THF Working Paper

MOOCs

Education for the Developing World?

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Abstract
The rise of the Massive Open Online Course (MOOC) has sent a shock wave through higher education. MOOC platforms are being developed around the world, from America to Australia. However MOOCs growth in the developed world leads to the question: what is the role of the MOOC in the developing world? This literature review will broadly examine and compare the MOOC situation within the developing nations of Africa and South East Asia, with a review of previous e-Learning developments. It will discuss the potential benefits of MOOCs for developing nations, and potential difficulties that may face those wishing to introduce MOOCs. In addition to this, possible solutions to these difficulties will be reviewed. The paper will conclude with a discussion as to the potential future for MOOCs in both Africa and South East Asia.

Introduction
Around the world many universities are embracing the powers of modern technology, with students now able to partake in higher education, up to even PhD level[1], without leaving the comfort of their homes. These e-learning developments are being seen not only in the developed world but in the developing world as well. Although e-learning in itself is not a new phenomenon, like any growing field, new aspects appear; one such aspect is the MOOC. Heralded as an education revolution[2], these courses have taken the world somewhat by storm. This storm may have left some countries behind, with one survey finding only one percent of MOOC participants come from developing countries [3]. This has led to question as to their efficacy, particularly claims such as those by Daphne Koller[4] that MOOCs support education in the developing world. In order to review these claims it is imperative to look at previous successes and failures of e-learning in developing Asia and Africa, from which the future of the MOOC and its value in the developing world can be extrapolated.

Interactive whiteboards or online courses: the meaning of e-learning
Before examining e-learning in specific contexts it is imperative to review what exactly is mean by e-learning. Although the term is used by teachers, universities and governments alike there is currently no one consensus as to the exact meaning of the term. A number of suggestions have developed over many years (which, it could be argued, reflect the increased availability and uptake of the Internet).

In 2002, Hirumi[5] suggested that the meaning of e-learning could be described as learning supported by telecommunications technology, which includes interactive whiteboards, email, video conferencing and the use of the Internet. This was followed by Charmonman[6], who outlines details of the Sloan Consortium's report stating that e-learning is learning where 80 to 100% of content is delivered via the internet. However this definition causes some argument, as it over laps with distance learning and ignores technology that does not require Internet access. This leads Brown[7] to suggest that currently there is no one agreed definition of e-learning and that when using the term, while online and distance learning must be taken into account, offline technologically aided learning must not be forgotten.

With these definitions in mind, whilst this paper acknowledges a broad view of e-learning, such as Hirumi and Brown outlined, the primary focus will be on online and distance learning with a secondary view to offline technologies. With a definition of e-learning explored, the next stage is to review how e-learning has developed in Asia and Africa, particularly the impact of this rise of technology based education in the developing regions of these continents.

E-learning in Asia
The history of e-learning in Asia is mixed, with some countries first embracing e-learning as early as 1995 in the case of China[8] and Thailand[6]. Currently there is a drive across ASEAN states, to promote e-learning (particularly the online and distance versions thereof). A number of Asian governments have, in order to keep up with modern technology and its role in the class room, developed e-learning policies. One such example is the Ministry of Education of Brunei[6], who in 2008 established an e-education flagship project, promoting e-learning throughout their education system. Another government who have embraced e-learning is Indonesia, where in 2000 the Presidential Decree number 50, developed the "telematika" which aimed to use and promote ICT in a wide range of subjects including education[9]. It would appear that across Asia, governments are supporting and promoting the use of e-learning in their respective countries[6].

Acceptance of e-learning is critical if these governmental ventures are to succeed. Studies indicated that students show a moderate level of e-learning acceptance. One such study conducted in Malaysia showed evidence that students believed themselves competent and motivated to complete an e-learning course, this belief encouraged students to study[10]. However the study also found that due in some part to technological factors, students still marginally preferred traditional face-to-face lectures. Another potential reason for some of the difficulties found by Asian students comes from the use of Western distance education, from these courses there can be up to 95% attrition[11]. Dalit suggests an improvement could be made by having a region-specific culturally sensitive approach. It could be argued that whilst there has been a drive for e-learning by governments those at the cutting edge of education can struggle with unfamiliar educative tools and processes.

A further area of difficulty in promoting e-learning is the potential for a digital divide. E-learning research papers often look to highly developed countries such as Hong Kong[12]. As such there is the potential to overestimate the current effectiveness of e-learning in developing Asia. Perhaps one paper that could best convey the potential difficulties of using e-learning methods in a developing country (in this case the Philippines), suggests that for every computer within a state primary school there are 346 students, and at secondary level there are 145[13]. It is difficult to dispute that without a computer or similar device e-learning is unobtainable. So although e-learning can have positive results, there is still a risk that it will increase the gap between developed and developing nations, as the latter struggle to keep their technology up to date.

E-learning in Africa

A number of e-learning programs have been developed in Africa, and like in Asia, have been supported at government level. Several of these projects were developed in the late 1990s across Africa to develop and encourage e-learning. One such project was the AVU (African Virtual University), first set up in 1997; this organisation was a World Bank project to assist the use of e-learning, as well as open and distance learning[14]. Today the AVU runs programs for African students in a range of topics, including four degree programs in mathematics, chemistry, physics and biology[15]. Other projects include the South African Department of Education's adoption of ICT, taking their methodology from a report of technology enhanced learning initiatives in 1997[16]. This report was used as a basis to improve teaching and learning across their education system via the use of e-learning.

Even with the successes of projects like the AVU, which have been promoting e-learning as an option for Africa for the last 17 years, there are still issues of acceptance. Leary and Berge[17], found that in a review of 150 sub-Saharan African distance education programs, paper-based traditional methods of distance learning continue to be more widely used due to sustainability and reliability than web-based methods. This said, when e-learning is introduced (often as part of an experiment to see if it is a viable method) the acceptance by those in Africa appears to be positive. One example of this found evidence that lecturers from the Open University of Tanzania who, working in teams of six, redesigned their paper-based courses to run on MOODLE, were satisfied with the process and became more confident in using technology to support their teaching[18]. The acceptance of e-learning in Africa is mixed, on the one hand many lecturers and students across Africa are happy to embrace e-learning, however difficulties of connectivity and lack of previous interaction with technology can dull this enthusiasm.

Although across Africa there have been efforts to introduce e-learning, and in some cases this has been successful[19], difficulties remain. As with Asia, there is a digital divide, and it is beginning to become apparent not just between developing African countries and developed countries, but within developing countries themselves. An example of this is Namibia where since 1995, due to a government initiative, computer education had been offered in schools[20]. However, predominately only 0.5 to 2.6% of students enrol, with only the most privileged schools being connected. Further to this within urban areas of Namibia there is a growth in Internet cafés, however the more rural areas of the county remain lacking in telecommunications infrastructure[21]. As such these areas which are already poverty stricken are being left behind in the digitalisation of education.

A brief introduction to MOOCs

A range of e-learning tools and learning methods have been developed and trialled, in developing Asia and Africa, with varying degrees of success. However in the developed world, in 2008, a new e-learning phenomenon began with the CCK08 (connectivism and connected knowledge) MOOC[22].
The MOOC remained in relative obscurity, until 2011 when Stanford University produced several MOOC courses including 'Introduction to Artificial Intelligence' and 'Introduction to Machine Learning'[23]. The Artificial Intelligence course attracted 161

000 participants[23]. It was at this point that the MOOC caught the attention of the rest of the education world. Following these very successful MOOCs a number of MOOC hosting platforms where developed, such as Coursera, edX, Udacity in the United States of America, and FutureLearn in the United Kingdom.

These platforms developed MOOCs that could be accessed, mostly for free, from nearly anywhere in the world (with a few notable exceptions, such as the block on sanctioned countries Iran, Cuban and Sudan by Coursera (http://help .coursera. org/ customer/portal/articles/1425714-why-is-my-country-blocked-). These courses can take a number of forms, falling into either the xMOOC (extended-MOOC), which is a predominately teacher-centric, passive learning style, or the cMOOC (connectivist-MOOC), which is predominately student-centric, collaborative learning style[24]. However one aspect that is apparent in both types of MOOC is the diversity of the online classroom[25], with students joining these courses from around the world.

With the rise of the MOOC as a free learning tool many have taken the chance given by these courses to learn new areas of knowledge. However there are a number of questions raised by the rapid advancement of the MOOC phenomenon. If, as has been suggested[3], MOOCs are only catering for the developed world, is there a barrier formed by the courses being created by developed countries, with lecturers often from Western universities.

MOOCs in developing Asia and Africa: The current situation
At the time of writing, in Asia academic communities are talking about MOOCs as much as those in the West. There are a number of Universities connected to the big MOOC providers, such as the Chinese University of Hong Kong [26]. Coursera has even developed certain courses which are run in Chinese as the first language[27]. However these connections remain, for the moment, with developed Asian countries such as Singapore and Hong Kong. This said in Vietnam, Dr Giap van Duong has created GiapSchool, this is the first MOOC platform in Vietnamese for the Vietnamese people[28]. MOOCs are developing in Asia; however whether these courses remain the privilege of the more economically developed countries is yet to be seen.

The current situation in Africa is rather different to that of Asia, and whilst many of the potential benefits and problems overlap, Africa is starting from a different level. Whilst there have been articles saying that Africa should no longer be a MOOC-less continent (http://openuct.uct.ac.za/blog/mooc-less-africa), very little has actually been developed. One organisation that has started to promote MOOCs in Africa is the African e-Learning Service Network (http://aelsnet.net/mooc-what-is-that/). This organisation has created a repository of courses from around the world and is inviting people to submit their own MOOCs for free hosting. However whilst the African e-Learning Service Network may promote courses from organisation such as Coursera, there are not currently any MOOCs run by African Universities.

MOOCs in developing Asia and Africa: The problems
As at least one country in developing Asia is embarking on a journey of MOOC creation, and Africa begins to embrace MOOCs from around the world, there are a number of hurdles that could hamper attempts to introduce MOOCs to these regions.

One point that is often overlooked is the size and scope of the regions involved. Africa for example is often spoken about like a country, whereas it is actually a vast continent made up of 61 countries, with a wide range of cultures and over 2000 languages[29]. This then is perhaps the first area where MOOCs could run into difficulty. Liu, Hodgson and Lord suggest that learning is the end result of activities within a community of practice, which if separated from the student's culture, loses some of its validity[30]. This causes two hurdles for MOOC success in Africa and Asia. Firstly MOOCs developed in Europe or America run the risk of being too culturally-specific to those regions to engage an African or Asian learner. In its simplest form, if one imagines for a moment one is a student in Cameroon and a MOOC lecturer talks about riding the subway to work, it is easy to see how one could become disengaged with culturally irrelevant information. Secondly were a region-specific organisation to develop region-specific MOOCs, either they must make them culturally neutral to work across Africa or Asia (and potentially not be engaging enough) or develop culturally, and potentially language, specific MOOCs and limit their potential audience.

Moving away from the social structures of the various countries and examining MOOCs at a university level, there exist factors limiting MOOCs efficacy. Whilst one survey showed pre-existing MOOC lecturers enjoyed their experience of running a MOOC, it also found they spend upwards of a hundred hours on developing their MOOC[25]. In addition Kolowich found that offline teaching often suffered from running MOOCs. Furthermore, in regards to e-learning, lecturing staff found the transition to online and digital teaching and learning difficult and time consuming[31]. If the lecturing staff are not fully accepting of e-learning, coupled with the fact MOOCs have a high workload to develop and maintain, it is possible to hypothesise that these uncommitted sentiments could apply to more recent forms of e-learning.

It is not just lecturing staff that must become au fait with MOOCs if they are to succeed, students must also embrace this form of learning. Traditionally e-learning has been met with a mixed reception by students in developing nations, in some cases finding it beneficial[32], in others finding the traditional lecture model preferable[10]. Where the MOOC is concerned there is a two tiered shift in learning styles. Firstly the xMOOC requires students to be self-motivated learners even if it does not ask then to be active learners. The second tier comes from the cMOOCs, wherein students are asked to actively partake in the learning experience, creating learning content and debating and discussing topics on online fora and social media[33,34]. These both sound positive steps for a student to take, however current educative practices must be taken into account. Taking developing Asia as our example, there has been a large shift towards student-centric learning in a number of developing Asian countries[35]. However this shift has not occurred throughout all faculties and students often learn in traditional teacher-centric passive learning environments. This then could lead to problems with students following MOOC courses, who are suddenly asked (particularly with the cMOOC) not just to listen to their lecturer as a sage on a stage, but to research and develop their own learning environment.

At present there is little, if any research data on acceptance of shifts in learning styles within MOOCs in developing nations, however it is possible to compare

classroom based pedagogical shifts. An example of this can be seen in Indonesia's Udayana University, whose law department has adopted a PBL (Problem Based Learning) student-centric learning approach[35]. When interviewing a student representative from the university, Servant found evidence that whilst they were enthusiastic toward the new method of study, the time required to actively engage interfered with life outside the course. The reaction in Malaysia was again mixed, Servant and Dewar found evidence that students agreed with PBL as a good learning system but that the instantaneous switch in pedagogy was difficult[36]. The student expressed frustration at the pedagogical shift at a tertiary level, having experienced teacher-centric learning in primary and secondary education. Whilst this applies to PBL, it is possible to compare the transition to that of a student partaking in a MOOC. From this it could be extrapolated that students may be left feeling frustrated with the new method of learning, due to the unfamiliar style and additional workload requirements. Evidence from MOOC participants in the developed world also supports this suggestion, one study found that participants of CCK08 found the student-centred nature was confusing and lacking in guidance needed for a meaningful learning experience[37].

Another potential problem with MOOCs in developing countries, and indeed developed countries, is participant retention. Existing MOOCs have seen high dropout rates, the now famous Stanford Artificial Intelligence course lost 135 000 participants giving an 85% dropout rate[38]. In developing Asia, as mentioned previously, current online distance courses from the West can have high attrition rates[11]. These two aspects taken together could lead to MOOCs with very high attrition rates, particularly if courses are non-region specific. This said, this hypothesis many not necessarily be extended to Africa. Mokwena, Mokgatle-Nthabu, Madiba, Lewis and Ntuli-Ngcobo[32] ran a study of an online distance learning courses to train health care professionals and, whilst dropout rates ranged between 14 and 28% depending on the year, this was lower than the global rate, which Mokwena et al. cite as being up to 70%.

Perhaps one of the bigger problems with MOOCs is what happens at the end of the courses. Whether MOOCs should be accredited is a discussion that shows no signs of being concluded; one study suggests that of 103 lecturers teaching MOOCs only 28% agreed they should be accredited. Learning for the sake of knowledge is a worthy pastime, however MOOCs have been cited as educating those in developing countries[4]. Yet without official recognition for the course, it could be argued that there is limited benefit for people in developing regions to take such a course. It has also been suggested[4] that exam centres could be developed for students to undertake a proctored exam following their MOOC. Two issues arise from this in both developing Africa and developing Asia; firstly, as has been mentioned, both continents are vast and travelling to these exam centres would prohibit many people from obtaining the necessary final exam. Secondly there is, particularly in Africa, a shortage of university space[4], and it seems somewhat counterproductive to develop MOOCs to improve the number of students that can be educated, if there is not enough room for them all to gain a final exam.

There is one area that could potentially limit the spread of MOOCs in Asia and Africa, and that is technology. Within Africa, there is a growing digital divide. In 2005

in sub-Saharan Africa only 1.4% of the population had a telephone connection[39]. Further strain is put on what few connections there are as rural communities tend to share a connection point rather than each household being connected. Until Internet connections can be guaranteed, e-learning and MOOCs will struggle to be chosen over traditional distance learning methods[16]. It is not only the lack of Internet connection, but computers and other devices with the capability to run MOOC courses. There are a number of organisations, such as Computers for Africa[40], who donate unwanted computers to Africa. However an issue that could potentially arise is that these computers, while working and providing computer access to people who would otherwise not have the chance, are not up to date enough to support the most recently developed MOOCs.

It is important to note, when looking at problems with introducing MOOCs to either the developing regions of Africa or Asia, that this paper has not addressed the issue of funding. When the University of London were spending £10 000 per MOOC[41], it is possible to suggest that this is the greatest barrier stopping MOOC development in less economically developed nations. However the original MOOCs (such as the successful CCK08) were developed as educational experiments without high budgets. Whilst much is written about the need for high budget MOOC production, MOOCs such as CCK08 are practical evidence that online education does not of necessity need a large budget.

MOOCs in developing Asia and Africa: The benefits
With the many problems faced by developing regions of Asia and Africa in using and developing MOOCs, it is important to review the potential benefits for these countries to use and develop MOOCs.

At first glance one could argue that with MOOCs from other nations readily available, there is little reason to develop MOOCs within developing regions. However one reason to develop local MOOCs is recognition. The University of London cite in their report on MOOC development, that developing MOOCs allowed them to reach markets which may not have been aware of their full degree range[41]. This could be of particular benefit for African and Asian universities, for example in 2003 only four African universities made it into the top 500 universities list [42], of which three were in South Africa and one in Egypt. Asia fared somewhat better, however only two developing counties from South East Asia were on the list. As such universities in developing regions need a method of promoting their skillsets globally. MOOCs could be that method. By promoting their existing course modules through MOOCs, universities from Africa and Asia can demonstrate their teaching styles and specialisms to the world. In turn this could bring not only students from the university's home country but from surrounding countries.

In creating their own MOOCs African and Asian universities could potentially address the issues discussed in section 5.0 connected to the cultural and linguistic barriers caused by relying on Western MOOCs, or those with a predominately Westernised outlook. This development of home grown MOOCs could also ameliorate the issue of cultural barriers, and assist in removing stereotypes about developing nations. It is a well-documented psychological phenomenon that with positive exposure, people's prejudices reduce[43]. As such, were universities in

developing regions to promote their ability to teach quality courses, then negative stereotypes could be lessened. In turn this creates positive interest in universities in developing regions which in theory could raise both internal and external interest in the host university.

This could bolster existing e-learning projects that are being used to promote collaboration in Africa. In Cape Verde the university of Averio (UA) began teaching online Masters in 2002; one of the key reasons behind developing their courses for an e-learning environment was to enhance collaboration between Cape Verde and other Portuguese speaking countries[44]. This could easily be extended to MOOCs, wherein university lecturers running MOOCs in both developing Africa and Asia could collaborate with their counterparts in developed countries to encourage partnerships within the academic community. This could prove to be beneficial for the developing regions as in certain cases universities struggle to find academics due to a 'brain-drain' to other more widely recognised institutions[45].

MOOCs have the potential to promote universities to those who many not have been away of the courses on offer[41]. However a physical rise in students could be difficult for universities who are already struggling to meet the pre-existing demand. Co-founder of Coursera Daphne Koller showed evidence of oversubscribed universities in Africa during a Ted lecture[4]. She also suggests MOOCs as a method of meeting this demand. Students can take high quality courses without having to travel or, in most cases, pay for the privilege. There are examples from around the world, not just Africa and Asia, of students undertaking MOOCs, where they would otherwise not be able to learn. One such tale is of a student (an 11 year old girl) from Pakistan, who was struggling to complete her course due to a block on YouTube in her home country. The MOOC community helped her access the videos via another website and she went on to complete the course[46]. This story and those like it add weight to the statement that MOOCs can provide education for those in developing regions where spaces in educational institutions may be rare. Furthermore, as the previous anecdote suggests, they can give sometimes underrepresented members of societies access to an education. Women in developing Asia and Africa risk losing out on a university education for a variety of reasons (including just being female[47]). With MOOCs becoming readily available more women and other underrepresented groups can enhance their educative prospects without having to give up commitments such as family.

Conclusion

Currently there are many obstacles that could hinder MOOC success in the developing nations of Africa and Asia. However MOOCs are being developed and these difficulties are being met head on. MOOC bring the promise of potentially allowing a large number of people access to tertiary education. There is a future for MOOCs in Africa and Asia; however this future is likely to be full of hard work, steep learning curves and a large amount of well researched trial and error.

In order for MOOCs to succeed, lessons must be learned from previous e-learning developments. These massive courses must be created in a way that does not set the technological bar so high that those in developing countries are incapable of actually accessing them. Consideration should be given to how and where these courses will run, pre-existing successful pedagogies need to be observed and adapted for the MOOC environment. For MOOCs to succeed in developing regions

of Asia and Africa, cultural issues need to be addressed. It is arguable that only when these issues are addressed will MOOCs be potentially of benefit to the developing regions of Asia and Africa.

The MOOC is not a knight in shining armour galloping into developing nations to save their students from all their educational woes. What the MOOC phenomenon can be, if applied with an understanding of technological, cultural and social boundaries in the target country, is a powerful educative tool in areas where demand for education is high and resources are low.

Note

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