ever Closer to Ethiopia

Distance learning on computers via the internet, or electronic learning, has been hugely successful in recent years not just in the big cities of Europe and America but also in more remote places such as the Australian outback or sparsely populated areas of sub-Sahara Africa. This is particularly true in Ethiopia where there has been a huge investment in the telecommunication infrastructure in the past decade.

Ethiopian setting

More than 100 Mio people live in Ethiopia; this catapults it to the top of the landlocked countries. Economically, it is one of the rising stars of Africa. Since years, Ethiopia shows steadily high economic growth rates. Socially, the average age of the Ethiopian population is below 18 years. This means there is an extremely strong part of young people. One big challenge is the very high rate of illiterate people. Such, the education of the young people is one of the top priorities. Broad access to education is ensured in the urban areas, whereas the majority of the Ethiopian population lives in rural areas.

The charm of modern edtech via mobile phones is that technology brings education access there where it is needed: rural areas.

Mobile penetration throughout the country is still relatively limited. Whereas, the Ethiopian government's Growth and Transformation Plan is expected to see the number of mobile subscribers rise to 100 million by the year 2020. With the rise in use and popularity of mobile phones and other electronic devices comes the opportunity for a huge percentage of the population to avail of the latest in distance learning techniques: M-learning ("Mobile learning").

The edtech environment in Sub-Sahara Africa

Learning online on computers is nothing new but the new education technology (edtech) of M-learning means that students can now avail of numerous courses on mobile phones, tablets and other hand-held devices. This new edtech brings e-learning to a whole new audience that were previously unable to access distance learning courses due to inadequate internet coverage or just a lack of available computers, which has been a major stumbling block to students in sub-Sahara Africa over the years. A further huge boost to the use of mobile devices for study and recreational purposes is the recent massive increase in the international bandwidth and huge improvements in fibre optic infrastructure. Prices have also dropped dramatically making mobile devices more affordable for more and more people.

M-learning and Massive Open Online Courses

As mobile devices have become faster and more advanced, edtech has raced to keep up with the technology and Massive Open Online Courses (MOOC) are growing both in number and in popularity with students throughout the world. MOOCs provide the user with a choice of thousands of courses from the simplest spelling programmes to university degrees in medicine or electronics. Only introduced in 2008, they are now the accepted standard in Mobile learning and the most popular method of distance learning since 2012.

The biggest advantages of using MOOCs as a means of e-learning are obvious. Courses are available to anyone with a smartphone and internet connection and studying can be done at a time and in a place that suits the student best. Most reputable educational apps will provide interactive support from teachers, regular

grading and advice and the time saved on travel is also a huge advantage. Just as mobile phones have developed rapidly in recent years, so has edtech and, with it, e-learning and the growth of MOOCs.

Advantages of M-learning

Probably the two biggest advantages of M-learning are the time and money saved. No longer is a student tied down to attending a college or school at preset times as distance learning can be availed of at any time in any place. Quite apart from the freedom involved and travel time saved, Massive Open Online Courses are relatively inexpensive compared to formal school, college or university courses and most reputable courses are accompanied by internationally recognised academic diplomas or certificates upon completion.

Future of M-Learning in Ethiopia

As being one of the poorest countries in the world there will be for sure no dramatic rise on mobile based education applications in Ethiopia. The major part of the population can simply not afford such higher education courses. First, basic education has to be established and the economic growth of the last years needs to result in widely spread higher incomes.

Nevertheless, m-learning can be the needed sign of hope at the horizon. According to the World Bank the country's per capita income was 590 USD in 2015. Compared to the investment of 20 USD for a starter online course it is obvious that there is a big gap.

On the other hand, it is evident that there is the need for a substantial improvement of the higher education system in regards of low access hurdles and certified knowledge. Moreover, with a growing economy there should be free means, which can be invested in the education sector.

About the author

Jens Ischebeck is the author of this ebook. He is publisher of the edtech website distance-education-guide-africa.com and the fintech website apps-for-money-transfer.com.

Inspired from the lack of overview about the African edtech (e-learning, m-learning, online courses) market, he addresses this site to African students and lecturers to encourage them to invest in themselves. Although he's situated in Germany, he's passionate about the development of African people and countries. Since many years, he's involved in African projects, in various countries.

His motivation are the many situations where too many young people are confronted with too many access hurdles of the (higher) education system. Given this, he wants to contribute to a better access to education for young people and students in Africa. Because he believes in the strong development of many African countries in the next years.

He invites you to have a look on his websites and to send your questions and remarks: Jens.Ischebeck@distance-education-guide-africa.com! Very much appreciated and most welcome!

Thank you very much for your interest!