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Massive Open Online Courses (MOOCs) and the 'Revolution' in Higher Education: Implications for the African Higher Education⁷

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Abstract:

Massive Open Online Courses (MOOCs) have been around only for less than a decade. In 2011 a pilot course - Introduction to Artificial Intelligence - by Sebastian Thrun and his colleagues at Stanford University gained an incredible success of attracting over 160,000 participants from all over the world. This marked the beginning of a new chapter in the development of higher education - soon a number of MOOC offering initiatives were launched and the popularity of the concept grew wildly. In the consequent years, dozens of top universities of the World opened up for MOOCs and millions of people from all walks of life and all over the world enrolled in the sharply increasing courses offered on such platforms. MOOCs gained coverage by both higher-education-concerned and general media outlets, and soon became a subject of heated debate.

While the subject remains under-researched, MOOCs are largely regarded as 'revolutionizing' the way higher education is perceived and conducted. They have offered the promise that higher education can be accessed by anyone, anywhere, regardless of their socio economic backgrounds or their previous academic and work experiences. They also have epitomized the peer learning approach in higher education where a professor, perhaps along with few colleagues, can offer a course for hundreds of thousands of participants at a time, who mainly learn through cooperating with each other.

There are both advocates and critics of MOOCs as to their contribution to the development of higher education. Often, however, the debate on the pros and cons of MOOCs is framed in general terms referring to the benefits and challenges embedded within their attributes. This paper tries to explore

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the potential implications of this new phenomenon for the African higher education. Considering the multitude of challenges and the pertinent limitation of capacity, the paper suggests what African higher education institutions can do to make the best use of this emerging dynamics.

Key words: Moocs, higher education, revolution, open and distance learning,

1. Introduction

In 2012, during a TED conference about online learning, Daphe Koller (co-founder of Coursera, one of the biggest MOOCs providers) began a passionate speech emphasizing that Higher education (HE) is still an inaccessible privilege for most of the world population, particularly in Africa. To make her point, she mentioned the case of South Africa, where there are “*not enough spots for candidates*”, as a consequence of a University system created during the apartheid period, for an elitist white minority population (Koller, 2012).

Indeed, HE in Africa is facing tremendous challenges and African Higher Education Institutions (HEIs) still lag behind their counterparts in other regions of the world, where HE systems stand in more mature phase of development. HEIs in Africa face challenges such as overcrowded universities, inadequate infrastructures, deterioration of quality in learning environments and brain drainage (Materu, 2007; Mohamedbhai, 2011). Moreover, in the last decades the levels of state funding to African universities was sharply reduced. At the same time, there is an increasing pressure to make universities more accountable for their research and graduate output, both of which should meet demands of the society, following a change of paradigm so recurrent in other parts of the world. Though enrollment has increased in the past decade (which still remains very low compared to developed countries), several indicators such as league tables, GDP invested in Education and R&D, scientific production, and gross enrolment ratio provide evidences that African institutions still have a long and difficult path to run (Akilagpa, 2004; Altbach, 2006; Altbach & Knight, 2007).



In the increasingly borderless and global HE system, African Higher Education Institutions cannot afford to be seen as outliers, they must strive for a role in the new dynamics that will shape the future of HE. This future cannot be projected without having in mind the continuous and unstoppable revolution in information technology.

The Massive Online Open Courses - called simply MOOCs - are the most recent educational trend with extensive highlights in the news (both generalist and HE- focused online journals). In the past few years, MOOCs have shown an unprecedented development. Large hundreds of thousands of students have been enrolling in the free online courses, taught by professors of some leading universities in the world. Having lived only for few years, sufficient evidence does not exist to measuring the actual impact of MOOCs, though more reports are recently emerging showing that the number of providers, involved HEIs, number of courses offered and the volume of participants is increasing remarkably. Therefore, the debate on the theme continues mainly on the web between academics, journalists, researchers, academic commentators, etc.

This paper examines the potential of the MOOCs in affecting the development of the African Higher Education. The paper first introduces the concept of MOOCs in terms of their unique characteristics and history. Then it moves on to exploring the pros and cons of MOOCs to the African HE; and finally offers suggestion as to how the major challenges can be tackled and, specifically, what African HEIs can do to make a good use of MOOCs.

2. What are MOOCs?

It seems that the term '*massive open online courses*' was first used in 2008, by Dave Cormier and Bryan Alexander (Daniel, 2012; Cormier & Siemens, 2010). It is also evident that online education, per se, was not an innovation at that year (as it is not now), actually the Open University in the UK, has been using the internet for distance learning since the mid-1990s. Hence, the so called MOOCs, seem to have introduced, as a distinctive feature, the fact that they were of open and free to access (Daniel, 2012). MOOCs are, in fact, self-descriptive. They refer to the type of courses that are *massive*, because they have no limit for enrollment (in 2012 a course called 'Think Again: How



to Reason and Argue' has enrolled 226,652 participants, though the completion was far less than that); *open* because there are no requirements and costs for enrollment (anyone interested with an internet connection can participate); and *online* because instruction and participation is via the web (OECD, 2015).

MOOCs, according to Sadera (2014, p. 9), can be understood as having the following key features relating to their nature, mode of delivery and weight in formal university education.

- Entirely online/digital
- Free to anyone
- Requires no previous qualifications to study
- No limitation on age or geographical location of students
- Asynchronous – participants study at own pace though there are often marked dates and deadlines
- Communication is via email or discussion forum
- Teaching materials usually consist of short videos, audios, lecture recordings, online quizzes and activities, forums and readings
- Principally uses peer-marking model and/or computer-marked assignment for formative assessment
- Main lecturer(s) supported by a number of facilitators
- Usually not credit bearing
- Certification rewards participation and completion rather than grade
- Current participation analytics suggest that only a proportion of those who register start each course, and then a successively smaller proportion completes each assessment point.
- There are currently low rates of completion.

It is important to understand that MOOCs vary in terms of the educational principles and motivations that their creators inculcate in their developed online courses.



2.1. cMOOCs and xMOOCs

Even though the history of the MOOCs dates of only a few years, there are already two categories of MOOCs (Daniel, 2012). The first, the cMOOCs, may be considered the original MOOCs, since the term MOOCs was used for the first time to describe these first generation MOOCs. It was in Canada that George Siemens and Stephen Downes, created an open online course – Connectivism and Connective Knowledge. The course was originally designed for about 25 fee-paying students at the University of Manitoba. When it was open to the general public for online enrollment, it managed to attract some 2300 students (Cormier & Siemens, 2010).

cMOOCs (“c” is for connectivism) were seen by its creators as a response to a period of overwhelming abundance of information. They aimed to create a dynamic and globally accessible platform, where learners would be able to connect and interact with each other, according to their personal motivations. Hence, students would have a participation in the MOOC that would vary according to their personal expectations and interests, even though they were enrolled in the same formal course. The materials (contents available online) are more than a prescription on what to learn and, instead, they provide a pretext for learners to define their own learning experience. In that way, the educational paths are endless, and the learner is free to decide the amount of effort that he or she puts into the course. That effort is influenced by: first, the contents that they select to explore, and second, the interactions that they make with other learners in the online community that constitutes a massive pool of potential partners (McAuley et al., 2010).

The other category of MOOCs, which arose a few years later, often referred to as xMOOCs (“x” is for extension), are the trendy ones, because, perhaps, they originated from initiatives rooted in prestigious universities, particularly in the United States. The xMOOCs are quite distinct from the cMOOCs, in certain aspects, even though they follow some basic principles, i.e. free access, massive enrollment, and based on online learning. However, their purposes and pedagogical principles seem to be different (Daniel, 2012).



The explosion of the popularity of xMOOCs, to a global scale, took off in 2012 with the establishment of the three most prominent MOOC providers - i.e. Udacity, edX and Coursera - involving dozens of universities offering hundreds of courses to millions of students. Cognizant of this development, the New York Times named 2012 as the "Year of the MOOCs" (Pappano, 2012). This outbreak of the xMOOCs started in 2011, when two professors from Stanford University (Sebastian Thrun and Peter Norvig) tested a free online course on Artificial Intelligence that enrolled 160,000 students. This experience led the authors of the course to create a private for-profit company, Udacity, in 2012. Stanford University was also the source of other major player in the MOOC revolution. Again, two professors from the same University, also from the field of computer sciences, decided to venture in the creation of a spin-off enterprise, Coursera. The third major provider of MOOCs, edX, has considerably different roots from the first two. It began years before 2012, rooted in the MITx, a project that aimed to serve as a testing platform to improve learning supported by technology (Daniel, 2012). Nevertheless, the MITx evolved to edX, which is an initiative from MIT and Harvard University.

2.2. The revenue issue

Although making profit has not been assumed as a priority of the major MOOCs providers (some MOOC providers such as edX and P2PU are entirely non-profit), this is one of the dilemmas that float in the air (Yuan & Powell, 2013). Even dismissing the motive of pure profit, there is still a need for these companies to attract and generate funding to support their ambitious activities. Among the different potential alternatives for generation of revenues are (Daniel, 2012; Young, 2012):

- Certification fees paid by students that complete the MOOCs.
- Payment by companies that want to track students' performance, for recruitment purposes (upon consent of participating students).
- Consultancy services
- Selling MOOCs to HEIs that could use the MOOCs in their own programs, and therefore credit learning that took place using the MOOCs.



- Collaborations with HEIs for the use of MOOCs platforms and technology. In this case universities would be producing online courses for their own students, but would have the technological support of the MOOC provider companies.
- Establishing testing centers. Since one of the controversies associated with the MOOCs is the fact that it is hard to assure that students are not plagiarizing, or being helped. These centers would be created as official testing locations, to assure the fairness of evaluations process (this option includes fees).

Finally, massive enrollment numbers give the MOOCs companies open access to a large global audience (and a large pool of contacts). Hence advertisement might soon be considered another source of revenue. It is also expected that other companies will make a move, either as partners or competitors, to invest in this potential emerging market (Boxall, 2012). But the question that remains is: how the revenue and profit issues will affect the altruistic initial principles of these companies - of educating the world?

2.3. The certification issue

A weakness that has been pointed out frequently about the MOOCs is the fact that the completion rates are considerably low: an overall completion rate of about 15% has been calculated by Jordan as of June 2015. However, it can be argued that even a small %age completion rate is substantial, considering the very large volume of participants.

Perhaps it would be more important to discuss why the dropout rates are so high. Apart from the obvious reasons related with the free enrollment and consequent low level of obligation of students to finish their course, a shortcoming of the MOOCs has to be highlighted: they do not grant formal credits. In many cases they may issue a certificate, but the added-value for the learner in the labor market or academic career is still very dubious, if not insignificant (at least for now). This means that students enroll in very demanding courses (e.g. Think Again: How to Reason and Argue, is a 12 weeks long course, taking 5-6 hours per week), but they don't have a widely acceptable recognition, in a form of credit to acknowledge their newly acquired skills and knowledge. It cannot be dismissed how valuable is what



students may have learned, but it seems contradictory to the claim of MOOC providers to offer “world class education” that, in the end, lacks recognition from most of the prospective employers and academic institutions.

2.4. The quality issue

The decisive test that the MOOCs’ revolution needs to pass is the quality issue. Quality could be a representation of how good is the teaching and learning that takes place within the educational environments created by the MOOCs. Is it reasonable to assume that the ranking leader HEIs are also capable of delivering high-quality teaching through MOOCs? Answering this question is not an easy task since the MOOCs phenomenon is so recent that there was not enough time to produce empirical evidence or perform an in-depth analysis of the impact of the MOOCs.

Quality is a tricky concept, and so, perhaps, it might help to look at the quality of MOOCs through some of the Harvey and Green's (1993) dimensions of quality: quality as exceptional, quality as transformation, and quality as fitness for purpose. First, are MOOCs trying to offer free access to world class education, on the assumption that the excellence of the inputs (top-ranking University and world top scholars) will guarantee the outstanding educational quality of their courses? In fact, since quality as exceptional would imply restrict and elitist access, the MOOCs approach is rather opposite.

Second, can we look to the MOOCs as a driver for transformation of learners? Are the MOOCs triggering the change in their students, empowering them to become social and economic entrepreneurs in their communities? Even if this objective can be found in the official missions of the MOOCs providers, the pedagogical approaches present in most MOOCs, where there seems to be a focus on transmission of knowledge in a traditional fashion, don’t suggest that the MOOCs are addressing the goal of empowering learners to change their environments (Daniel, 2012).

Finally, should the quality of MOOCs be considered in terms of fitness for purpose? If yes, whose purpose? The purposes of the providers are mostly imprecise and overly ambitious, such as “reinventing education”, and



"educate the masses". Perhaps, we can look at the learner's perspective. How can the impact of the MOOC be assessed taking a user-based approach? With staggering enrollments of hundreds of thousands, is it accurate to rely on student feedback? Wouldn't that perspective be diluted by the several motivations that students from all over the world, with different ages and qualifications might have?

These questions can be answered only when sufficient data becomes available on certain issues such as the precise purpose of the MOOCs providers, the motivation of students to enroll and engage in the courses, and the authenticity of student's participation in the MOOCs (i.e. plagiarism, cheating etc.)

3. Are MOOCs good news for Africa?

It is imperative to consider the general situation of the African higher education as a background against which the pros and cons of MOOCs shall be evaluated. The African higher education in general is challenged in many ways: very low access as compared to the rest of the world, very high inequity and various forms of exclusion, financial instability of institutions, poor learning environment and low quality of education, lack of research, absence of proper integration with labor market, and low employability of graduates are some to mention (Materu, 2007; Mohamedbhai, 2011).

On the other hand Africa has recently started to enjoy a considerable rate of economic growth. Reports forecast that Africa will continue to be the fastest growing region in the coming decades not only in its economy but also in population. By 2050 Africa's population will reach over 2.4 billion, more than double of where it is now, and will have a significant proportion of young-aged citizens (African Economic Outlook, 2015). In the meantime the continent will face fierce economic competition from other regions of the world, which it cannot stand unless equipped with the skills required for knowledge based economic advancement.

The aforementioned common limitations of the African HE, along with the fast-growing economy, with a huge demand for skill, and young-age

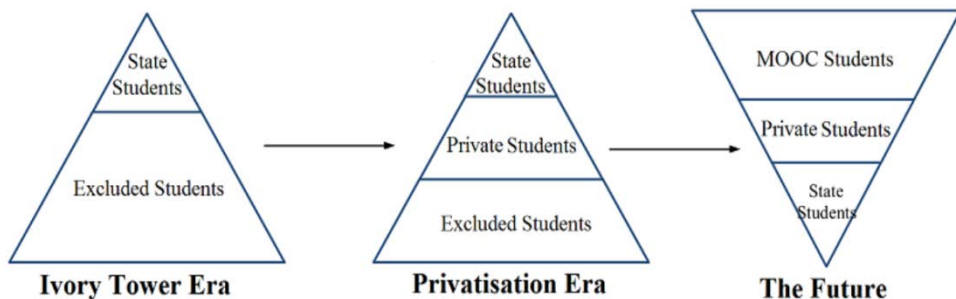
dominated population set the scene for the debate on whether or not MOOCs are good for Africa.

a) The positive view

The most common and the strongest case made for MOOCs in Africa is the potential that these courses can significantly help improve access to HE in the region. As MOOCs become more familiar and extend to courses that are more relevant to the African context, it is expected that more people would be enrolled. Since MOOCs do not have any formal requirement other than interest and the required technology, they can be a significant boost to the effort of availing affordable and equitable higher education. The fact that anyone regardless of geographic location, age, gender, ethnicity, socio-economic status, previous academic background, etc. can freely attend MOOCs, creates the strongest advantage that people, who otherwise are unable to attend formal university education, will have a fair access to higher education through MOOCs (Boga & McGreal, 2014; Liyanagunawardena, Williams & Adams, 2013; Chen, 2013). This is reflected in the ambitions of Sebastian Thrun, the co-founder of Udacity, who said that he wants to take education to where it is not currently available (Thrun & Evans, 2012).

Oyo & Kalema (2014) foresee that in the future MOOCs will take the largest share of higher education provision in Africa where private and public HEIs will follow respectively, and no exclusion will exist.

Figure 1: Perspectives of higher education access in Africa: past, present and future



Source: Oyo & Kalema, 2014, p. 4.



Another case made for the importance of MOOCs in African HE drives from the fact that the later has a serious capacity limitation that needs to be improved by all means available. MOOCs can be instrumental in improving the capacity of university staff, which in turn enables the institutions to offer more timely and relevant training for wider audience, as well as conduct problem-solving researches. It has been reported that MOOCs are attended by a significant number of [university] teachers from developing countries (Ho et al, 2015), who, indeed, might be just looking at how the professors of the most high ranking universities design and deliver courses, or might be actually interested in learning from the courses in a way that enhances their own capacity.

In Africa capacity limitation is not a problem of HEIs only. Rather it also pertains to other sectors where a critical mass of local experts to meet the demand of fast growing economy remains unmet. As a mode of Life Long Learning, MOOCs can be considered an important means for professional capacity development for those who already are on the job (Boga & McGreal, 2014). The characteristics of MOOCs such as delivery through short video, online and face-to-face discussion, and peer assessment, according to Viehland (2014), are ideally suited for professional development.

MOOCs are also credited for offering better world view for learners and reduce cultural misunderstandings. One of the most significant contributions of MOOCs is said to be the popularization of lateral interaction among learners whereby participants study through cooperation and networking via online forums (Liyanagunawardena, Williams & Adams, 2013). Studying with a large pool of students from every corner of the world through open discussions, enables students see things from various standpoints as those contributed by peers from other cultures and social domains. Such an interaction is also believed to continue between people of like-minds even after the courses are formally over. This is, of course, in addition to the new ideas and perspectives learners would be introduced to by attending courses that are designed in a different part of the world (Chen, 2013). They will be exposed to various issues, problems and perspectives through the examples, cases and exercises put as part of the courses.



b) The negative view

The contrary view as to how much MOOCs can contribute to the African HE relate in part to the nature of the courses and their mode of delivery, and in part to the readiness of the region in different aspects. The most revered advantage of MOOCs - access to the disadvantaged - has fallen in to question by data that have recently come out. A study at Pennsylvania University, for instance, showed that of the surveyed participants on 32 courses on Coursera, 83% had at least a two-year college degree, with 44.2% of participants having some form of training beyond Bachelor's degree. Moreover, men account for 56.9% of overall MOOC students, while this figure is 64% in non-OECD countries. Similarly, about 70% of MOOC students are already employed at the time of enrollment (Emanuel, 2013, p. 342). These data show that MOOCs are strengthening advantages for those who already are on the upside, than benefiting the disadvantaged.

The success of MOOCs predicates on the achievement of certain level of basic education and access to technology. In their present form, Boga and McGreal (2014) note, MOOCs require a reliable connectivity with ample bandwidth as well as knowledge of the student to work with various hardwares and soft-wares. Liyanagunawardena, Williams & Adams (2013) argued that access to technology is a prohibitive factor in developing countries since its availability is limited. Though there are certain areas where a good infrastructure is available, mostly in capital cities and major urban areas, for the most part of the rural world there is a very limited and interrupted supply of electricity and close to none internet connectivity. In some areas where internet connectivity is better, the data usage cost, often on mobile devices is so high that it devalues the free nature of MOOCs.

Another challenge presented against MOOCs in Africa is the employment effect of the courses. It is not common with all the MOOC providers to produce a certificate attesting the attendance and completion of a course by a participant. Exceptions can be noted like the Brazilian open course provider FGV Online which offers the option to print 'self- declaration of participation' statement upon successful completion of a course. Similarly, Coursera grants a certificate of completion or a verified certificate (paid for and employing anti-fraud mechanisms) upon a successful completion of its



courses with a minimum passing grade attained. However, even when certificates are available, they are not considered by the labor market as a proper credential (Yanez, 2014; Van Stam, 2013). MOOCs certificates are not also recognized by academic institutions for credit. It is possible to relate these with the lack of awareness about MOOCs among employers, the absence of clear quality control mechanism for MOOCs and/or the absence of system level mechanisms to the evaluation and accreditation of MOOCs and their consequent certificates.

Language barriers and cultural differences also contribute to the challenges of effective utilization of MOOCs as educational opportunities. Critics mention that most MOOCs are offered in English (what is deemed to be the Lingua Franca of the academic world), and hence individuals without academic level knowledge of the English Language remain excluded from the opportunity. In many African countries local languages are the dominant medium of communication, except for former British colonies and students are not competent enough in English to take online courses. They may fall behind understanding the colloquialisms in discussion forums or the learning culture in the source countries - often North America and Europe (Boga & McGreal, 2014; Chen, 2013; Liyanagunawardena, Williams & Adams, 2013). Even when translations are available, since the courses are originally designed for the typical student in the West, the contents may not accurately reflect the context and realities of Africa.

There are even those who oppose to the very idea of MOOCs claiming that they are designed just to advertize the courses of the participating prestigious universities, and to disseminate the western educational culture and values to the rest of the World. Trucano (2013) warned policymakers of developing countries to be conscious of the fact that most MOOCs originate in the urban settings of the developed countries and hence the solutions they offer may not fit to the context of the developing countries. Head (2015), on her part, notes the need to look at MOOCs deeper than just content and delivery. Issues of exclusivity in the pool of institutions and hence approaches of teaching along with the lack of diversity, all directing to the implication of 'academic colonization' require careful considerations. Czerniewicz et al, (2014) also underline the danger MOOCs pose of "exacerbating existing educational divisions and deepening the



homogeneity of global knowledge systems" (p. 122), while Chen (2013) warns of "possible loss of native culture" (p. 12).

The afore mentioned challenges add up to the general concerns regarding MOOCs: the absence of any quality control mechanism and the prevalent cheating and plagiarism; the big question of sustainability offering free courses still looming; the very low rate of completion; and pertinent pedagogical limitations (Yuan & Powell, 2013; Van Stam, 2013; Jordan, 2015; OECD, 2015).

4. Recommendations

Considering the potential benefits and challenges of effectively utilizing MOOCs in the African higher education, the following points can be noted for further improvement. Indeed some of the actions needed, such as reducing the dropout rate and contextualizing contents to different regions, are things that can be more relevantly pursued by the MOOC providers themselves. African governments on their part should work on:

- Improving access to technology - better access to technology is one of the most essential inputs for better use of resources such as MOOCs. The current distribution of access is skewed in favor of major urban centers and is limited to certain classes of society. In recent years, significant progress has been made by many African nations with respect to improving internet access (both in terms of volume and speed). However even in the places where it is accessible, it appears that use of data on regular basis is expensive. Hence, it is not just access, but access to affordable ICT technology is key.
- Improving ICT literacy - since the use of MOOCs requires basic literacy in operating hard-wares and soft-wares, the more ICT literate citizens are the better their opportunity to tap its potential benefits. More and more open resources are accumulating on the internet (not only pertinent to formal trainings but in other spheres of life as well), therefore improving ICT literacy - such as by incorporating them in lower level education and setting up alternative venues of training - would enable better use of available resources.



- Credentialing MOOC trainings - by setting a system of assessing the skills value of MOOCs and paralleling them with the local qualifications framework would encourage more people to take advantage of MOOCs. If the values of MOOCs can be assessed and certified, employers will have an easy way of considering them as training credentials in their employment process.
- Policy support for institutions - governments can also improve the use of MOOCs by offering support to those institutions (HEIs or otherwise) that run initiatives to use online resources. Oyo and Kalema (2014) who make the point that African HEIs are not currently ready for MOOCs on their own, suggest that governments should develop an all-encompassing policy support that includes the establishment of a 'National MOOC Coordination Secretariat' which will oversee: program accreditation and content development, creation of online and offline e-learning platform, and improvement of access to computers and internet.

On the other hand, HEIs can do more to maximize their benefit from the open resources of the top universities of the world. In doing so two important strategies can be emphasized:

- a) Integrating MOOCs with their current programs - instead of taking MOOCs as independent training programs on their own, HEIs can find a way to use them, and the resources associated, as supplementary resources targeted at improving their capacities. African HEIs can not only learn from the practices of the prestigious universities on how to design and deliver courses, they can also use the lecture videos, case studies, exercises, etc. as additional inputs to make their programs better. In this process, however, HEIs need to be careful in localizing contents, and properly aligning the borrowed resources with their curricular and pedagogical principles/philosophy.
- b) Devising cooperation - working in cooperation with the MOOC providers, other HEIs, private companies, government agencies, regional or international organizations (from North, South, or both) creates a better way to utilize online open resources. African HEIs can join their



resources to set up an initiative that can help them better utilize MOOCs as well as other open educational resources.

E.g.1. In 2013 Udacity in collaboration with Georgia Institute of Technology launched an online master's degree which is paid for by AT&T. AT&T, which put forward a 2 million USD seed money, will have a pool of well trained talents to hire from, as well as have its current employees participate in the training. The 1.3 million USD generated in the first year of the project is split 60-40 between the Georgia Tech and Udacity (Chafkin, 2013). This can be taken as an example for similar initiatives to take place in Africa

E.g. 2. In Tanzania, the New Economic Skills for Africa Program - ICT (NESAP-ICT) of the World Bank (launched in 2008) in partnership with the Tanzanian Government and Coursera, a pilot is launched to train young people in IT skills that are relevant to the labor market in Tanzania - curriculum aligned to fit to the Tanzanian private sector employment needs. This initiative, called Youth Employment Accelerator Program Initiative (YEAPI) targets on producing skills in IT and IT-Enabled Services relevant to Africa, focused on the use of mobile technology as medium (World Bank, 2013).

It has to be noted, however that such initiatives are also faced with various challenges including, but not limited to, lack of capacity, technological limitations, IT illiteracy of staff, unwillingness of staff, lack of proper support from government, and unfamiliarity of private companies (with such partnerships), etc.



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