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The impact and reach of MOOCs:a developing countries' perspective

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The Impact and Reach of MOOCs: A Developing Countries' Perspective

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Massively Open Online Courses (MOOCs) are a recent but hugely popular phenomenon in the online learning world. They are hailed by many as a solution for the developing world's lack of access to education because MOOCs can provide learning opportunities to a massive number of learners from anywhere in the world as long as they can access the course through Internet. However, a close consideration of the ability of learners from most developing countries to make use of MOOCs seems to contradict this rhetoric. This paper discusses features of MOOCs and looks at them from a developing countries' perspective to conclude that due to a complicated set of conditions ('access', language, computer literacy among others) prevailing in developing countries, MOOCs may not be a viable solution for education for a large proportion of people in these areas of the world. The paper further shows the need for more data on the demographics of MOOC participants from developing countries to form a better understanding of MOOCs role in educating people from developing countries.

1. Introduction

Online learning has taken a new turn with the introduction of Massively Open Online Courses (MOOCs) (Liyanagunawardena, Adams, & Williams, 2013), a recent addition to the range of online learning options. Today MOOCs are offered by many institutions; the three main MOOC portals (Coursera, EdX and Futurelearn) have between them 91 institutions as of March 10th 2013, while many more institutions are exploring the possibilities of such endeavours. The potential of MOOCs to deliver education around the globe has created a great interest not only in academic circles but also in the news, making MOOCs a contemporary buzzword (Daniel, 2012). The growing global demand for higher education places, especially in India where 40 million additional university places are estimated to be required by 2025 (Everitt, 2013), provides a strong case for MOOCs as an alternative to in-person university education[1].

Education researchers have classified the pedagogical underpinnings of MOOCs into cMOOCs (connectivist MOOCs) and xMOOCs (a more institution oriented MOOC model) (Daniel, 2012; Rodriguez, 2013) or cMOOCs and AI Stanford like courses (Rodriguez, 2012). According to Rodriguez (2012), "AI-Stanford like courses [xMOOCs] fall predominantly into the cognitive-behaviourist category (with some small components from social constructivism) and the c-MOOCs into the connectivist". Furthermore, he concludes that "c-MOOCs establish a many to many relation to develop massive interconnectedness. AI [Standford like courses] establishes a one to many relationship to reach massive numbers". cMOOCs use multiple learning spaces, tools and technologies as opposed to xMOOCs where it is conducted around a specific selected platform.

1 Udacity (www.udcity.com) and Peer to Peer University (www.p2pu.org) also offer alternative models of free to enrol higher education (or at least higher education-like) courses.

2. MOOC Participation

Available details on the locations of MOOC participants show that a large majority is from North America and Europe (Liyanagunawardena, et al., 2013). There is very limited participation from Asia and even less from Africa. For example, Miller & Odersky (2013) show the participant distribution in the MOOC 'Functional Programming Principles in Scala' graphically, both as number of participant per country and as number of participant per country relative to countries' population, which clearly illustrate the lack of participation from Asia and Africa. On the other hand there were a large proportion of participants (relative to countries' population) from Norway, Sweden, Finland and Switzerland in the MOOC. In describing MobiMOOC participants' geographic distribution, Koutropoulos, et al. (2012) state that "there was a large concentration of participation in Europe and North America with little participation in South America, Africa, Asia and Oceania". There are a variety of possible reasons for this distribution, discussed below. But it is possible that the ready 'access' to digital technologies in the Scandinavian countries encourages participation while in Africa and Asia it inhibits participation. The demographic data on participants that has been made available[2] has been insufficient to identify participants' locales (for example, capital city, other urban areas, rural villages, etc.) or the form of access they use for MOOC participation (for example, their own computer, a telecentre, friend's computer, etc.). In developing countries, while there are often pockets with good infrastructure, usually the capital city and a few other major urban areas, many of the towns and almost all of the rural areas will have hardly any significant infrastructure (often no, unreliable or part-time electricity supply for example, let alone Internet connectivity), which would typically make it difficult for participants to engage in a MOOC. In Sri Lanka, for example, Colombo (the capital) and most other cities have high speed broadband Internet connectivity provided through ADSL (Asymmetric Digital Subscriber Line), which many users consider a 'good connection'; on the other hand, the surrounding areas, in some instances less than 5km away from a city centre, have to rely on more expensive mobile broadband services, which users perceive to be less satisfactory; there are also rural villages that have coverage from neither landline nor mobile services (Liyanagunawardena, 2012).

2 It is likely though not certain that most of the data collected has been made available in at least aggregated form.

A recent qualitative study of 29 MOOC participants by Milligan, Margaryan & Littlejohn (2013) has shown that confidence, prior experience in learning in a MOOC and motivation were important determinants of engagement in a MOOC. They also found that there were some students who were frustrated and dissatisfied with the MOOC, because these students "failed to see the inherent value of learning through the network" (Milligan, et al., 2013). The literature on learner experiences in MOOCs has also shown that digital literacy, English language proficiency[3], structure of learning, the delivery environment, the perceived value of learning and critical literacies to efficiently evaluate large quantities of information play a key part in shaping a learner's MOOC experience (Fini, 2009; Kop, 2011; Kop & Fournier, 2011).

3. Completion and Participant Retention

So far MOOCs have reported very low completion rates. The website www.class-central.com, a MOOC aggregator from top universities such as Stanford, MIT, and Harvard reports that as of March 10th 2013, 132 MOOCs had been made available and completed their process (note that some of these were repeated iterations of the same basic course, with perhaps some alterations to content between iterations and with new enrolments each time though generally no limitation on re-enrolment). The breakdown of these courses according to discipline is as follows: 61 Computer Science, 21 Business and Management, 14 Humanities, 13 Science, 12 Health and Medicine, 8 Mathematics and Statistics and 3 Engineering. Out of these MOOCs 92 were offered by Coursera (www.coursera.org) while Edx (www.edx.org) offered 9 and OpenLearning (www.openlearning.com) offered 7; the MOOCs ranged from 3 weeks to 15 weeks in length. Data on completion rates of these MOOCs are not readily available. However, Jordan (2013) collated completion rates for 24 MOOCs (as of March 11th 2013), which shows that the highest completion rate achieved was 19.2% on 'Functional Programming Principles in Scala' offered by Coursera in 2012 (Sept – Nov) (Miller & Odersky, 2013). The majority of MOOCs had completion rates of less than 10%.

Participant retention is a challenge for MOOCs and there is very little known about the experiences of non-completing

3 MOOCs so far studied have been in English. However, the recent expansion of Coursera to include the University of Tokyo and other primary non-English language teaching places suggests that MOOCs are likely to be offered in other languages in the near future. As of March 2013, Coursera offers MOOCs in five languages (English, Chinese, Italian, French and Spanish).

MOOC participants (Koutropoulos, et al., 2012). In the authors' experience of a recent MOOC (as participants) showed that there is an overwhelming amount of information available to MOOC participants. Taken together the learning materials provided by the MOOC creators and discussions and posts by the massive number of participants create floods of information. As there are participants from all around the world the MOOC discussion threads never seem to stop but keep on growing 24 hours a day, making it very difficult for one to maintain full engagement. Combining this with ones' daily activities and work place commitments, it becomes an increasing challenge to be on top of things. This may be why critical literacies to efficiently evaluate large quantities of data become vital for the successful participation in a MOOC. Prior experience in participating in a MOOC may have allowed learners to develop strategies to cope with the information overload helping them to cope better in following MOOCs. However, relying on learners to develop their own idiosyncratic approaches by trial and error requires a level of perseverance that many may not have, so the development of background advice or even a 'MOOC-survival' MOOC might be highly beneficial for learners and MOOC operators.

4. Developing countries' perspective

4.1. Access to Digital Technologies

The word 'access' is used with different meanings according to the context in which it is being deployed. Here we consider 'access' in a wide perspective to cover the motivational, physical, skills and usage access to digital technologies (van Dijk, 2005). It is argued that:

> "*meaningful access to ICT comprises far more than merely providing computer and internet connections. Access to ICT is embedded in a complex array of factors encompassing physical, digital, human and social resources and relationships. Content and language, literacy and education, and community and institutional structures must all be taken into account if meaningful access to new technologies to be provided* (Warschauer, 2003, p6)".

Even though there are few success stories of minimally invasive learning such as the 'hole in the wall' experiment by Mitra (1999), there are many people who fear even touching a computer unless they get support. For example, Liyanagunawardena (2012, p251) reports of a 25 year old female teacher from Badulla, Sri Lanka who admitted "I have facilities [computers and connectivity to Internet] but don't know how to use." Therefore building digital literacy among the public is as important as providing them with physical resources.

Computer literacy levels in developing countries is still in infancy; for example, Sri Lanka one of the best performers in basic education with an adult literacy rate of 91% in 2010 (UNICEF, 2013) has only achieved 20.3% in computer literacy (Department of Census and Statistics Sri Lanka, 2009). There are different definitions of computer literacy; for example the Sri Lankan government conducted a pilot study in 2004 to estimate the computer literacy of the country. This survey considered one to be computer literate:

> "*if he/she could do something on his/her own using a computer. For example, if a child of 5 years old could play a game using a computer on his/her own, he/she was considered as computer literate*" (Satharasinghe, 2004).

Satharasinghe (2004) offered justification for this definition of computer literacy, arguing that using a definition of computer literacy from a developed country, where computer usage is much higher, does not suit Sri Lanka. This very basic ability to use computers is neither sufficient for knowledge work (which includes searching, filtering and assimilating knowledge from multiple sources), nor for participation in daily activities (such as online shopping, banking, online learning and social networking). In 2009, with the same definition for 'computer literacy', only 20.3% of Sri Lankans reached even this very basic level (Department of Census and Statistics Sri Lanka, 2009).

As discussed already, many cMOOCs use multiple learning spaces (Rodriguez, 2012); users can select and participate in learning spaces that suits them. While multiple learning spaces may appeal to experienced computer users, it may put off people who are struggling with online learning as they may have to register and learn to use different learning spaces. Some novices may even think that they will fail if they do not participate in all the learning spaces suggested. One could argue that by learning to participate in multiple learning spaces will increase a student's computer literacy levels. Conversely, if there is insufficient support available for novices learners it could depress learners' motivation as they keep struggling with each and every activity on different learning spaces, possibly leading to disengagement.

4.2. Infrastructure

Learners from developing countries come from geographical locations with various levels of infrastructural facilities. While there are places where the digital infrastructure facilities are comparable or exceeding that of modern developed cities, the vast majority of locations suffer from poor digital infrastructure:

- Liyanagunawardena (2012) describes of a female undergraduate from Sri Lanka who took two bus-rides taking 45min (one-way) to travel to an Internet access centre. On the other hand, the same study reports of students, from the capital Colombo, having high speed broadband access and do not realize that there are people in Sri Lanka facing difficulties in accessing Internet.
- In Burundi, a land locked country in the African continent, 97% of the population live without electricity (Legros, Havet, Bruce, & Bonjour, 2009); those who have access to electricity only get it on certain days of the week.
- A study on browser-loading times of web pages conducted in 12 Asian countries reported loading times that were 4 times slower than generally accepted (10 seconds (Nielsen, 1993))with frequent page-load failures (Baggaley & Batpurev, 2007).

Consider the case of Mala from Sri Lanka who endures 2 bus rides for 45 min (one-way) to go to the Internet access centre. In order to try to ensure fair distribution of resources, these facilities often impose restriction on access times, hence restricting the times Mala can use computers and access the Internet. Also consider the case of Sebesthian from Burundi who has home Internet access but has limited access to electricity. If they were to participate in a MOOC such as the "Learning Design for a 21st Century Curriculum" or OLDSMOOC offered by the Open University, which has scheduled activities for all seven days of the week (learners can engage in these activities at their own phase) it would be challenging to keep up with the course.

The download speeds of Internet connections in many of the developing countries are not sufficient to download large files or viewing streaming videos. For example, Liyanagunawardena (2012) discusses issues faced by Sri Lankan students in downloading video lectures while accessing the Internet from Internet cafes; a recent technology audit that examined the use of technology by members of a voluntary organization in 145 countries reported that for a number of people downloading a document took a considerable amount of time (Williams, Spiret, Dimitriadi, & McCrindle, 2012). While MOOC providers take lot of effort to produce high definition videos to satisfy developed countries' participants with high expectations, these videos add to the challenges faced by developing countries' participants as the videos take either a long time or fails to download. In these conditions, it is difficult to expect learners to take part in a Google+ Hangout even though they may wish to. In order to serve students from developing countries with limited bandwidth and access times, MOOCs that aspire to engage learners from these environments need to consider offering suitable engagement tools such as: lower resolution versions of videos, facilitating offline "burst connectivity" tools which download the minimum text-only information during connection, allow offline reading and composition of replies and then upload interaction in a second "burst". Such patterns of online interaction were commonplace in the late 90s when dial-up Internet access was the norm at home.

4.3. Language and Culture

Most developing countries have local languages and only a small proportion of the population is competent in an international language, generally the language of the colonial occupiers. The majority of the MOOCs today are run in English and this limits the access to people from the developing countries because not many are competent in a second language to the level to take up an online course. Furthermore, courses are offered to a global audience of culturally diverse people, thus the issues encountered with Open Educational Resources (Adams, Liyanagunawardena, Rassool, & Williams, 2013) are similar to the ones encountered with MOOCs. However, MOOCs have other challenges to overcome; for example, making dynamic discussions inclusive for all participants. Humour in one context can be interpreted differently in another. Thus one can take offence at a forum post even though it was not intended. Participants from various locations may not understand the colloquial language and idioms used in forums. Unacceptable behaviour (for example, forceful intellectual debates, feelings of participation being demanded, and rude behaviour) from some MOOC participants was reported by Mak, Williams & Mackness (2010), which led other participants to cease posting on forums. Given that people from different cultures are engaging in the dialogue, the likelihood of conflict and misinterpretations can be greater than that of offering a course in a class. Thus MOOC facilitators have a greater challenge in facilitating discussions in MOOCs as their participants are a culturally heterogeneous group. On the other hand, MOOC online discussions can

form the basis for collaboration and networking that can persist (even after the MOOC has ended) possibly providing valuable opportunities for sharing knowledge for learners from developing countries.

MOOCs have the potential to be an invaluable tool in offering education to marginalized groups in some cultures (if the other necessary conditions for participation are met). This could be females in countries such as Afghanistan where the Taliban, an Islamic fundamentalist group, ban females receiving education after the age of eight (Physicians for Human Rights, 1998); or the Dalit community (people belonging to Scheduled Cast) in Nepal where the majority of people do not have access to education or health services (Bhatta, 2012). Just as free political expression has found outlets on the Internet that are suppressed in the physical world in some countries, so could MOOCs provide an educational channel for those denied it in-person.

4.4. Re-use

In contrast to the earlier development of Open Educational Resources such as OpenCourseWare (OCW) by MIT, in which many of the visual materials (primarily course notes and lecture slides but also including some audio or audio/video of lectures and similar) were made available for re-use[4], MOOCs are generally made available under strict copyright terms: registration in the course is (money) cost-free and open (though charges are often made for additional services ranging from marking of coursework or taking exams to formal academic credit recognition) but the material is only available to be used by learners as learners on the course and not allowed to be copied, and re-used (in the original form or as revised derivative work) (Adams, 2013). For higher education policymakers, administrators and educators in the developing world while (used judiciously) OERs might offer them a basis for more cheaply developing their own fit-for-purpose (socially, culturally, and targetted to the needs and abilities of their learners) higher education systems, MOOCs may offer their learners a take-it-or-leave-it (Adams, 2013) colonial educational experience dependent on technologies only available to the already-privileged in those countries.

4 Under a non-commercial creative commons license – a heavily criticised move especially since there is considerable doubt about a common understanding of the meaning on "non-commercial" for such materials – does it mean that only non-profit education institutes can use it or does it only mean that the content cannot be packaged and sold as content, but may be used by a commercial education provider as part of their educational provision (Lowe, 2010).

Building on the over forty years of experience of the UK's Open University in providing distance education (copied and adapted to local situations more or less successfully in many countries) using gradually evolving technologies for teacher/student information transmission and interaction, and for student/student interaction, might be a more successful way for the HE sector in many developing countries to proceed, rather than assuming that the MOOCs offered by the likes of Harvard and MIT in the US or the University of Edinburgh in the UK, will provide a good return on the time (and possibly money) invested by their students. As suggested by Johansen & Wiley (2011) there may be significant financial benefits in reusing OERs from elsewhere in developing locally-suited distance-learning materials. No developing world university has yet joined any of the big MOOC platforms (the closest being one Mexican partner in Coursera: Mexico is a transition nation) and besides, being a member of the platform does not provide any rights to reuse the materials on the platform from other members. Leber (2013) reports on an initiative to start an entirely MOOC-based university in Rwanda, which would be an interesting development in the MOOC spread to developing countries.

4.5. Conclusion

'Access' to digital technologies in parts of developing countries (for example, other than the capital and metropolitan areas) are still insufficient to support online learning (Liyanagunawardena, 2012). Together with the lack of international language and computer literacy, online learning even in its simplest form becomes a challenge to a large proportion of developing countries' population (Liyanagunawardena, 2012). The use of multiple learning spaces, overload of information and cultural sensitivity are some other aspects of MOOCs that poses great challenges to learners from developing countries. Even though there is a rhetoric that MOOCs will offer opportunity to and be embraced by learners from developing countries' who currently lack direct access to learning opportunities, especially at higher levels, in reality it may well be serving only the 'privileged' in developing countries who already have 'access' to digital technologies and international language learning (Liyanagunawardena, Adams, Rassool, & Williams, 2011). There is insufficient data on MOOC participants' demographics to tease out the level of participation from rural areas of developing countries. Future data collections from MOOC participants could support further investigations of developing countries participation in MOOCs to understand the uptake of MOOCs in developing countries illuminating our understanding.

So, while some, even a significant number, of individuals in developing countries may benefit substantially from the appearance and success of MOOCs, there is significant doubt that in their current form they will provide a significant platform for expanding the higher education needs of developing countries to match the expansion of opportunities in the developed world over the last few decades.

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